

AUTHORSHIP OF COMPUTER-GENERATED WORKS IN COPYRIGHT: A NEW
MATERIALIST PERSPECTIVE

By

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ABSTRACT

Authorship of computer-generated works (CGWs) under s9(3) of the Copyright, Designs and Patents Act 1988 (CDPA) remains largely unexplored by the judiciary except for few cases such as the seminal ruling in *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24. Questions emerge in academic literature on the meaning and scope of the *arrangements* that will be deemed *necessary* for authorship under the provision.

It is contended that copyright law needs to better understand the meaning of CGWs. It is suggested that the current understanding of how copyright matter is formed corresponds with the Newtonian and Cartesian theory on matter. This results in a reductionist approach to copyright works, where works are interpreted as static ‘things or an objects’; evidenced in the very narrow judicial interpretations of the categorisation system within the CDPA. This has the potential for the judiciary to erroneously abstract material as an idea rather than as copyrightable expression, which may have future implications for the authorship of CGWs. Further, once matter is understood as a static thing or an object, it creates a dualist understanding of matter, where differences become essential in determining legal conceptualisation. Arguably, this creates a distraction from fully understanding CGWs.

This thesis posits that the ontological theory of new materialism should be adopted to better understand CGWs. This can be done by focusing on the materials and material effects of a CGW, so the processes involved in such a work become more visible. It should be noted that computer-generated materials may include computer programs. This thesis takes a forensic gaze into the legal materials that attempts to give meaning to computer materials. An

examination of the legal texts and statutory interpretive tools is conducted, providing an ontological understanding of computer matter, including CGWs, for copyright purposes.

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CHAPTER ONE

INTRODUCTION

1.1 Research context

The painting of Edmond de Belamy made by machine learning algorithms, sold for \$432,500, at Christie's New York,¹ potentially raises a question over the human contributions involved in making the work or works of a similar nature.² The algorithm called Generative Adversarial Networks (GANs) was created by Goodfellow et al, while Fautrel, an artist of Obvious Art, a Paris based art collective, selected over 15,000 portraits from the 14th to 20th century to use as datasets to train the algorithms how to paint. The algorithms learnt from the images contained in the dataset to produce the algorithm's version of an Edmond de Belamy painting.³ The painting, the first of its kind, was sold by Obvious Art at Christie's auction house. Originally estimated to sell for between \$7,000 and \$10,000, sold for a staggering \$432,000.⁴ The sale raised a question over the authorship of the painting, if litigation ever ensued.⁵ More specifically, whether authorship could be assigned to the creator of the algorithm.⁶ The same

¹Christie's 'Is Artificial Intelligence Set to Become Art's Next Medium?' (Christie's Auction, 12 Dec 2018) <https://www.christies.com/lot/artificial-intelligence-set-to-become-art-s-next-medium?lot=5528200&intcid=artwork-page&from=result&lang=en&location=usa&partner=social&search=artificial%20intelligence%20set%20to%20become%20art's%20next%20medium?__hpid=hp-artwork-page-top-carousel-artwork-item-1&__hst=c&__hsz=a> accessed 6 March 2024.

² Annsey Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 6 March 2024.

3. Annseley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2021; Ian J Goodfellow, Jean Pouget-Abadie, Mehdi Mirza and Others, 'Generative Adversarial Networks' (2014) Cornell University Library 6/2014 < [\[1406.2661\] Generative Adversarial Networks \(arxiv.org\)](https://arxiv.org/abs/1406.2661) > accessed 5 July 2023.

⁴Christie's 'Is Artificial Intelligence Set to Become Art's Next Medium?' (Christie's Auction, 12 Dec 2018) <[Is artificial intelligence set to become art's next medium? | Christie's \(christies.com\)](#)> accessed 6 March 2024.

⁵ Annsley Merelle Ward, ‘Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy’ (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 6 March 2024.

⁶ Annseley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 6 March 2024.

question was raised by academics such as Fjeld et al over generative machine learning algorithms.⁷

Traditionally, answers over human authorship may have been less complex when computer programs were visible more as a tool assisting the author rather than being more autonomous in nature. With respect to the former, which can be referred to as computer assisted works, contributions between the human and the machine may be deemed easier to ascertain.⁸ For example, *Express Newspapers Plc*, concerned a newspaper competition involving a grid containing five by five squares, with a sequence of letters. Readers could obtain a card for free and check in one of three newspapers whether the letters on their card matched a specific sequence of letters to win a cash prize.⁹ Mr Justice Whitford commented:

The computer was no more than the tool by which the varying grids of five-letter sequences were produced to the instructions, via the computer program, of Mr Ertel. It is as unrealistic as it would be to suggest that, if you write your work with a pen, it is the pen which is the author of the work rather than the person who drives the pen.

Mr Justice Whitford refusing to accept the published sequences of words were computer-generated and beyond copyright protection.¹⁰ However, a question remains whether the more

⁷ Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

⁸ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 4 <<https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

⁹ *Express Newspapers Plc v Liverpool Daily Post & Echo Plc and Others* [1985] FSR 306, 308.

¹⁰ CDPA, s178. There needs to be some human input for copyright protection of computer-generated works. See CDPA, s9(3).

advanced artificial intelligence (AI) generative works, contain sufficient human input for human authorship to be assigned to the work.¹¹

The term ‘AI’ is often used as an umbrella term, however, AI lacks an agreed definition.¹² Nevertheless, AI can be referred to as general AI or narrow AI.¹³ Noto La Diega refers to general purpose AI as strong or full AI which would replace humans.¹⁴ Abbotts suggests general AI would be capable of performing any intellectual task that a human could perform.¹⁵ However, Abbotts makes it clear that this type of AI is more hypothetical and may exist in the future.¹⁶ Noto La Diega appears to agree, which is why the author purports the focus should be on narrow AI which is already challenging copyright law.¹⁷ Unlike general AI, narrow AI refers to technologies that perform to a dedicated purpose.¹⁸ For example, an AI can operate a car, but could not play a game of chess, unless the technology was re-programmed to play chess.¹⁹ Following this line of argument, this thesis focuses on narrow AI.

¹¹ Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King’s College London Research Paper 16 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024.

¹² Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141, 1146; Guido Noto La Diega, ‘Draft Issues Paper on Intellectual Property and Artificial Intelligence’ (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind_noto_la_diega.pdf \(wipo.int\)](#)> accessed 22 April 2024).

¹³ Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141; Guido Noto La Diega, ‘Draft Issues Paper on Intellectual Property and Artificial Intelligence’ (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind_noto_la_diega.pdf \(wipo.int\)](#)> accessed 22 April 2024) 1-2.

¹⁴ Guido Noto La Diega referring to research of Ted Goertzel, ‘The Path to More General Artificial Intelligence’ (2014) 26 Journal of Experimental & Theoretical Artificial Intelligence 343 in Guido Noto La Diega, ‘Draft Issues Paper on Intellectual Property and Artificial Intelligence’ (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind_noto_la_diega.pdf \(wipo.int\)](#)> accessed 22 April 2024) 2.

¹⁵ Abbotts referring to World Intellectual Property Organisation, ‘Revised Issues Paper on Intellectual Property Policy (IP) and Artificial Intelligence (AI)’ (WIPO/IP/A1/2/GE/20/1, WIPO, 21 May 2020) <[Perma | www.wipo.int](#)> accessed 22 April 2024 in Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141

¹⁶ Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141, 1146.

¹⁷ Guido Noto La Diega, ‘Draft Issues Paper on Intellectual Property and Artificial Intelligence’ (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind_noto_la_diega.pdf \(wipo.int\)](#)> accessed 22 April 2024) 1.

¹⁸ Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141, 1146.

¹⁹ Ryan Abbott & Elizabeth Rothman, ‘Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence’ (2023) 75 Florida Law Review 1141, 1146.

AI can generate new pictures through GANs, among other related models, which can be referred to as algorithmic art.²⁰ GANs operates with two neural networks.²¹ In this instance, a neural network is akin to a biological neural network that uses neuron equivalents.²² A notable example using neural networks to create unique images is Google's Deep Dream.²³ A GAN can be described as a non-cooperative game between two neural networks, the generator and discriminator.²⁴ The generator network learns to generate images from random noise.²⁵ Noise refers to something that is seen as opposed to being heard.²⁶ The aim of the generator network is to learn to produce images which are indistinguishable from the real images that the discriminator has learnt from.²⁷

AI generative works may involve several actors in the creation of a neural network.²⁸ This is evident in the making of the Edmond de Belamy AI painting. Goodfellow et al designed the GAN, while Fautrel, an artist of Obvious Art, produced the datasets which trained GAN to

²⁰ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 198.

²¹ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 198.

²² Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated works' (2017) 2 *Intellectual Property Quarterly* 169, 171.

²³ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 202.

²⁴ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 199.

²⁵ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 199.

²⁶ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 15.

²⁷ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 199-200.

²⁸ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213.

learn to paint.²⁹ In simple terms, the software programmer or software engineer may set up the neural network as Goodfellow et al did in connection with the Edmond de Belamy AI painting.³⁰ A neural network may be trained with data from datasets, created by either machine learning engineers or researchers.³¹ For example, Google trained the neural network of Google's Deep Dream with millions of images.³² The researchers let the network decide which feature would be amplified in the image leading to unpredictable results.³³ Another example comprises of a new system for generating art which builds over GAN. Although a human artist was not involved, the training process relied upon human created images.³⁴ One of the latest generative AI in images involves Stable Diffusion and DALL-E.³⁵ Both use a diffusion model to produce an image from a training set of images.³⁶ A diffusion model is involved in two

²⁹ Christie's 'Is Artificial Intelligence Set to Become Art's Next Medium?' (Christie's Auction, 12 Dec 2018) <[Is artificial intelligence set to become art's next medium? | Christie's \(christies.com\)](#)> accessed 6 March 2024.

³⁰ Ian J Goodfellow, Jean Pouget-Abadie, Mehdi Mirza and Others, 'Generative Adversarial Networks' (2014) Cornell University Library 6/2014 < [\[1406.2661\] Generative Adversarial Networks \(arxiv.org\)](#)> accessed 5 July 2023.

³¹ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 201. At the time of submitting this thesis, datasets were also being created by bots or web crawlers scraping data off the internet. See *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3.23-cv-00201 Document 1 Filed 1/13/23 [26]. At the time of submitting the PhD, the question whether the datasets have been legally trained has not been determined.

³² Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 202. Alexander Mordvintsev, Christopher Olah, Mike Tyka, 'Inceptionism: Going Deeper into Neural Networks' (Google Blog, 18 June 2015) < [Inceptionism: Going Deeper into Neural Networks – Google Research Blog](#)> accessed 6 March 2024.

³³ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 202. Alexander Mordvintsev, Christopher Olah, Mike Tyka, 'Inceptionism: Going Deeper into Neural Networks' (Google Blog, 18 June 2015) < [Inceptionism: Going Deeper into Neural Networks – Google Research Blog](#)> accessed 6 March 2024.

³⁴ Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 202. Ahmed Elgammal et al, 'CAN: Creative Adversarial Networks Generating "Art" by Learning About Styles and Deviating from Style Norms' (June 23 2017) <[1706.07068.pdf \(arxiv.org\)](#)> 1-2 > accessed 6 March 2024.

³⁵ There are a growing number of cases that are being presented to the courts at the time of submitting this thesis. Some examples of notable cases are the following: *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3.23-cv-00201 Document 1 Filed 1/13/23; *DOE 3 and DOE 4, Individually and on Behalf of all Others Similarly Situated v Github Inc v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC* Case 3: 22-cv-07074 Document 1 filled 11/10/22; *Getty Images v Stability AI* [2023] EWHC 3090 (Ch).

³⁶ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3.23-cv-00201 Document 1 Filed 1/13/23 [21].

stages before the model can deconstruct the original image from the training set.³⁷ The diffusion model takes an image and adds noise to the image in a series of steps. At each step, the program stores how the addition of noise alters the image until the image is said to be diffused into random noise.³⁸ The second stage of the diffusion model involves deconstructing the image by removing the noise in the sequence of steps in which it was added. These stages lead to the model being able to deconstruct the image.³⁹ An example can consist of two images blended from the training datasets using the diffusion model which leads to, arguably, a new diffused source (image).⁴⁰ It should be noted the neural network was trained from datasets scrapped off the internet by bots or crawlers.⁴¹ Arguably, the more autonomous the AI systems advance, the more relevant the debate as to whether human contribution exists in creating the final work.

Some authors debate the creative choices in the neural networks. Guadamuz argues that the time is fast approaching where creative decisions will not be made by humans.⁴² Works will be more of an expression of a computer learning autonomously based on a set of parameters pre-determined by programmers.⁴³ On the other hand, Ginsburg et al argue that the

³⁷ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [68], [69].

³⁸ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [68].

³⁹ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [69].

⁴⁰ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [81-83], [86].

⁴¹ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23; *DOE 3 and DOE 4, Individually and on Behalf of all Others Similarly Situated v Github Inc v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC* Case 3: 22-cv-07074 Document 1 filed 11/10/22.

⁴² Guadamuz's work is referred to in Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213. See Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 170.

⁴³ Guadamuz's work is referred to in Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213. See Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 170.

output may be attributed to the human who designs the neural networks.⁴⁴ Although Ginsburg’s research is more recent than Guadamuz’s, perhaps, both arguments can be reconciled insofar as both academics agree there is human involvement in designing the algorithms. Benhamou and Anderijevic appear to lean more to the latter interpretation.⁴⁵

Accepting the argument that programmers are still involved in the more recent examples of generative AI gathers strength if one examines *Getty v Stability AI Ltd*.⁴⁶ Although the case deals largely with preliminary issues, it does provide an insight into the evidence presented around the development of the diffusion model.⁴⁷ Professor Farid’s unchallenged evidence associated to the long and complex process of developing and training a generative AI model led to the judge accepting ‘it supports the real possibility that human intervention of one kind or another occurred’.⁴⁸ Mr Saunders (KC) illuminates human contribution in the process of creating the neural network when he relies on a press release, dated Sept 2022, which stated that The Machine Vision & Learning Group led by computer scientist Bjorn Ommer “has developed one of the most powerful image synthesis algorithms in existence, ‘a reference

⁴⁴ Yaniv Benhamou, Ana Andrijevic, ‘The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law’ in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213; Jane Ginsburg, Luke A Budiardjo, ‘Authors and Machines’ (2019) 34 Berkeley Technology Law Journal 343, 400.

⁴⁵ Yaniv Benhamou, Ana Andrijevic, ‘The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law’ in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213.

⁴⁶ This case emerged close to the time of submitting the thesis. *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch).

⁴⁷ *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch). This argument was also made by Guadamuz. See Andres Guadamuz, ‘High Court rules that Getty v Stability AI case can proceed’ (5 Dec 2023) < [High Court rules that Getty v Stability AI case can proceed – TechnoLlama](#) > accessed 8 March 2024.

⁴⁸ *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [66].

to the ‘new stable Diffusion AI model’”.⁴⁹ The preliminary materials do seem to indicate some human involvement in creating the algorithm.

One of the potential issues with trying to ascertain authorship over AI generative works is associated to the copyright over computer programs. The contributions in the form of creating algorithms usually do not attract copyright because of their perceived functional nature.⁵⁰ This thesis attempts to re-examine algorithms by drawing on the philosophy of computer science to bring another perspective to the meaning of algorithms for copyright law to consider. This, in turn, may contribute to discussions on authorship of AI generative works.

Focusing on algorithms of a computer program for the purposes of attempting to contribute to discussion on authorship of generative AI works may have the support of other academics. For example, Aplin and Pasqualetto both argue that part of the problem with assigning authorship to an AI generated output is because of the limitations on software copyright.⁵¹ Both academics correctly note the issue that copyright rarely extends to the functions of a computer program.⁵² The hypothesis of this thesis suggests that copyright law does not reliably understand the functions of a computer program, and if re-examined, by drawing on the philosophy of computer science, more meaning can be sought for algorithmic

⁴⁹ *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [67].

⁵⁰ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229]. See also Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 recital 11.

⁵¹ Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King’s College London Research Paper 16 <<https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

⁵² Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King’s College London Research Paper 16 <<https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

materials. Ghosh is likely to support research on computer software to better understand how copyright may approach AI works. This argument is advanced as Ghosh contends:

that at a minimum recognising copyright of artificial intelligence as just software connects the ongoing debates over robot authors and the death of intelligence property to a more long-standing debate over the proper treatment of software under intellectual property laws.⁵³

Ghosh emphasising the importance of continuing with the copyright debate on computer software for the purposes of AI. This is insofar as examining computer software can help bridge the gap between arguments which suggest copyright law does not have the elasticity to deal with AI. Moreover, it provides a direction on how copyright may deal with AI especially as AI is in direct conflict with the anthropocentric premise that dominates copyright law. Although Ghosh uses Mr Justice Thomas's dissenting judgment from *Google v Oracle*⁵⁴ to advance an argument around transformative use in AI outputs,⁵⁵ this thesis focuses on re-examining algorithms of a computer program for the purposes of authorship of an AI generative work.

Scholarly literature indicates how copyright law may approach AI generative works. An argument can be advanced that AI entities should be assigned authorship. Teubner raises this argument by drawing on analogies with corporate actors.⁵⁶ However, Noto La Diega,

⁵³ Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225.

⁵⁴ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Breyer J).

⁵⁵ Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 242.

⁵⁶ Guido Noto La Diega, 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind noto la diega.pdf \(wipo.int\)](#)> accessed 22 April 2024) 11; Gunther Teubner, 'Rights of Non-Humans? Electronic agents and Animals as New Actors in Politics and Law' (2006) 33 *Journal of Law and Society* 497, 509-521.

Guadamuz, Aplin and Pasqualetto correctly observe the legal obstacles with this suggestion.⁵⁷ The law would deviate away from personhood and the anthropocentric nature of copyright law.⁵⁸ Although the latter can be challenged for its binary nature, caution needs to be taken with this approach as it involves assigning rights and responsibilities to an AI entity, which can impact on a range of other legal areas. Moreover, giving legal personality to AI could be used to shield a human from legal accountability.⁵⁹ Further, if legal personality in an AI system was accepted, the approach is likely to lead to very complex philosophical debates that are not easily answered on the meaning of creativity, including machine creativity.⁶⁰ Therefore, it is not likely that the answers on how copyright can address AI generated works lie in allocating rights to computers.⁶¹

Other eminent scholars engage in discussion on the best approach to be taken for copyright of AI generative works. Bonadio and Lucchi recognise debate exists about the degree of human involvement required in a work for authorship to be attained under English law.⁶² The authors suggest the way forward may include relaxing the human authorship requirement

⁵⁷ Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 *European Intellectual Property Review* 12, 19; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 173; Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 17 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024.

⁵⁸ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 17 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024. See Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 173. A spokesperson, Bianca D'Orsi, from the Intellectual Property Office told the Guardian that animals cannot own copyright. Samuel Gibbs, 'Money Business: Macaque Selfie Can't be Copyrighted, Says US and UK' (The Guardian, 22 Aug 2014) <[Monkey business: macaque selfie can't be copyrighted, say US and UK | Photography | The Guardian](#)> accessed 22 March 2024.

⁵⁹ Guido Noto La Diega, 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) <[ind_noto_la_diega.pdf \(wipo.int\)](#)> accessed 22 April 2024) 11.

⁶⁰ Elena Cooper *Art and Modern Copyright* (CUP 2018) 19-103; Margaret A Boden, *The Creative Mind Myths and Mechanisms* (2nd ed, Routledge 2005).

⁶¹ At the time of submitting the thesis.

⁶² Enrico Bonadio and Nicola Lucchi, 'How Far Can Copyright be Stretched? Framing the Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 *Intellectual Property Quarterly* 115, 131.

which would mean that the law would focus more on copyright works.⁶³ This suggestion is unlikely to be successful unless it was part of a *sui generis* law. This is due to the United Kingdom (UK) having international obligations to follow the provisions within the Berne Convention and the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).⁶⁴ Both instruments refer to nationality in the context of copyright, where an inference can be made about a human authorship requirement. Relaxing human authorship in favour of works may be problematic as the suggestion does not align with international copyright obligations so other suggestions need to be examined.

Schafer et al assert that there should be a *sui generis* law produced in England which would give less protection to AI generated works than human generated works.⁶⁵ The proposal is likely to have the support of de Cock Buning, as the author also moots the idea of a *sui generis* system but for the European Union (EU).⁶⁶ The arguments that a *sui generis* system provides flexibility and does not stretch copyright principles beyond what is necessary⁶⁷ has merit. This system appears to be an attractive system as it may prevent authorship, for example, from being stretched too far. Nonetheless, Aplin and Pasqualetto question the need for a *sui generis* law from a utilitarian or economic standpoint citing evidence from the European

⁶³ Enrico Bonadio and Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing the Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 Intellectual Property Quarterly 115, 131.

⁶⁴ The Berne Convention refers to authorship and nationality so inferences can be drawn about human authorship. See Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) Art 3. See also the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336, Art 3.

⁶⁵ Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) CREATE 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024.

⁶⁶ Madeline de Cock Buning's research was cited in Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024. See also Madeleine de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 531–532, 534.

⁶⁷ Madeleine de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar, 2018) 532.

Commission.⁶⁸ The latter suggesting the *sui generis* database right failed to boost the EU database industry.⁶⁹ Whether having a *sui generis* system would boost the technology industry is perhaps too early to comment on. However, the theoretical stance taken in this thesis would be opposed to demarcating between a human and a machine to better understand AI generative works for copyright purposes.⁷⁰

It may be preferable not to protect AI generative works. For example, this suggestion has been mooted by Bonadio et al, assuming the works are fully autonomous, and cannot be protected by copyright.⁷¹ The reasoning seems logical as the works would fall into the public domain due to being authorless.⁷² Since machines do not need incentives by copyright law, protection would not be required.⁷³ However, the authors note that denying copyright protection may decrease incentives to invest in AI generative works which may have implications for medical, artistic, and other sectors.⁷⁴ The latter argument is corroborated by

⁶⁸ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

⁶⁹ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

⁷⁰ A new materialist perspective attempts to understand legal matter (copyright on AI generative works) by appreciating differences but not allowing the legal matter to be shaped by the differences. Therefore, it may be reasonable to argue a *sui generis* system manifests out of differences between machines and humans. For a more detailed explanation of new materialism, see notable works such as Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 2; Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 809; Rosi Braidotti, *The Posthuman* (Polity 2013) 56.

⁷¹ Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 *International Review of Intellectual Property and Competition Law* 1174, 1189. CDPA, s178.

⁷² Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 *International Review of Intellectual Property and Competition Law* 1174, 1189.

⁷³ Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 *International Review of Intellectual Property and Competition Law* 1174, 1189.

⁷⁴ Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 *International Review of Intellectual Property and Competition Law* 1174, 1189.

the reasoning from Kariyawasam.⁷⁵ There appears to be a logic in the authors' arguments especially around the lack of incentives to invest in works if no protection is given. However, the incentive argument is difficult to establish. A speaker at a World Intellectual Property Organisation (WIPO) conference asserted that copyright protection may not be needed to incentivise developers, referring to the rapid growth in the AI sector as evidence.⁷⁶ Nonetheless, it is not clear whether developers in the future may want to rely on copyright law, should litigation ensue. Regardless of the incentive argument, technology does not appear to be fully autonomous for a sustainable argument that generative AI could be considered authorless.⁷⁷

Moreover, questions emerge around whether the work-made-for-hire doctrine could apply to generative AI works. Works prepared by an employee, or a computer, may be authored by the employer, according to Bridy.⁷⁸ S11 (2) of the Copyright, Designs and Patents Act (CDPA) states that an employer is the first owner of a work which is made by an employee in the course of employment.⁷⁹ The legality of this proposal may be called into question when viewed against the legal reasoning by Lord Justice Arnold in *Thaler*.⁸⁰ Although the legal reasoning is associated to patent law, it is contended the legal issue is of a similar nature that can be applied to challenge Bridy's proposals. The type of reasoning by Bridy is akin to an argument presented by Professor Abbot in *Thaler* which presupposes that a machine has rights which can be transferred to the owner of a computer. Lord Justice Arnold states that 'there is

⁷⁵ Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 International Journal of Law and Information Technology 279, 286.

⁷⁶ WIPO 'WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence' (WIPO Geneva Switzerland 4 Nov 2020) < [Summary of Second and Third Sessions \(wipo.int\)](https://www.wipo.int/pressdoc/eng/summary/summary_2020_11_04.htm) > accessed 21 March 2024).

⁷⁷ This is likely to be the case at the time of completing this thesis. See *Getty Images (US)*, *Getty Images International UC*, *Getty Images (UK) Ltd*, *Getty Images DEVCO UK Ltd*, *ISTOCKPHOTO LP*, *Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [66].

⁷⁸ Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 Columbia Law Journal and Arts 395, 400

⁷⁹ CDPA, S11(2). This applies to works such as literary, dramatic, musical, artistic and film.

⁸⁰ *Thaler v Comptroller General of Patents Trade Marks and Designs* [2021] EWCA Civ 1374 [2021] RPC 19.

no rule of law that a new intangible produced by existing tangible property is the property of the owner of the tangible property’.⁸¹ Machines do not possess rights,⁸² therefore, the suggestion that a computer can pass authorship to an employer is not possible at the time of writing this thesis. However, Bridy quite rightly explains that the works-for-hire doctrine has been remodelled in the UK and framed as s9(3) of the Copyright Designs and Patents Act 1988. The provision states.

“in the case of literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken”.⁸³

Effectively, the law in the UK has made explicit provision for computer-generated works (CGWs) by attributing authorship to the person that made the *arrangements necessary* for the creation of the CGW. S9(3) avoids the problematic area of giving rights and responsibilities to machines therefore may be an attractive option to explore in more detail.

1.2 Authorship of CGWs under s9(3) of the CDPA

S9(3) of the CDPA is an attractive solution on how copyright law should address CGWs. The provision allows one to find a human author for a CGW which avoids contentious debates on non-human rights. By doing so, the provision aligns more with existing copyright law and the need for human authorship.⁸⁴

⁸¹ *Thaler v Comptroller General of Patents Trade Marks and Designs* [2021] EWCA Civ 1374 [2021] RPC 19 [137].

⁸² *Thaler v Comptroller General of Patents Trade Marks and Designs* [2021] EWCA Civ 1374 [2021] RPC 19 [136], [137].

⁸³ Copyright, Designs and Patents Act 1988, S9(3).

⁸⁴ The Berne Convention refers to authorship and nationality so inferences can be drawn about human authorship. See Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) Art 3. See also The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336, Art 3.

S9(3) acts an exception to the law insofar as CGWs are works without a human author, and therefore do not attract copyright protection.⁸⁵ S9(3) assigns authorship to the person who is responsible for the *arrangements necessary* for the creation of the work.⁸⁶ In other words, s9(3) presupposes some human input.⁸⁷ However, indications from *Getty v Stability AI Ltd* suggest that AI systems are not fully autonomous, although this may change in the future.⁸⁸ Academics such as Guadamuz and Schafer et al are keen proponents of the provision.⁸⁹ Burk, although an academic based in the United States of America (US), finds s9(3) so appealing, he advocates for a similar provision to deal with patents and AI-generated patents for the US.⁹⁰ The academics' support can largely be attributed to the way the provision is used to allocate rights rather than in the strictest sense dealing with authorship. Burk is firmly of the view that there are no credible reasons for recognising AI systems as autonomous as doing so would preclude from the law all human interactions that led to building the system. He uses an interesting analogy of a dishwasher and how it would be erroneous to understand the machine as autonomous as this would be omitting the human input in the manufacturing process.⁹¹ Although it may be argued that the analogy used by Burk is not close enough to explain how the more advanced AI systems operate, the analogy still aligns with the preliminary judgment

⁸⁵ CDPA, s178.

⁸⁶ CDPA, s9(3).

⁸⁷ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 15 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

⁸⁸ At the time of completing this thesis. *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [66]

⁸⁹ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 186; Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) *CREATE* 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024.

⁹⁰ WIPO 'Conversation on Intellectual Property (IP) and Frontier Technologies' (WIPO Geneva, 21, 22 September 2022) < [wipo_ip_conv_ge_2_22_3.pdf](http://www.wipo.int/ip/2022/09/22/3.pdf) > accessed 22 March 2024.

⁹¹ WIPO 'Conversation on Intellectual Property (IP) and Frontier Technologies' (WIPO Geneva, 21, 22 September 2022) < [wipo_ip_conv_ge_2_22_3.pdf](http://www.wipo.int/ip/2022/09/22/3.pdf) > accessed 22 March 2024.

on how the latest Stable diffusion model appears to operate.⁹² Moreover, s9(3) has been adopted in other common law countries such as New Zealand and India.⁹³ Further, similar provision is also visible in the laws from Hong Kong and Ireland.⁹⁴ As other countries have adopted parallel provision to s9(3), this can be used as supportive evidence for continuing to use the law, although it is acknowledged some ambiguity exists within the provision.

S9(3) provides statutory provision on CGWs by focusing on the *arrangements necessary* for the creation of the work, although the provision omits any further details regarding the remit. For example, the provision is silent on originality. Originality in the sense of being the author's own intellectual creation.⁹⁵ The Court of Justice of the European Union (the CJEU) elaborated on the meaning of the author's own intellectual creation by stating that the author needs to express their creative abilities by making free and creative choices. By making these choices, the author stamps the work with their 'personal touch'.⁹⁶ Adhering to the CJEU decision has been confirmed in the recent English case of *TJH Systems Ltd*.⁹⁷ Academic debate is divided on whether s9(3) includes an originality component which may be problematic for the judiciary in future litigation. Guadamuz contends the provision is likely to exclude originality.⁹⁸ The author draws on a Hansard report at the time of creating s9(3) which explains why moral rights are exempted from the provision. The report states that a personal

⁹² At the time of submitting the thesis. *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [66], [67], [75].

⁹³ Guadamuz makes this point. Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 186. See also The Copyright Act 1994, s5(2)(a); The Copyright Act 1957, s2(d)(vi).

⁹⁴ Copyright Ordinance cap 528, s11(3); Copyright and Related Rights Act 2000, s21(f).

⁹⁵ Case C-145/10 *Painer v Standard Verlags GmbH* [2011] ECR I-12533 [89].

⁹⁶ Case C-145/10 *Painer v Standard Verlags GmbH* [2011] ECR I-12533 [92].

⁹⁷ *TJH Systems Ltd, Optionnet LLP and Sheridan, Sheridan Options Corp* [2023] EWCA Civ 1354 [15],[16]

⁹⁸ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176; HL Deb vol 493, col 1305 (25 February 1988).

creative effort is required for one to have a moral right, which does not apply to CGWs.⁹⁹ According to Guadamuz, the Hansard report strongly indicates no original input in CGWs is required for authorship under s9(3).¹⁰⁰ Conversely, McCutcheon, seems to suggest that originality could be applied for the purposes of s9(3) if the human author of a CGW can be identified.¹⁰¹ McCutcheon's stance appears to align with De Wachter's argument, as the latter purports that the CDPA should be read together with Directive 2009/24 on the protection of computer programs.¹⁰² Art 3 of the Directive refers to originality in the sense that the work should be the author's own intellectual creation.¹⁰³ Following this line of argument, originality should be read into s9(3).

Weight can be given to each of the above arguments which suggests ambiguity exists within s9(3). For example, Guadamuz's argument is supported by a Hansard report relating to s9(3). Nevertheless, the conclusion Guadamuz draws on the absence of originality from the provision is from a discussion around moral rights in a CGW as opposed to a detailed analysis on whether originality was intended. Further, it is one Hansard report from Lord Beaverbrook, which is unlikely to be representative of all members of the parliamentary debate. It is noteworthy that the only case which applies s9(3), namely, *Nova*, did not consider the originality component as part of the decision for attributing authorship to the human author of

⁹⁹ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176.

¹⁰⁰ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176.

¹⁰¹ Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 Melbourne University Law Review 46, 51. McCutcheon's work is also mentioned in Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 Cambridge Law Review 62, 77 and Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 15 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

¹⁰² Joren De Wachter, 'Software Written By Software – Is Copyright Still the Appropriate Tool to Protect IT?' (2010) 11 Computer Law Review International 12, 16.

¹⁰³ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42

a CGW.¹⁰⁴ Although the decision in *Nova* on CGWs was from a Court of First Instance, therefore, without further authority on the matter, it is reasonable to argue that there is a lack of certainty on the issue. Moreover, there is logic to McCutcheon's contention that originality may be required for s9(3), as some other works, although not all, need to be an original expression to attract copyright under the CDPA.¹⁰⁵ Perhaps, the argument is strengthened when one considers De Wachter's reasoning as the CDPA should be read together with Directive 2009/24.¹⁰⁶ And although the UK has left the EU, the directive is still binding.¹⁰⁷ As s9(3) is silent on the issue, there is a degree of uncertainty around the need for originality.

It is contended the lack of clarity over the originality component in s9(3) is not fatal to pursuing the research in this thesis. The research associated to determining whether a creator of an algorithm can be assigned authorship considers the scholarly literature on the originality issue. For example, if the argument that originality is not required, is accepted, Guadamuz asserts the programmer is the author under s9(3).¹⁰⁸ If this interpretation is correct, this does not address whether the creator of the algorithm, like in the creation of the Edmond de Belamy painting, could be assigned authorship, as the creator may be a separate individual from the programmer. It is hoped that the research in this thesis attempts to address this gap. However, if the provision requires an originality component, the creator of an algorithm may find it very difficult to be attributed authorship due to the perceived lack of originality in the material. Both Aplin and Pasqualetto corroborate that this is a concern and part of the existing problem with

¹⁰⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹⁰⁵ Literary, dramatic, musical and artistic works need to be originally expressed. CDPA, s1(1)(a).

¹⁰⁶ Joren De Wachter, 'Software Written By Software – Is Copyright Still the Appropriate Tool to Protect IT?' (2010) 11 *Computer Law Review International* 12, 16.

¹⁰⁷ Directives have been retained, following Brexit, unless explicitly overruled by legislation. See The European Union (Withdrawal) Act 2018, s2.

¹⁰⁸ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 176.

determining how copyright can respond to AI generative works.¹⁰⁹ As this thesis focuses on whether the functions of a computer program, which includes algorithmic material, is reliably understood, the research may be used to also help address this issue.

Concern is also raised regarding how proximate the *human arrangements* need to be in relation to the output that is generated for s9(3) to apply. This concern grows in the face of more autonomous technology. Examining the case law on the historical legal understanding of arrangements for copyright purposes may be a prudent place to start. Mr Justice Brett in *Nottage and Another v Jackson* provides an *obiter dicta* statement about the proximity of arrangements that are required in the production of a photograph for copyright:

The nearest I can come to is that it is the person who effectively is, as near as he can be, the cause of the picture which is produced – that is, the person who has superintended the arrangement, who has actually formed the picture by putting the people into position, and arranging the place in which the people are to be – the man who is the effective cause of that.¹¹⁰

The arrangements can extend beyond making and operating the device. Although not a case on CGWs, difficulties around proximity were present as far back as 1883 as they are in modern day copyright. Mr Justice Brett states ‘neither of them make the picture because, after all, this is done by the sun’,¹¹¹ referring back to how photographs were traditionally made, leaving the focus on the arrangements for authorship akin to s9(3) on CGWs.

¹⁰⁹ Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King’s College London Law School Research Paper 16 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024.

¹¹⁰ (1883) 11 QBD 627, 632 (Brett, MR).

¹¹¹ (1883) 11 QBD 627, 631 (Brett MR).

Proximity is an issue that was mentioned on several occasions throughout the judgments in *Nottage*.¹¹² In discussing whether *Nottage* and *Kennard* (the appellants) could be assigned authorship, Lord Justice Bowen referred to the lack of physical proximity between the appellants and the production of the photographs. The lack of proximity was due to the appellants hiring photographers to produce the photographs.¹¹³ Further, proximity as a prerequisite for establishing authorship is corroborated in Mr Justice Brett's judgment.¹¹⁴ Mr Justice Brett explicitly refers to physical locations, whereby the owners could be in Scotland or may live 200 miles away, or even visit the shop once a week where the photograph is being produced.¹¹⁵ And although Mr Justice Brett confesses that he 'cannot be very clear about it, all I can do is to see who is the nearest person—the nearest like the author of a painting or the author of a drawing;'¹¹⁶ being in close proximity to the production of a work is tantamount for authorship to be assigned. However, as the judgment pre-dates algorithms, it may not provide the answers to the emerging questions regarding AI generative works.

In the case of AI generative works, Lambert raises the issue of proximity when works are produced at a distance or even across traditional boundaries of legal jurisdiction from the arrangements made by the human.¹¹⁷ *Kariyawasam* also raises this as a concern noted by other academics.¹¹⁸ *Nova*, the only case to apply s9(3), is over seventeen years old and does not illuminate understanding on this issue due to the technology at the time which was central to the litigation on the application of s9(3). *Nova* was concerned with whether the designer's *arrangements* were deemed *necessary* for authorship of the composite frames in a computer

¹¹² (1883) 11 QBD 627.

¹¹³ (1883) 11 QBD 627, 637.

¹¹⁴ (1883) 11 QBD 627, 637.

¹¹⁵ (1883) 11 QBD 627, 631.

¹¹⁶ (1883) 11 QBD 627, 632.

¹¹⁷ Paul Lambert, 'Computer Generated Works and Copyright: Selfies, Traps, AI and Machine Learning' (2017) 39 *European Intellectual Property Review* 12, 17.

¹¹⁸ Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 *International Journal of Law and Information Technology* 279, 288.

pool game which were computer-generated.¹¹⁹ However, not only was the human input in the arrangements distinct from the computer, but also the arrangements were proximate to the output. For example, the designer created bitmap files using computer tools such as a mouse, notional brushes, and a screen colour palette. The images were then stored in the computer memory.¹²⁰ From these bitmap images, the program developed the composite frame by using a bitmap image of a table and overlaying it with images of balls and a cue. Images were stored in several different orientations, which were selected by the program to create an image on the screen.¹²¹ Not surprisingly, the (then) Mr Justice Kitchin held the designer could be assigned authorship under s9(3) as the designer had devised the appearance, the rules and logic of the frames, coupled with writing the computer program.¹²² As the decision involves ‘very simple computer generation of content’,¹²³ to borrow words from Dickenson et al, the judgment does not help address how the courts may deal with proximity issues when more advanced AI systems are used.

Although this thesis does not delve into proximity issues as part of the remit, it is prudent to make a few observations to set this thesis into context, whilst acknowledging further research in the future may need to be conducted. The reasoning by Bonadio et al may be useful, as the academics purport that s9(3) is a pragmatic provision in determining authorship of a CGW. This is insofar as the provision establishes a link between the human and the work

¹¹⁹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹²⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [101].

¹²¹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [102].

¹²² *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹²³ Julia Dickenson, Alex Morgan, Birgit Clark, ‘Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications’ (2017) 39 *European Intellectual Property Review* 457, 459.

resulting from the human's technical arrangements and activities.¹²⁴ McCutcheon corroborates the latter argument insofar as correctly observing s9(3) does not include the words *causing* the work to be created but stipulates making the *arrangements necessary* for the creation of the work.¹²⁵ Establishing a link between the input and the output appears also to align with Aplin and Pasqualetto's research that s9(3) is a provision for assigning rights rather than the author having a direct connection to the work.¹²⁶

Similarly, Paton and Morton's reasoning offers further support that a pragmatic approach may be taken to interpreting s9(3).¹²⁷ The authors substantiate their reasoning by referring to different statutory provisions within the CDPA that contains similar language to s9(3). For example, the authors draw attention to how the author of a sound recording or film is the producer.¹²⁸ Under s178 of the CDPA a producer is deemed to be the person who undertakes the *arrangements necessary* for the sound recording or the film.¹²⁹ With similar provision to s9(3), one can appreciate Paton and Morton's argument. Moreover, the authors offer a further suggestion that would extend authorship to even a person who has the idea for the CGW akin to case-law on film and sound recording.¹³⁰ This means that the person would not necessarily be the one who undertook the arrangements for the financing or the shooting,

¹²⁴ Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence' (2022) 53 *International Review of Intellectual Property and Competition Law* 1174, 1189.

¹²⁵ Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 *Melbourne University Law Review* 46, 67. See also CDPA, s9(3).

¹²⁶ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 15 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

¹²⁷ Paul Marton, Jeremy Morton, 'Copyright Protection for Software Written by Software' (2011) 12 *Computer Law Review International* 8, 10.

¹²⁸ Paul Marton, Jeremy Morton, 'Copyright Protection for Software Written by Software' (2011) 12 *Computer Law Review International* 8, 10.

¹²⁹ CDPA, s178.

¹³⁰ Paul Marton, Jeremy Morton, 'Copyright Protection for Software Written by Software' (2011) 12 *Computer Law Review International* 8, 11.

cutting, editing the film or sound recording.¹³¹ Kariyawasam, citing M de Cock's research, also advocates for an expansive interpretation of s9(3), that may be suitable for fully autonomous AI-generated works.¹³² Kariyawasam notes the author could include the entity who makes the financial investment.¹³³ On this basis, there is a sense to the hypothetical reasoning by Dickenson et al insofar as the judiciary are more likely to interpret the existing provision broadly in order to give effect to its intent.¹³⁴

The research above should help address the gap exposed around proximity in *Nova*, whilst attempting to provide some direction on how to answer Lambert's question. Moreover, the research can be used to advance an argument that if a link can be established between the human input and the output, then it may be possible for a creator of an algorithm to be assigned authorship of a CGW. This is despite the human input being possibly perceived to be far down the line from the CGW. If the argument is accepted that there does not need to be a direct connection to the CGW, a lot of the suggestions in the paragraph above may indicate authorship could also be assigned to the creator of an algorithm. However, the suggestions above which could be used to underpin an argument for authorship to be assigned to the creator of an algorithm hinge on originality being absent from s9(3). Accepting this argument on originality is by no means certain according to the scholarly literature. Potentially, this leaves designers

¹³¹ Paul Marton, Jeremy Morton, 'Copyright Protection for Software Written by Software' (2011) 12 Computer Law Review International 8, 11.

¹³² Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 International Journal of Law and Information Technology 279, 290 citing M de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology By Autonomous Creation' in W Barfield and Ugo Pagallo (eds) *Research Handbook on The Law of Artificial Intelligence* (Edward Elgar 2018) 511–35.

¹³³ Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 International Journal of Law and Information Technology 279, 290 citing M de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology By Autonomous Creation' in W Barfield and Ugo Pagallo (eds) *Research Handbook on The Law of Artificial Intelligence* (Edward Elgar 2018) 511–35.

¹³⁴ Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 European Intellectual Property Review 457, 459.

of algorithms in a precarious legal position over the application of s9(3), which this thesis hopes to address.

As observed previously, *Nova*, did not deal with the more advanced AI systems, which can involve several actors in the creation of the neural networks, including the creator of an algorithm,¹³⁵ More specifically, there was no clear opportunity to examine whether the creator of an algorithm could be assigned authorship as the case focused on the designer who wrote the program. It should be noted that the (then) Mr Justice Kitchen did consider how the designer devised the rules and logic by which each frame was generated. However, as there was no explicit mention of algorithms in the judgment, it seems reasonable to conclude that this remains uncertain. The interest in addressing this question gathers pace when one examines the reasoning from Fjeld et al, Ward in addition to Aplin and Pasqualetto.¹³⁶

Despite advocating for a re-examination of algorithms for the purposes of addressing authorship of CGWs, the Intellectual Property Office envisage no changes to copyright law are required for CGWs.¹³⁷ The reasons provided are associated to evidence which suggests the works are not harmful and that a change is not needed as AI is in its early stages.¹³⁸ The report was published in October 2021 and updated in June 2022. The findings in the report are not

¹³⁵ This was also noted by Olways A Kinsara, ‘Clash of dilemmas: How should UK Copyright Law Approach the Advent of Autonomous AI Creations?’ (2021) 6 Cambridge Law Review 62, 76.

¹³⁶ Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King’s College London Law School Research Paper

16< <https://ssrn.com/abstract=3419481>>accessed 29 March 2024. See Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, ‘Art and the Science of Generative AI’ (2023) 380 Science 1110, 1111; Annsley Merelle Ward, ‘Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy’ (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>>accessed 21 March 2024.

¹³⁷ Intellectual Property Office, ‘Artificial Intelligence and IP: Copyright and Patents’ (29 Oct 2021) < [Artificial Intelligence and IP: copyright and patents – GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/99999/artificial-intelligence-and-ip-copyright-and-patents.pdf)>accessed 21 March 2024.

¹³⁸ Intellectual Property Office, ‘Artificial Intelligence and IP: Copyright and Patents’ (29 Oct 2021) < [Artificial Intelligence and IP: copyright and patents – GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/99999/artificial-intelligence-and-ip-copyright-and-patents.pdf)>accessed 21 March 2024.

likely to be representative of the current state of technology and therefore caution needs to be taken when considering this report.

Conversely, the World Intellectual Property Office (WIPO) consulted on how copyright law should respond to the challenges from AI generative works.¹³⁹ WIPO invited members of the legal profession and academia, along with the technology sector, to address the challenges. Weibel, Ogada and Guadamuz advocate for returning to copyright values to understand the meaning and function of authorship in a digital era.¹⁴⁰ Both certainty and harmonisation were also viewed as important when proposals for reform were being mooted.¹⁴¹ As part of attempting to address whether the creator of an algorithm can be assigned authorship under s9(3), the thesis applies utilitarian values that can be traced all the way back to *Donaldson v Beckett*.¹⁴² These values consist of promoting learning and educating the public, and are paramount during the legal analysis conducted on algorithms, as algorithms need to be available for interoperable purposes. For example, algorithms only available in a limited number of ways should be freely on offer for other programmers to use. Returning to copyright values is important and is contemplated when examining the direction the law should take on CGWs.

Despite the Intellectual Property Office findings, having a more meaningful understanding of algorithms is likely to contribute to the scholarly literature on the authorship

¹³⁹WIPO ‘WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence’ (WIPO Geneva Switzerland 27 Sept 2019). Another session took place in Nov 2020, with mixed comments on how copyright may approach the subject of authorship of AI-generated works. See WIPO ‘WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence’ (WIPO Geneva Switzerland 4 Nov 2020) < [Summary of Second and Third Sessions \(wipo.int\)](#) > accessed 21 March 2024).

¹⁴⁰ Beat Weibel, Tom Ogada and Andres Guadamuz ‘WIPO Conversation on Intellectual Property (IP) and artificial Intelligence’ (WIPO Geneva Switzerland 27 Sept 2019).

¹⁴¹ Beat Weibel, Tom Ogada and Andres Guadamuz ‘WIPO Conversation on Intellectual Property (IP) and artificial Intelligence’ (WIPO Geneva Switzerland 27 Sept 2019).

¹⁴² *Donaldson v Becket* [1774] 1 ER 837.

of generative AI works. This is insofar as the research may help determine whether the creator of the algorithm can be assigned authorship.

1.3 Research questions

How copyright law will address CGWs has been subject to academic debate which has helped inform the research questions for this thesis.¹⁴³ The questions have been influenced by Aplin and Pasqualetto's reasoning that part of the problem with addressing authorship of generative AI works lies in the limited way copyright deals with the functions of a computer program.¹⁴⁴ Pila's research, although not on the functions of a computer program, is used to help formulate

¹⁴³ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 1-19 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024. Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 198-217; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225-244; Gunther Teubner, 'Rights of Non-Humans? Electronic Agents and Animals as New Actors in Politics and Law' (2006) 33 *Journal of Law and Society* 497-521; Madeleine de Cock Buning, 'Artificial Intelligence and the Creative industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 511- 535; Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence' (2022) 53 *International Review of Intellectual Property and Competition Law* 1174-1200; Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 *International Journal of Law and Information Technology* 279-296; Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 *Melbourne University Law Review* 46-102; Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 *Cambridge Law Review* 62-85; Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 *European Intellectual Property Review* 457-460; Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 *Columbia Law Journal and Arts* 395, 399; Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver, David Komuves 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) *CREATE* 2015/02 3.0 <<http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law>> accessed 14 March 2024; Enricho Bonadio and Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing the Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 *Intellectual Property Quarterly* 115, 131; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, AI And Machine Learning' (2017) 39 *European Intellectual Property Review* 12, 17; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 *Science* 1110, 1111.

¹⁴⁴ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 16 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024.

one of the research questions as Pila suggests the judicial adoption of what appears to be a formalist conception of a copyright work under the CDPA contributes to the ontological instability of English copyright law.¹⁴⁵ It follows that one of the research questions comprises of whether formalism limits or enables judicial understanding of the functions of a computer program, including algorithmic materials, for English copyright purposes. Reasoning by Fjeld et al, coupled with Ward, corroborate the need for copyright research on algorithms for the purposes of authorship of a generative AI work.¹⁴⁶ The latter being the crux of the main research question. Favours an approach focusing on a computer program for answers on the copyright of AI generative works should have the additional support from Ghosh.¹⁴⁷ Depending on the findings, the research may demonstrate that focus should be on the copyright legal process rather than determining the meaning of arbitrary legal concepts, which may offer an interesting insight for the copyright of AI generative works.

One of the other research questions focuses more on the legal processes and the legal context with the aim to provide, arguably, a more meaningful account of algorithms for copyright consideration. More specifically, the research question aims to describe algorithms, through a new materialist lens, by examining the legal materials and legal context of a computer program for the purposes of authorship of a CGW. This will entail examining Directive 2009/24 on the copyright protection of computer programs as the directive has been retained in English law.¹⁴⁸

¹⁴⁵ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 236-241. For a more detailed explanation of Pila work, cross refer to chapter 2, 'n 130'.

¹⁴⁶ Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 *Science* 1110, 1111.

¹⁴⁷ Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225-244

¹⁴⁸ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. Directives have been retained, following Brexit, unless explicitly overruled by legislation. See The European Union (Withdrawal) Act 2018, s2. New materialism will be explained in the next section on the research methodology.

Guadamuz, Burk, Schaffer et al all offer persuasive accounts as to why s9(3) of the CDPA is the most appropriate legal route to deal with authorship of AI generative works.¹⁴⁹ With this in mind, coupled with many other countries which have adopted similar provision, the main research question will be explored in the context of s9(3).

Overall, it is hoped the research will go some way to addressing the above questions, but more broadly speaking, will contribute to the existing literature on the copyright of AI generative works. Furthermore, the research will answer calls from the likes of Rosati and Lambert who advocate for more research on the meaning of the *arrangements necessary*¹⁵⁰ which this thesis hopes to offer for the designer of an algorithm. The next section features a more detailed explanation of the research methods that will be used to help answer the research questions.

1.4 Research methodology

The research methodology involves doctrinal legal research (DLR), socio-legal research and some comparative insight. With respect to the former, there are different ways to explain this type of research. One way is to argue that doctrinal research emerges from the *doctrine* of precedent due to rules being able to be consistently applied.¹⁵¹ Doctrinal research examines judicial reasoning based on precedents, interpretative guidelines, and copyright values, which

¹⁴⁹ At the time of completing this thesis. Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 175-178; Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver, David Komuves 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) CREATE 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024; Dan Burk 'Conversation on Intellectual Property (IP) and Frontier Technologies' (WIPO Geneva, 21, 22 September 2022) < [wipo_ip_conv_ge_2_22_3.pdf](http://www.wipo.int/ip_conv/ge_2_22_3.pdf) > accessed 22 March 2024.

¹⁵⁰ Eleonora Rosati, 'The Monkey Selfie Case and the Concept of Authorship: An EU Perspective' (2017) 12 Journal of Intellectual Property Law & Practice 973, 977; Paul Lambert, 'Computer Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 European Intellectual Property Review 15, 17.

¹⁵¹ P Ishwara Bhat, Doctrinal Legal Research as a Means of Synthesizing Facts, Thoughts, and Legal Principles in P Ishwara Bhat, *Ideas and Methods of Legal Research* (OUP 2020) 143, 144-145.

explain and justify the law.¹⁵² Hutchinson notes that doctrinal research takes an insider's view of the law.¹⁵³ What this means is that the research is produced without considering the context. For example, the focus of the research is drawn from the legal system and the concepts, categories and criteria that the system produces.¹⁵⁴ This method is chosen insofar as the method may allow a deeper understanding of the relationship between the different *forms* a copyright work can take and the functions of a computer program, which includes algorithmic materials. It is hoped that chapter two serves this purpose. However, solely understanding the relations between the functions of a computer program and legal doctrine may not go far enough in addressing the question whether a designer of an algorithm can be assigned authorship for an AI generated output.

A central weakness perceived of DLR is the focus on the rules of law without reference to the context of problems the law is supposed to resolve.¹⁵⁵ Salter and Mason argue that isolating the law from the material world is supposed to achieve objectivity.¹⁵⁶ However, Davies disputes the objectivity of the law as the law is about relationships with others.¹⁵⁷ The research in this thesis aligns more with Davies. For example, chapter four demonstrates how the law is enmeshed in the material world. Furthermore, Hutchinson argues doctrinal research can drift into the realm of formalism whereby the recommendations are 'dogmatic, limited and rigid'.¹⁵⁸ In other words, replicating the cycle of limiting copyright law on the functions of a computer

¹⁵² Terry Hutchinson, 'Doctrinal Research' in Dawn Watkins and Mandy Burton (ed) *Research Methods in Law* (2nd ed, Routledge 2017) 22.

¹⁵³ Terry Hutchinson, 'Doctrinal Research' in Dawn Watkins and Mandy Burton (ed) *Research Methods in Law* (2nd ed, Routledge 2017) 22.

¹⁵⁴ Terry Hutchinson, 'Doctrinal Research' in Dawn Watkins and Mandy Burton (ed) *Research Methods in Law* (2nd ed, Routledge 2017) 22.

¹⁵⁵ Terry Hutchinson, 'Doctrinal Research' in Dawn Watkins and Mandy Burton (ed) *Research Methods in Law* (2nd ed, Routledge 2017) 23.

¹⁵⁶ Michael Salter, Julie Mason, *Writing Law dissertations* (Pearson 2009) 110.

¹⁵⁷ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 93.

¹⁵⁸ Terry Hutchinson, 'Doctrinal Research' in Dawn Watkins and Mandy Burton (ed) *Research Methods in Law* (2nd ed, Routledge 2017) 22.

program which may have implications for s9(3).¹⁵⁹ The strong possibility of replicating the cycle by following past precedents provides the impetus to use alternative methods to seek answers on different interpretive approaches to a copyright work.

The thesis adopts a socio-legal method to conduct the research in chapter five. A socio-legal method does not treat the law and society as distinct phenomena.¹⁶⁰ The law is a human construct; material phenomena made to direct everyday life.¹⁶¹ A socio-legal method is used to study law and the legal process.¹⁶² The method can encompass a theoretical analysis of the law as a social phenomenon.¹⁶³ It has long been the case that academic lawyers have used this approach to meaningfully understand the law.¹⁶⁴ Social theory has recently extended the field of society to include new materialism.¹⁶⁵ New materialism does not treat the human as separate from the non-human world. In other words, human bodies are a physical condition of the material world.¹⁶⁶ A human's existence depends on material and natural artefacts and also has the potential to be shaped and directed by technology.¹⁶⁷ Therefore, a socio-legal method

¹⁵⁹ Michael Salter, Julie Mason, *Writing Law dissertations* (Pearson 2009) 113. This is especially the position if s9(3) requires an originality component.

¹⁶⁰ Susan S Silbey 'What Makes a Social Science of Law? Doubling the Social in Socio-Legal Studies' in Dermot Feenan, *Exploring the Socio-Legal Studies* (Palgrave Macmillan 2013) 25

¹⁶¹ Susan S Silbey 'What Makes a Social Science of Law? Doubling the Social in Socio-Legal Studies' in Dermot Feenan, *Exploring the Socio-Legal Studies* (Palgrave Macmillan 2013) 25

¹⁶² Fiona Cownie, Anthony Bradney, 'Socio-legal Studies A Challenge to the Doctrinal Approach' in Dawn Watkins, Mandy Burton (ed) *Research Methods in Law* (2nd ed, Taylor & Francis 2018) 42.

¹⁶³ Fiona Cownie, Anthony Bradney, 'Socio-legal Studies A Challenge to the Doctrinal Approach' in Dawn Watkins, Mandy Burton (ed) *Research Methods in Law* (2nd ed, Taylor & Francis 2018) 42.

¹⁶⁴ Fiona Cownie, Anthony Bradney, 'Socio-legal Studies A Challenge to the Doctrinal Approach' in Dawn Watkins, Mandy Burton (ed) *Research Methods in Law* (2nd ed, Taylor & Francis 2018) 42. Notable examples include David Nelken, *Comparative Criminal Justice: Making Sense of Difference* (Sage Publications 2012); Roger Cotterrell, 'Culture, Comparison, Community' (2006) 2 *International Journal of Law in Context* 1.

¹⁶⁵ Nicole Graham, Margaret Davies, Lee Godden, 'Broadening Law's Context: Materiality in Socio-Legal Research' (2017) 26 *Griffith Law Review* 480, 486. New materialism is mentioned in the following paragraph.

¹⁶⁶ David Nelken, *Comparative Criminal Justice: Making Sense of Difference* (Sage Publications 2012); Roger Cotterrell, 'Culture, Comparison, Community' (2006) 2 *International Journal of Law in Context* 1.

¹⁶⁷ Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), *New Materialism Ontology, Agency and Politics* (Duke University Press 2010) 3.

¹⁶⁸ Nicole Graham, Margaret Davies, Lee Godden, 'Broadening Law's Context: Materiality in Socio-Legal Research' (2017) 26 *Griffith Law Review* 480, 487. See also Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), *New Materialism Ontology, Agency and Politics* (Duke University Press 2010) 3.

recognises that the law is about relations between human and non-human materials.¹⁶⁸ Chapter four acts a vehicle for the research method in chapter five by illuminating how doctrinal copyright law on the functions of a computer program is not divorced from the material world. This provides support for a socio-legal method to be used to investigate how the functions of a computer program, more specifically, algorithms, could be understood for the purposes of authorship of a CGW.

The thesis draws on new materialism as a theoretical approach to understand algorithmic material for copyright purposes. Chapter three offers a critique of the theory. New materialism is used to re-examine the relations between copyright law and the functions of a computer program, with a specific focus on algorithms. New materialism allows the law to emerge from the legal materials and the legal context.¹⁶⁹ This means that one can examine copyright knowledge without being constrained by artificial legal boundaries produced by a formalist conception of a copyright work. It follows that the theoretical approach is ideal to re-examine algorithmic materials for copyright consideration.

Kang and Kendall's research has been influential in the design of this thesis insofar as clarifying the types of legal materials that can be used; a problem plagued by other legal researchers.¹⁷⁰ Materials pertinent to this thesis are the *travaux préparatoires* connected to Directive 2009/24 on the protection of computer programs, the text of the directive, and some

¹⁶⁸Nicole Graham, Margaret Davies, Lee Godden, 'Broadening Law's Context: Materiality in Socio-Legal Research' (2017) 26 Griffith Law Review 480, 485.

¹⁶⁹ Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 822; Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar 2016) 44; Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 93; Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 International Journal of the Semiotics of Law 365; Jose Bellido, 'Forensic Technologies in Music Copyright' Forensic (2016) 25 Social and Legal Studies 441.

¹⁷⁰ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

statutory interpretive techniques used by the judiciary.¹⁷¹ With respect to the latter, a purposive interpretive technique allows the judiciary to draw on external knowledge outside the realm of the law.¹⁷² New knowledge drawn from the philosophy of computer science on algorithms will be analysed with the legal materials to allow the meaning of algorithms to re-emerge from the material process. Knowledge from the philosophy of computer science and computer science are not treated differently through a new materialist lens.¹⁷³ The material process allows algorithms to re-emerge and to be considered for copyright purposes. This may go some way to understanding the human contribution in creating an algorithm for the purposes of assigning authorship of a CGW under s9(3).

A legitimate question may be asked as to why an interpretation from the philosophy of computer science would be any better than a legal interpretation on algorithmic materials. Cotterrell's reasoning may be useful to draw upon at this point.¹⁷⁴ Cotterrell concedes other disciplines can confront the law whilst illuminating how the law has its own distinct way of interpreting material. This way the law can resist scientific interpretations which could challenge legal concepts.¹⁷⁵ Instead, the law can borrow from scientific disciplines or practices when it is useful to do so.¹⁷⁶ This means that one can discover the truth about the law, but the law cannot be swept away; the law coexists with other interpretations.¹⁷⁷ In other words, it is

¹⁷¹ Directive 2009/24 has been transposed into the CDPA. Moreover, directives have been retained, following Brexit, unless explicitly overruled by legislation. See the European Union (Withdrawal) Act 2018, s2.

¹⁷² *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693 [19] (Lord Bingham); [27] (Lord Steyn).

¹⁷³ Karen Barad, a proponent of new materialism, explains how philosophy of a subject is inseparable from the subject matter. She discusses this in relation to philosophy of physics and physics. See Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

¹⁷⁴ Roger Cotterrell, 'Why Must Legal Ideas be Interpreted Sociologically?' in Roger Cotterrell, *Law, Culture and Society Legal Ideas in the Mirror of Social Theory* (1st ed, Routledge 2006) 45-63.

¹⁷⁵ Roger Cotterrell, 'Why Must Legal Ideas be Interpreted Sociologically?' in Roger Cotterrell, *Law, Culture and Society Legal Ideas in the Mirror of Social Theory* (1st ed, Routledge 2006) 48.

¹⁷⁶ Roger Cotterrell, 'Why Must Legal Ideas be Interpreted Sociologically?' in Roger Cotterrell, *Law, Culture and Society Legal Ideas in the Mirror of Social Theory* (1st ed, Routledge 2006) 48.

¹⁷⁷ Roger Cotterrell, 'Why Must Legal Ideas be Interpreted Sociologically?' in Roger Cotterrell, *Law, Culture and Society Legal Ideas in the Mirror of Social Theory* (1st ed, Routledge 2006) 48.

not to concede that the philosophy of computer science, for example, should take priority over the law.

There is merit in suggesting other disciplines should not take priority over the law, but debate whether the law coexists alongside scientific interpretations. Cotterrell draws on Leff's reasoning around how the law is not produced but is something that one does.¹⁷⁸ This resonates with Barad, a key proponent of new materialism,¹⁷⁹ who understands matter as a process rather than a pre-determined thing or an object.¹⁸⁰ Matter in the sense of being conceptual rather than physical.¹⁸¹ Barad's work has been influential in legal research conducted by Davies to illustrate how the law is about relationships with others.¹⁸² The research of Barad points to the fallacy of how the law is produced in isolation to its context as definitions of the law tend to be enmeshed in cultural, historical, political materialisations.¹⁸³ Nevertheless, the thesis has been carefully designed so any new material on algorithms from the philosophy of computer science is considered within the boundaries of Directive 2009/24 on the protection of computer programs.¹⁸⁴

It should be noted comparative insights from *Google v Oracle*¹⁸⁵ will also be drawn upon in chapter five. Although a case from the United States (US), the case deals with examining the functions of a computer program for copyright purposes. As the case graced the

¹⁷⁸ Roger Cotterrell refers to Arthur Allen Leff (1935-1981) in Roger Cotterrell 'Why Must Legal Ideas be Interpreted Sociologically?' in Roger Cotterrell, *Law, Culture and Society Legal Ideas in the Mirror of Social Theory* (1st ed, Routledge 2006) 52.

¹⁷⁹ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

¹⁸⁰ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 828.

¹⁸¹ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 7.

¹⁸² Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 93.

¹⁸³ Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819

¹⁸⁴ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16.

¹⁸⁵ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021).

courts for a decade, it is reasonable to argue the judgments offer a more detailed analysis on the functions of a computer program than arguably any other English case has to offer. This may provide insight into the treatment of algorithms. Moreover, judicial reasoning in the case, refers to the *Altai* test, a case which has been implanted *albeit* controversially into English law¹⁸⁶ may prove to be of interest. Furthermore, the US style merger test was adopted by Lord Justice Lewison, in the CA of *SAS Institute*.¹⁸⁷ The test forms the basis of some of the reasoning by the District and Federal Circuit courts which may act as persuasive authority on how to deal with the SSO of a computer program. That said, ensuring the remit of the thesis is adhered to, the facts of *Google v Oracle* are re-imagined under Directive 2009/24, and analysed, using a new materialist lens. The next section provides an outline of the overall research objectives of the thesis.

1.5 Research objectives

The thesis has three overarching research objectives. One of the research objectives is to demonstrate how a formalist conception of a copyright work is likely to lead to a limited and incomplete understanding of the functions of a computer program, including algorithmic materials, for copyright purposes. The second objective is to apply a new materialist perspective to offer a critique on formalism. The third objective is to describe algorithmic materials for copyright consideration, and for the purposes of authorship of AI generative works, through tracing the legal-material process of a computer program. It is hoped that the three main objectives are achieved in the thesis. Despite the careful consideration that has

¹⁸⁶ *Computer Associates v Altai* 982 F 2d 693, 709 (CA 2d Cir 1992) was referred to in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 988, 989 (ND Cal 2012) and in *Oracle America Inc v Google LLC* 750 F 3d 1339, 1367 (Fed Cir 2014).

¹⁸⁷ *Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31] (Lewison LJ).

¹⁸⁷ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 997, 1001 (ND Cal 2012); *Oracle America Inc v Google LLC* 750 F 3d 1339, 1360-61, 1370 (Fed Cir 2014).

been given to the design of the thesis, some research limitations exist and are, arguably, inevitable.

1.6 Limitations

A new materialist will acknowledge, as I do, their role in the materiality of copyright matter, which can be perceived to be a limitation, affecting the integrity of the research. Kang and Kendall contend that humans can be part of the legal materials when they are providing legal meaning to law's matters.¹⁸⁸ Critical legal theorist Foucault was criticised by both new materialists, Barad and Braidotti, for failing to account for the role that a human takes in how power operates over the law.¹⁸⁹ Whilst recognising the active role a researcher takes in this thesis, there will always be a degree of influence in interpretation on law's matters that arguably cannot, and perhaps, should not, be removed. This is the essence of a new materialist approach as the law is a process that involves the human interpretation which emerges and fluctuates over time. This is why law's matters should be (re) examined.¹⁹⁰ This is the objective of conducting this thesis. From a new materialist perspective, one may quibble with identifying the materiality of the body as a limitation insofar as including the body as materiality allows knowledge to be fluid and an on-going process.

1.7 Organisation of thesis

The purpose of the **introductory chapter** is to problematise CGWs by examining relevant case-law and the scholarly literature on the area. This provides reasons for choosing CGWs as a research topic for this thesis. Research indicates that adopting s9(3) as the focal point will be

¹⁸⁸ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 8.

¹⁸⁹ Michel Foucault has written many books on the role that power plays on society and the law. By way of example, see Michel Foucault, *The Punitive Society* (Bernard E Harcourt eds, Graham Burchell tr, Picador 2015); Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 809; Rosi Braidotti, *The Posthuman* (Polity 2013) 61.

¹⁹⁰ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 822.

beneficial not only for England but for several other countries that either have adopted the provision or have provision akin to it. Nevertheless, scholarly literature suggests that more research is required on how s9(3) may be applied. The thesis aims to examine whether the creator of an algorithm can be assigned authorship under s9(3). It is hoped that this will contribute to the academic literature on how copyright might deal with authorship, which is significant, when viewed against the lack of case-law or statutory guidance on the area.

The aim of **chapter two** is to understand whether copyright law reliably understands the functions of a computer program as a copyright work. This entails examining the structure, the sequence and the organisation (SSO) of a computer program for copyright purposes. The chapter uses DLR to explore the relationship between formalism and judicial understanding of the functions of a computer program. It should be noted algorithms form part of the functions of a program.¹⁹¹Unpacking the SSO of a computer program in this way forms a building block for the entire thesis as it helps to address whether a re-examination of algorithms is needed. If this is the case, any new knowledge that emerges on algorithms may help to answer the overarching question whether the creator of an algorithm can be assigned authorship under s9(3).

Chapter three introduces the reader to an innovative, cutting-edge ontological theory of new materialism. The aim of the chapter is to explain how a new materialist understands matter. The chapter explores the different strands to new materialism, including an account by its critics. Despite the variations to new materialism, common themes on how matter is formed are revealed. What is striking is how new materialism can be used to challenge the legitimacy of a legal positivist, formalist model. The chapter acts as a vehicle for the arguments that

¹⁹¹ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [229].

follow in the thesis as the theory helps provides direction on how better to understand algorithmic materials for copyright purposes.

Chapter four uses new materialism to (re) examine doctrinal copyright law on the functions of a computer program. Findings corroborate scholarly literature that the legal positivist model is not as divorced from the material world as initially discussed in chapter two. This provides the impetus to use new materialism to better understand the legal materials and legal processes in dealing with algorithmic materials for copyright purposes. The chapter examines the legal text of Directive 2009/24 on the protection of computer programs, coupled with tracing the legal materials, namely the *travaux préparatoires* of the directive. The chapter introduces Angius and Primiero's reasoning from the philosophy of computer science on the meaning of algorithms. Parallels are drawn between Angius and Primiero's reasoning and how a new materialist understands matter to strengthen the credibility of their reasoning. The legal material analysis of the directive reveals there is space within the directive to consider alternative interpretations of algorithms from the philosophy of computer science.

Chapter five commences with the US case of *Google LLC v Oracle America Inc*¹⁹² for comparative insight. Although the judgments, when viewed in isolation, do little to provide comparative insight into the SSO of a computer program for copyright purposes, the case serves as a vital cog in understanding algorithms. Angius and Primiero apply their understanding of algorithms from the philosophy of computer science to *Oracle v Google*. The authors demonstrate how algorithms have been abstracted by each judge from the different courts. Angius and Primiero's reasoning is examined against the contrasting judgments from both the District Court and Federal Circuit. *Amicus curiae* briefs are used to inform evaluative comments on the legal analysis by each judge. The chapter turns to (re) imagining the facts of

¹⁹² *Google LLC v Oracle America Inc* 141 SCt 1183 (2021).

Google v Oracle under Directive 2009/24 on the protection of computer programs. The chapter uses a legal materialist construction of Directive 2009/24 to discuss whether algorithms abstracted in the way Angius and Primiero suggest, could be perceived as an expression of an idea, deserving of copyright protection. During the legal analysis, insights are revealed as to how the English judiciary appear to be abstracting algorithms for copyright purposes. The case of *SAS Institute* is used as a way of example.¹⁹³ The chapter concludes by using the findings to discuss whether the creator of an algorithm can be assigned authorship for a CGW under s9(3).

Chapter six has two main functions; firstly, to illuminate the main findings from the thesis, and secondly, to consider how the thesis may serve as a foundation for future research by other academics. The chapter draws on the analysis of the formalist model to hopefully offer a persuasive account of the flaws that formalism brings to understanding a copyright work. The chapter exposes the hidden material on the SSO of a computer program for copyright purposes. More specifically, in the context of algorithms. Depending on the way algorithms are abstracted may depend on whether they can be perceived for copyright consideration. Abstracting algorithms in the specific way described increases the visibility of the arrangements that have been undertaken to create an algorithm, and in turn, for authorship to be assigned under s9(3) of the CDPA. The chapter draws to a close by considering the limitations of the thesis and how the thesis can be built upon for future research by other academics. Research indicates a new material legal analysis could be conducted on US law. As the US is positioned as one of the market leaders in AI technology, this seems like a logical

¹⁹³ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104.

step.¹⁹⁴ Moreover, a material legal analysis could also be conducted on computer software for US copyright law purposes, especially given the uncertain landscape the Supreme Court in *Google v Oracle* has left the industry in. On a separate note, the thesis lays the foundations for new materialism to be a theoretical basis for the purposive interpretative approach. Future research by academics could explore this as a separate project and offer an opportunity to provide more substantive evidence to support the findings in this thesis.

1.8 Conclusion

Overall, the research question emerges from the scholarly literature on the area, sparked by the Edmond de Belamy painting which was made by machine learning algorithms. The sale of the painting spurred academic discussion on how copyright could address the challenges that the law faces with AI generative works. Focus on the functions of a computer program, more specifically algorithms, emerged as potential material to be re-examined with the aim of helping to address authorship of CGWs.

The chapter outlines the focus of the thesis, which is on s9(3) of the CDPA. This is due to both scholarly support for the provision and the use of the provision in other jurisdictions. The thesis has been carefully crafted so the research will contribute to the academic discussion on how s9(3) will apply, with a specific focus on authorship for creators of algorithms of a CGW.

The chapter examines the research methods which leads to DLR and socio-legal research being conducted within this thesis. Comparative insights from the US will also be

¹⁹⁴ Goldman Sachs, 'AI Investment Forecast to Approach \$ 200 Billion Globally by 2025' (Goldman Sachs, 1 Aug 2023) < [AI investment forecast to approach \\$200 billion globally by 2025 \(goldmansachs.com\)](https://www.goldmansachs.com/insights/pages/artificial-intelligence-investment-forecast-2025.html) > accessed 23 April 2023.

drawn upon. It is hoped it is clear which legal materials and processes are being used as part of the analysis on algorithmic materials so Kang and Kendall's criticisms of other new materialist researchers who are unsure about law's matters, are addressed. The thesis commences with DLR on the SSO of a computer program.

CHAPTER TWO

LIMITATIONS OF THE FORMALIST MODEL IN UNDERSTANDING AUTHORSHIP OF COMPUTER-GENERATED WORKS

2.0 INTRODUCTION

‘The unconscious remains bound to archaic fixations only as long as there is no investment [engagement] directing it towards the future.’¹

The importance of understanding the human input in a computer program for the purposes of authorship of a CGW under s9(3) of the CDPA is made clear in *Nova*.² The (then) Mr Justice Kitchen held the designer had devised the appearance of the computer game, the rules and logic for how each computer-generated frame operated, coupled with writing the computer program.³ It followed that the designer was assigned authorship under s9(3), as the designer was responsible for the *arrangements necessary* in creating the CGW.⁴ Although *Nova* does not deal with the more recent advanced artificial intelligence (AI) systems that involve, for example, generative adversarial networks (GANs) or diffusion models,⁵ it is contended that understanding the functions of a computer program can help contribute to determining authorship of a CGW under s9(3).⁶ It should be noted that although the more recent generative

¹ Felix Guattari, *The Three Ecologies* (Ian Pindar, Paul Sutton (trs), The Athlone Press, London 2000) 38.

² *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

³ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

⁵ Cross refer to chapter 1, ‘n 37’.

⁶ For example, Aplin and Pasqualetto argue that part of the problem with attributing authorship to a generative AI work is associated to the limitations on a computer program insofar as copyright rarely extends to the functions of a computer program. See Tanya Aplin, Giulia Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King’s College London Research Paper 16. Ghosh is also of the view that answers lie in examining the copyright of computer software for answers on the copyright of AI generative works. See Shubha Ghosh, ‘Ain’t it Just Software?’ in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225.

AI works involve less human input, this is not likely to be fatal to a claim of authorship under s9(3) as long as a link can be established between the human input and the output.⁷ This makes sense as s9(3) is a provision for assigning rights rather than in the strictest sense focusing on a direct connection to the work.⁸

The aim of the chapter is to examine judicial reasoning on a computer program. More specifically, the focus is on the structure, sequence and organisation (SSO) of a computer program so as to try to understand whether the functions of a computer program are reliably understood. As research indicates algorithms can be identified as the SSO,⁹ it is hoped the findings may help with addressing the research question on whether the creator of an algorithm can be assigned authorship of a CGW.

Although academics such as Bandey, Baron, Christie et al voice concerns at the narrow categorisation system within the CDPA,¹⁰ this chapter suggests problems arise due to how the

⁷ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper

15< <https://ssrn.com/abstract=3419481>>accessed 29 March 2024. See also Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 *International Journal of Law and Information Technology* 279, 290 citing M de Cock, 'Buning Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology By Autonomous Creation' in W Barfield and Ugo Pagallo (eds) *Research Handbook on The Law of Artificial Intelligence* (Edward Elgar 2018) 511–35; Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 *European Intellectual Property Review* 457, 459.

⁸ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper

15< <https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

⁹ 'text to n 58', 'text to n 69'.

¹⁰ Brian Bandey, 'Over-Categorisation in Copyright Law: Computer and Internet Programming Perspectives' (2007) *European Intellectual Property Review* 461; Ann Baron, 'Copyright Art and Objecthood' in Daniel McClean, Karsten Schubert (eds), *Dear Images Art, Copyright And Culture* (Ridinghouse 2002) 292; Jonathan Griffiths, 'Dematerialization, Pragmatism and the European Copyright Revolution' (2013) 33 *Oxford Journal of Legal studies* 767, 788; Andrew Christie A, 'A Proposal for Simplifying United Kingdom Copyright Law' (2001) 23 *European Intellectual Property Review* 26; Enrico Bonadio, Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing The Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 *Intellectual Property Quarterly* 115; Dan Booton, 'Framing Pictures: Defining Art in UK Copyright law' (2003) *Intellectual Property Quarterly* 38, 51-61; Lucy Finchett-Maddock, 'Forming the Legal Avant-Garde: A Theory of Art/Law' (2019) *Sussex Research Online* 4. The narrow categorisation system has been called into question after Case-C-310/17 *Case-C-310/17 Levola Hengelo BV v Smiled Foods BV* [2018] ECR I-00000. See *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch) [27]; *Response Clothing Ltd v The Edinburgh Woolen Mill* [2020] EWHC 148 (IPEC); [2020] FSR 24 [27].

categories are interpreted. A computer program needs to take the form of a literary work.¹¹ The chapter reveals judicial interpretations on a computer program appear to be undergirded by formalism. Formalism makes visible a copyright work through the phenomena's non-aesthetic properties. The non-aesthetic features are limited to the physical and sensory properties of a copyright work. What this means is that formalism produces rather than meaningfully describes a computer program for copyright purposes.¹² Copyright knowledge is treated as a discrete separate unit from technological understandings of a computer program. While judicial focus is on the literary work, the chapter examines *how* the SSO of a computer program is understood by the judiciary.

It is hoped the examination of judicial discourse can act as a building block in the search for a more meaningful understanding of the SSO of a computer program which can contribute to the academic discussion on authorship of CGWs.¹³ The contribution is made insofar as the

¹¹ CDP, s 3(1)(b),(c).

¹² This statement is inspired by Karen Barad insofar as how matter is formed. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

¹³ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 1-19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024. Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 198-217; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 225-244; Gunther Teubner, 'Rights of Non-Humans? Electronic agents and Animals as New Actors in Politics and Law' (2006) 33 *Journal of Law and Society* 497-521; Madeleine de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar, 2018) 511- 535; Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence' (2022) 53 *International Review of Intellectual Property and Competition Law* 1174-1200; Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 *International Journal of Law and Information Technology* 279-296; Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 *Melbourne University Law Review* 46-102; Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 *Cambridge Law Review* 62-85; Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 *European Intellectual Property Review* 457-460; Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 *Columbia Law Journal and Arts* 395, 399; Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver, David Komuves 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) *CREATE* 2015/02 3.0 <

chapter exposes the limitations of the formalist conceptual model for assigning authorship of a CGW to designers of the SSO, more specifically, algorithms in a computer program.

The chapter consists of four sections. The first section will discuss the meaning of CGWs. The section will also examine the scope and application of s9(3) of the CDPA. The second section will explore the formalist conceptual model, and its limitations, in its use for judicial interpretations of a copyright work. The third section uses formalism as a lens to examine the judicial reasoning of the SSO of a computer program in the context of copyright law. Finally, a conclusion is drawn bringing together the research on the existing copyright discourse of a computer program. The conclusion acts as a building block to inform the research on an alternative conceptual theory to meaningfully understand the SSO of a computer program. Further, an alternative conceptual model is suggested to better equip the judiciary to understand the contributions in the processes of making a CGW. It is hoped that the model will help the judiciary in the future with assigning authorship of a CGW under s9(3) of the CDPA. The alternative conceptual model is mooted in the conclusion but will be examined in more detail in chapter three. The chapter now turns to examining the meaning of CGWs.

2.1 Computer-generated works

<http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024; Enricho Bonadio and Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing The Debate on whether New And Different Forms of Creativity Can Be Protected' (2019) 2 Intellectual Property Quarterly 115, 131; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, AI And Machine Learning' (2017) 39 European Intellectual Property Review 12, 17; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

This section draws on the seminal text of Russell and Norvig to illuminate the meaning of CGWs. Although Russell and Norvig refer to artificial intelligence (AI) instead of the term CGWs, AI can be used to cover CGWs.¹⁴

2.1.1 Approaches to understanding computer-generated works

Russell and Norvig's classical text list four approaches to AI.¹⁵ These consist of acting humanly, thinking humanly, thinking rationally and acting rationally.¹⁶ Briefly describing each one in turn; *acting humanly* is associated to the infamous Alan Turing test.¹⁷ This is where a computer arguably could be perceived to be intelligent, if a human cannot distinguish whether a human or a computer responded from the answers given by the computer.¹⁸ *Thinking humanly* is whether AI thinks like a human.¹⁹ For example, understanding how humans think can be done firstly, introspectively, whereby one concentrates on their own thoughts. Secondly, understanding human thought through psychological experiments, namely, observing people. Thirdly, human thought can be observed by using brain imaging.²⁰ If a computer program's input and output resembles how a human thinks, in the ways described above, there is an argument that the computer is thinking as a human.²¹ On the other hand, *thinking rationally* is being able to define the world based on logical statements, where AI can infer knowledge from such statements.²² Logicians used notation for statements about objects and the relationship

¹⁴ Andres Guadamuz, 'Impact of Artificial Intelligence on IP Policy' (WIPO, 14 Feb 2020) < [submission-Guadamuz \(wipo.int\)](#) > accessed 15 April 2024; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 European Intellectual Property Review 12; Eleonora Rosati, 'The Monkey Selfie Case and the Concept of Authorship: an EU Perspective' (2017) 12 Journal of Intellectual Property Law & Practice 973.

¹⁵ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20-22.

¹⁶ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20-22.

¹⁷ Alan Turing, 'Computing Machinery and Intelligence' (1950) 59 Mind 433-460; Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

¹⁸ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

¹⁹ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20-21.

²⁰ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

²¹ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

²² Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 21-22.

between objects.²³ By 1965, a computer program could solve problems based on logical notation. The theory of probability plays a part in producing statements based on uncertain data.²⁴ Being able to produce statements based on logic is a way that resembles rational thought. Finally, *acting rationally* involves a computer program being able to perceive from their environment, and take action that maximises their chances of achieving the best outcome.²⁵ The four ways describe the approaches taken to AI, but AI relies on algorithms to produce works.

For a computer program to act in the ways described by Russell and Norvig, the computer will utilise what is known as an algorithm. There are four major families of algorithms; supervised, unsupervised, semi-supervised and reinforcement learning.²⁶ The first three involve some human contribution. Supervised learning is where the human acts as supervisor annotating or labelling the training data. The annotated/labelled data is used so AI can produce a model that predicts the output of unseen inputs.²⁷ For example, if the purpose of AI was to classify the objects in different images as either a bus or pedestrian, the supervisor would first label the training data so each image would either be classified as one or the other. The AI system could then learn from the training data and would eventually be able to identify and label an unclassified image as a bus or a pedestrian.²⁸ Unsupervised algorithms still involve the human collecting the appropriate dataset so the algorithm can extract features from the data without the need for a label.²⁹ For example, the colour of the sky in the background

²³ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

²⁴ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 20.

²⁵ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (3th ed, Pearson 2016) 2-5.

²⁶ Margaret A Boden, *Artificial Intelligence: A very Short Introduction* (OUP 2018) 40; Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 671

²⁷ Margaret A Boden, *Artificial Intelligence: A Very Short Introduction* (OUP 2018) 40; ; Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 671.

²⁸ Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 671.

²⁹ Margaret A Boden, *Artificial Intelligence: A very Short Introduction* (OUP 2018) 40; Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 671.

of an image or whether the floor is wooden.³⁰ In other words, learning takes place in a similar way to a human insofar as experiencing the world rather than being given information about a specific object.³¹ Semi-supervised learning combines the features of both supervised and unsupervised algorithms to a small set of labelled data and a large set of unsupervised data.³² For example, Alexa, Amazon's AI virtual assistant, learns how to recognise the user's voice through the operator labelling data but also by autonomously interpreting data.³³ The three families of algorithms involve human input, however, there is one remaining that does not require human involvement.

There is a type of algorithm associated to reinforcement learning, which is more independent from the human entity than the others. Training sets are devised by autonomous AI agents whilst perceiving their environment. The AI agent learns through cumulative rewards. Take for example a system that plays chess. There are no labelled datasets that outline each possible move and provide an assessment on whether the action could be considered a good move or a bad move. Instead, when the system is told that it has won or lost, these labels help reinforce the moves that may make for optimum play illustrating the independence from human activity.³⁴

³⁰ Greg Allen, 'Understanding AI Technology A Concise, Practical, And Readable Overview of Artificial Intelligence and Machine Learning Technology Designed for Non-Technical Managers, Officers, and Executives' (JAIC April 2020) < <https://www.ai.mil/docs/Understanding%20AI%20Technology.pdf> > accessed 15 April 2024 12-13.

³¹ Guido Noto La Diega, 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) < [ind_noto_la_diega.pdf \(wipo.int\)](https://www.wipo.int/ip/ai/ge/20/1/papers/draft_issues_paper_on_intellectual_property_and_artificial_intelligence.pdf) > accessed 22 April 2024) 2.

³² Greg Allen, 'Understanding AI Technology A Concise, Practical, And Readable Overview of Artificial Intelligence and Machine Learning Technology Designed for Non-Technical Managers, Officers, and Executives' (JAIC April 2020) < <https://www.ai.mil/docs/Understanding%20AI%20Technology.pdf> > accessed 15 April 2024 14.

³³ Guido Noto La Diega, 'Draft Issues Paper on Intellectual Property and Artificial Intelligence' (WIPO/IP/AI/GE/20/1, WIPO, 21 Dec 2019) < [ind_noto_la_diega.pdf \(wipo.int\)](https://www.wipo.int/ip/ai/ge/20/1/papers/draft_issues_paper_on_intellectual_property_and_artificial_intelligence.pdf) > accessed 22 April 2024) 2.

³⁴ Margaret A Boden, *Artificial Intelligence: A Very Short Introduction* (OUP 2018) 41; Stuart J Russell, Peter Norvig, *Artificial Intelligence: A Modern Approach* (4th ed, Pearson 2021) 671; Greg Allen, 'Understanding AI Technology A Concise, Practical, And Readable Overview of Artificial Intelligence and Machine Learning Technology Designed for Non-Technical Managers, Officers, and Executives' (JAIC April 2020) < <https://www.ai.mil/docs/Understanding%20AI%20Technology.pdf> > accessed 15 April 2024 14-15.

Having described the families of algorithms, the majority involve a human process in creating an AI generative work. This finding aligns with the scholarly literature which points to human input in the design of generative AI.³⁵ This can include the involvement of the creator of the algorithm as well, as was evidenced by Goodfellow et al in the creation of GAN.³⁶ That said, human involvement may be called into question in the future with more advanced AI generative systems. However, the recent advances involving stability diffusion software appear to indicate human involvement. In *Getty v Stability AI Ltd*, preliminary evidence points to human involvement in the developing of the generative AI system.³⁷ Court documents illuminate computer scientist Bjorn Ommer's contribution in developing one of the most powerful algorithms; a reference to the new stable diffusion model.³⁸ Accepting the argument there is some human input in the design of generative AI works, the next section discusses the legal provision protecting this type of work.

2.1.1.1 The nexus between the structure, sequence, and organisation (SSO) of a computer program, algorithms, and authorship of computer-generated works

Under s9(3) of the CDPA, authorship of generative AI works may be understood by ascertaining whether the human input amounts to the *arrangements necessary* for a CGW.³⁹ Despite human involvement being considerably less in the face of more autonomous generative

³⁵ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 170; Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213; Jane Ginsburg, Luke A Budiardjo, 'Authors and Machines' (2019) 34 Berkeley Technology Law Journal 343, 400.

³⁶ Ian J Goodfellow, Jean Pouget-Abadie, Mehdi Mirza and Others, 'Generative Adversarial Networks' (2014) Cornell University Library 6/2014 < [\[1406.2661\] Generative Adversarial Networks \(arxiv.org\)](https://arxiv.org/abs/1406.2661)> accessed 5 July 2023.

³⁷ This case has not been fully heard at the time of submitting this thesis. *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [67].

³⁸ *Getty Images (US), Getty Images International UC, Getty Images (UK) Ltd, Getty Images DEVCO UK Ltd, ISTOCKPHOTO LP, Thomas M Barwick INC v Stability AI Ltd* [2023] EWHC 3090 (Ch) [67].

³⁹ CDPA, s9(3).

works, evidence points to *some* human involvement in the design of algorithms,⁴⁰ which may be discussed in the context of s9(3).

S9(3) is a provision for assigning rights of authorship rather than requiring the author to have a direct connection to the CGW.⁴¹ This is done by being responsible for the *arrangements necessary* for the creation of this type of work.⁴² An interesting event which illuminates the uncertainty around the meaning of arrangements necessary in a generative AI work for the purposes of s9(3) involves the sale of the Edmond de Belamy painting.⁴³ The painting, which sold at Christie's auction house for \$432,500, was created by an algorithm called Generative Adversarial Networks (GAN). GAN was designed by Goodfellow et al, whilst Fautrel, an artist of Obvious Art, gathered data from 15,000 portraits from the 14th to 20th century to produce a dataset for GAN to learn to paint.⁴⁴ GAN learnt to paint by mimicking patterns within the data to produce the new painting. A question posed by Ward on whether the creator of the algorithm could be assigned authorship, if litigation ever ensued, or litigation

⁴⁰ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 170; Jane Ginsburg, Luke A Budiardjo, 'Authors and Machines' (2019) 34 Berkeley Technology Law Journal 343, 400; Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 213; ⁴⁰ WIPO 'Conversation on Intellectual Property (IP) and Frontier Technologies' (WIPO Geneva, 21, 22 September 2022) < [wipo_ip_conv_ge_2_22_3.pdf](#) > accessed 22 March 2024.

⁴¹ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 15< [https://ssrn.com/abstract=3419481](#)>accessed 29 March 2024.

⁴² CDPA, s9(3).

⁴³ Christie's 'Is Artificial Intelligence Set to Become Art's Next Medium?' (Christie's Auction, 12 Dec 2018) <[Is artificial intelligence set to become art's next medium? | Christie's \(christies.com\)](#)> accessed 15 April 2024.

⁴⁴ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < [https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html](#)>accessed 2 May 2024.

in a similar matter arose in the future.⁴⁵ Moreover, academics Fjeld et al also raise the same question for authorship of generative AI works.⁴⁶

The question whether creating the algorithm for the Edmond de Belamy painting would be sufficient to merit being involved in the *arrangements necessary* has not been debated in court as the painting was not involved in litigation. There have been no decided cases of a similar nature at the time of writing this thesis.⁴⁷ Nevertheless, the case can be viewed in the light of *Nova*;⁴⁸ the only case to deal with CGWs.⁴⁹ The (then) Mr Justice Kitchin had to decide whether the designer of the compositive frames of a video pool game could be assigned authorship for the artistic work.⁵⁰ Mr Justice Kitchin held that the compositive frames were created by the designer or by the computer program which the designer wrote.⁵¹ Mr Justice Kitchin recognised that each compositive frame was computer-generated. However, because the designer devised the appearance of the elements of the game and the rules and logic by which each frame was generated, in addition to writing the computer program, the designer was held to be responsible for the *arrangements necessary* for the creation of the CGW under s9(3) of the CDPA.⁵² The material facts of *Nova* do not deal explicitly with algorithms so leaves the question whether a creator of an algorithm can be assigned authorship, open to

⁴⁵ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 6 March 2024.

⁴⁶ Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

⁴⁷ At the time of submitting the thesis, there have been no decided cases in the UK.

⁴⁸ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032.

⁴⁹ At the time of submitting the thesis.

⁵⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [104]

⁵¹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [104].

⁵² *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

debate;⁵³ a question central to this thesis. Although Mr Justice Kitchen refers to the designer being involved in the rules and logic by which each frame is generated, therefore there may be scope in the future to infer that the creator of an algorithm may be assigned authorship, it is still far from being clear. Further, as the issue on CGWs was only discussed at the Court of First Instance over seventeen years ago, and involved very simply computer generation of content,⁵⁴ the research on this area is likely to be welcomed.

Viewed against the lack of explicit mention on algorithms in *Nova*, this chapter will examine the judicial reasoning on the SSO within a computer program to illuminate understanding on algorithms. Although the SSO can be perceived separately from the functions of a computer program,⁵⁵ which comprise of algorithms,⁵⁶ this is based on the false premise that the SSO is fully understood.⁵⁷ By examining the SSO in a computer program, a more meaningful understanding is likely to be gained, which may give the impetus to re-examine algorithms for copyright purposes. This, in turn, will help inform discussions on whether the creator of an algorithm can be assigned authorship of a CGW under s9(3).

It is worth noting in the philosophy of computer science, an area drawn on later in the thesis, that algorithms can be recognised as the SSO of a computer program. Newell, a Professor of Computer Science, warns of the dangers of distinguishing between algorithms and the SSO insofar as it leads to unreliable knowledge and understanding of each concept.⁵⁸

⁵³ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

⁵⁴ Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 *European Intellectual Property Review* 457, 459; *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [101], [102].

⁵⁵ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [232].

⁵⁶ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [232].

⁵⁷ Cross refer to 2.3.2, 77..

⁵⁸ Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 *University of Pittsburgh Law Review* 1023, 1028-1030.

Newell uses the example of an algorithm and a method to substantiate the argument.⁵⁹ This is an important insight for copyright as the *method-class-package* organisational structure in a computer program is described by Mr Justice Breyer in *Google v Oracle* as the SSO.⁶⁰ Pre-written programs are organised into packages, classes and methods. Methods form a specific function and are grouped into larger classes and similar classes into packages.⁶¹ Although methods transform matter, these transformations result from algorithms.⁶² Newell argues that it is conceivable that in some areas of technology *all* the creative activity produced by the program occurs due to the algorithm.⁶³ Newell's reasoning importantly highlights the unreliability of separating algorithms from the SSO of a computer program; reasoning that may be helpful in shaping the direction that copyright takes if the findings suggest that copyright could better understand algorithms.

Although *Google v Oracle* is from the US, arguably, the case is much more detailed on the SSO of a computer program than any other English case, so is used for comparative insight as noted in the methodology section. However, as a recap, *Google v Oracle* may be of persuasive influence on the English judiciary. For example, the Federal Circuit of the Court of Appeal (CA) used the *Altai* test as part of the CA's reasoning.⁶⁴ *Altai* was transplanted *albeit* controversially into English law by Mr Justice Ferris in *John Richardson Computers Ltd*.⁶⁵ Furthermore, a US style merger test adopted by the English judiciary in *SAS Institute*⁶⁶ also

⁵⁹ Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 University of Pittsburgh Law Review 1023, 1030.

⁶⁰ *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

⁶¹ *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

⁶² Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 University of Pittsburgh Law Review 1023, 1030.

⁶³ Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 University of Pittsburgh Law Review 1023, 1030.

⁶⁴ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1355, 1361, 1370 (Fed Cir 2014).

⁶⁵ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 refers to the *Altai* test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992). Mr Justice Ferris's implant of the *Altai* test was controversial as it was argued that the test was applied superficially. See David Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, Computers & Artificial Intelligence 269, 274-276.

⁶⁶ *Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31] (Lewison LJ).

forms part of the judicial reasoning in both the District Court and CA in *Oracle v Google*.⁶⁷ On this basis, *Google v Oracle* is used as comparative insight on the SSO of a computer program.

Angius and Primiero, philosophers of computer science, corroborate and build on Newell's work, avoiding drawing arbitrary distinctions between the SSO and algorithms.⁶⁸ Angius and Primiero abstract the SSO of Oracle's application programming interface in *Google v Oracle* as algorithms abstracted as a machine.⁶⁹ Although examined later in the thesis, interpretations of algorithms emerge from, and includes the levels of abstraction of a computer program.⁷⁰ Angius and Primiero's understanding aligns with Newell's reasoning on the SSO, including algorithms, in a computer program.

It is hoped the nexus between the SSO of a computer program, algorithms and authorship of a CGW is made visible. The next section explores the academic discussion on how authorship can be assigned for CGWs to assess the extent the scholarship addresses the meaning of *arrangements necessary* under s9(3).

2.1.2 The debate over authorship of computer-generated works

Whether the creator of an algorithm can be assigned authorship under s9(3) remains unclear. Arguably, Guadamuz's reasoning comes closest to helping answer the question, but it is contended does not go far enough to offer certainty of the answer.⁷¹ Guadamuz appears to take

⁶⁷ *Oracle America Inc v Google LLC* 872 F sup 2d 974, 997, 1001 (ND Cal 2012); *Oracle America Inc v Google LLC* 750 F 3d 1339, 1360-61, 1370 (Fed Cir 2014).

⁶⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 286-290.

⁶⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 304-05.

⁷⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 289. Algorithms can be abstracted at three different levels, which will be discussed in chapter,

⁷¹ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 176.

the view that the programmer who creates the program will be the author of the CGW under s9(3).⁷² It may be argued the question is answered when Guadamuz refers to the programmer being assigned authorship. However, Guadamuz omits to provide reasons or further details. Moreover, the question whether the creator of an algorithm can be assigned authorship was not explicitly addressed. This becomes important in works such as the Edmond de Belamy painting where the creator of the algorithm is a different person to the programmer. Ward, Fjeld, Epstein, Hertzmann et al advocate for further research to be conducted on algorithms in the context of copyright law.⁷³

Moreover, as it is not clear whether s9(3) requires an originality component for authorship to be assigned, this could have a negative impact on creators of algorithms being able to claim authorship under the provision. Guadamuz contends s9(3) excludes originality insofar as there is no need for original input into the CGW.⁷⁴ However, this argument is only based on a Hansard report at the time of creating s9(3).⁷⁵ Moreover, the Hansard report was focused on a discussion of moral rights in a CGW rather than whether original input is required.⁷⁶ Furthermore, Guadamuz's argument clashes with academic opinion from McCutcheon and De Wachter who makes claims to the contrary.⁷⁷ What this potentially means

⁷² Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176.

⁷³ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2021; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

⁷⁴ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176.

⁷⁵ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176 citing HL Deb vol 493, col 1305 (25 February 1988) as supportive evidence.

⁷⁶ HL Deb vol 493, col 1305 (25 February 1988).

⁷⁷ Jani McCutcheon, Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories* (2013) 37 Melbourne University Law Review 46, 51; Joren De Wachter, 'Software Written By Software –Is Copyright Still the Appropriate Tool to Protect IT? (2010) 11 Computer Law Review International 12, 16.

is that if an originality component is required, which is not clear from the statutory provision,⁷⁸a creator of an algorithm may not attain authorship under s9(3). This is due to how existing copyright law understands algorithms to be functional material.⁷⁹ Aplin and Pasqualetto purport that copyright's limited approach to understanding the functions of a computer program is part of the problem with how copyright can respond to AI generative works.⁸⁰ This is likely to be the case as algorithms play a vital role in the creation of generative AI works. By re-examining the SSO of a computer program to assess whether the SSO is reliably understood, one may be able to advance an argument that the understanding of algorithms needs to be re-examined also. The research may help to respond to Aplin and Pasqualetto's arguments on how better to address authorship of generative AI works.

The uncertainty around how proximate the input needs to be in relation to the output is an additional area of debate associated to when s9(3) applies to CGWs. Although this is not an area that is addressed in this thesis, it is prudent to explore the debate, as it can help to set the thesis into context, especially as the human input may be less with the more autonomous AI generative works. The issue is illuminated in Lambert's reasoning as Lambert raises several questions over the scope of s9(3) which suggests ascertaining authorship to the programmer may be more complex than envisaged by Guadamuz.⁸¹ The questions focus on the degree of control or proximity that is required for the human arrangements to be deemed necessary for creating the CGW. Lambert raises this question using a range of examples, including machine

⁷⁸ S9(3) is silent on the issue.

⁷⁹ C-406/10 *SAS Institute Inc v World Programming Ltd* [2012] RPC 31[55]; Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16, recital 11.

⁸⁰ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 16 <<https://ssrn.com/abstract=3419481>> accessed 29 March 2024.

⁸¹ Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, Ai and Machine Learning' (2017) 39 *European Intellectual Property Review* 15.

learning robots.⁸² The example is to illustrate the issue that the CGW may be produced down the line from the programmer, so proximity could be a problem in assigning authorship under s9(3).⁸³ If the creator of the algorithm is a different individual to the programmer, the issue applies to them also. Perhaps, an answer lies with how the provision is concerned with attributing rights rather than in the strict sense focusing on authorship. This argument is also raised by Aplin and Pasqualetto.⁸⁴ Moreover, McCutcheon, reminds the reader that s9(3) does not state that the *arrangements necessary* have to *cause* the creation of the CGW.⁸⁵ By not having to establish the chain of causation between the input and output, one can understand the logic behind the argument that only a link is required between the input and the output. The latter is an argument presented by Bonadio et al insofar as establishing a link between the technical arrangements and the CGW for authorship to be assigned under s9(3).⁸⁶ If this argument is accepted, a creator of an algorithm could satisfy s9(3), but a re-examination of algorithms for copyright purposes is likely to be required, given the landscape on the uncertainty around the originality component associated to s9(3).

⁸² Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, AI And Machine Learning' (2017) 39 European Intellectual Property Review 15, 17. An explanation of machine learning is where the machine mimics patterns or makes statistical calculations based on data from the training datasets (*Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [21]).

⁸³ Paul Lambert, 'Computer Generated Works and Copyright: Selfies, Traps, Ai and Machine Learning' (2017) 39 European Intellectual Property Review 15, 17.

⁸⁴ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 15 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024.

⁸⁵ Jani McCutcheon, *Curing the Authorless Void: Protecting Computer-Generated Works Following ICETV and Phone Directories* (2013) 37 Melbourne University Law Review 46, 67. See also CDPA, s9(3).

⁸⁶ Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 International Review of Intellectual Property and Competition Law 1174, 1189.

Before re-examining the SSO of a computer program to inform discussion on algorithms, it is important from a new materialist perspective when examining the law on CGWs, that one understands the context of s9(3).⁸⁷

2.1.3 Hansard reports: The material process of s9(3)

The Hansard reports reveal concern during the enactment of s9(3) about whether the provision would adequately address the advances in technology, namely, CGWs.

It may not be surprising that academic discussion has arisen around the meaning of *arrangements necessary* in s9(3), as the so- called provision is all of two lines.⁸⁸ And although there is merit in keeping provision broad so it can evolve with the advancements in technology,⁸⁹ it is too short to offer any meaningful answers on how authorship should be assigned. Sir Pattie makes a similar remark during a parliamentary debate associated to the bill on the CDPA. Pattie questioned whether the definition for CGWs was clear enough in terms of the distinction between computer-generated and human-generated.⁹⁰ He raised strong concerns over whether humans would be protected, as although the CDPA makes provision for CGWs, in his judgement, “lip service may have been paid to new technology.”⁹¹ He is suggesting that no thought or meaning has gone into drafting how the provision works in practice. This criticism does not seem to have been acted upon within the final version of the provision within the CDPA.⁹²

⁸⁷ A new legal materialist aims to explore how the law comes into being, to better understand how it is understood, would include examining any external legal materials that sheds light on the context of the law.

⁸⁸ CDPA, s9(3).

⁸⁹ Hansard, HC vol 132 col 541 (28 April 1988).

⁹⁰ Hansard, HC vol 132 col 542 (28 April 1988).

⁹¹ Hansard, HC vol 132 col 541 (28 April 1988).

⁹² S9(3).

The CDPA faces further criticism by Sir Pattie, in the way it deals with computer programs. Pattie draws on the similarities within the language of the CDPA with that of the Copyright Act 1956.⁹³ Pattie observes the 1956 Act covers computer programs, at a time when computers were almost the size of a house.⁹⁴ Although somewhat exaggerated,⁹⁵ this is a very valuable point as it indicates the conditions of technology when provision within the 1956 Act was being drafted. The language of the 1988 Act is not dissimilar to the 1956 Act. S2 of the Copyright Act 1956 identifies that copyright can subsist in original literary, dramatic or musical works without any further elaboration as to what may qualify under these categories.⁹⁶ And although computer programs are now *identified* as literary works,⁹⁷ computer programs remain undefined.⁹⁸ This is a grave cause for concern, as understanding a computer program, more specifically, the SSO, is vital to this thesis in how the research helps to address whether the creator of an algorithm can be assigned authorship of a CGW.

Direction can be sought from the Hansard reports on how the judiciary might approach understanding CGWs. It is of noteworthy importance the reports could be used to suggest an interpretive approach the judiciary could take when bringing meaning to the provision. During a parliamentary debate, Nicholson, expounded that “we have to think laterally to find a definition that fits this unique product”.⁹⁹ The unique product she is referring to is CGWs. Nicholson, a computer programmer, and a computer consultant, is of the opinion that language need not be so literal and needs to be used to aid understanding and to reflect that ‘computer software is the product of new methods of identifying and transmitting human thought.’¹⁰⁰

⁹³ Hansard, HC vol 132 col 541 (28 April 1988) refers to The Copyright Act 1956.

⁹⁴ Hansard, HC vol 132 col 541 (28 April 1988); The Copyright Act 1956.

⁹⁵ Nicholson, a computer programmer and computer consultant quarrelled with his technical knowledge. Whilst accepting “pseudo-Shakespeare” would not be created, recalls creating fugues on computers. See Hansard, HC vol 132 col 577 (28 April 1988).

⁹⁶ The Copyright Act 1956, s2.

⁹⁷ CDPA s3(b).

⁹⁸ CDPA, s3(b).

⁹⁹ Hansard, HC vol 132 col 577 (28 April 1988).

¹⁰⁰ Hansard, HC Vol 132 col 577 (28 April 1988).

What this means is that the judiciary should not get bogged down in semantics but should employ interpretative tools that facilitate a broader understanding that reflects the human contributions within the technology. It should be noted that Nicholson is not a lawyer, however, the judiciary do have the capacity to look beyond the plain, ordinary meaning of a provision.¹⁰¹ As a new materialist researcher, I would support the direction in which Nicholson suggests.

A new materialist would not be distracted by semantics or determining arbitrary demarcations within the law on computer programs and CGWs,¹⁰² which appear to be the unintended consequences of legal positivism, framed within the theory of formalism.¹⁰³ Rather, the judiciary should interpret s9(3) in a way that understands CGWs as *intra-actions*.¹⁰⁴ Intra-actions means that engagements do not take place between pre-existing units.¹⁰⁵ It is contended to fully understand the contributions in an algorithm an understanding of *all* the legal materials and processes connected to dealing with an algorithm in the context of copyright law should be examined.¹⁰⁶ This includes incorporating the philosophy of computer science.¹⁰⁷ It is noteworthy that Mr Justice Pumfrey warns against continuing with the current copyright approach for the digital era and claims that a comprehensive understanding of the technology inherent in computers is needed before sound legal reasoning can be provided on related

¹⁰¹ The judiciary can opt to use the purposive approach which examines the purpose of the Act rather than the literal meaning of specific words within the provision. The thesis explores this proposal in chapters 4 & 5.

¹⁰² This argument is made through a new materialist lens. I include some notable scholarship on new materialism: Diana Coole, Samantha Frost, '*Introducing the New Materialism*' in D Coole, S Frost (eds), '*New Materialism ontology, agency and Politics*' (Duke University Press 2010) 1-15; Rosi Braidotti, '*The Posthuman*' (Polity 2013) 95-101; Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813-818.

¹⁰³ A feature of the next section in this chapter.

¹⁰⁴ This is a term coined by Karen Barad. For a more detailed explanation on the intra-actions within engagements see Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

¹⁰⁵ Margaret Davies, '*Law Unlimited Materialism, Pluralism, and Legal Theory*' (2017 Routledge) 60. See Karen Barad for a more detailed explanation. Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

¹⁰⁶ New materialism, as a theory, considers all the legal materials within the legal process of making the law.

¹⁰⁷ Cross refer to chapter 1, ('n 172').

copyright issues.¹⁰⁸ The Hansard reports provide not only context but some direction that may be useful in the approach to be taken on better understanding algorithms of a computer program for the purposes of s9(3).

The following section examines the SSO of a computer program through a formalist lens to try to understand whether the SSO is reliably understood. An incomplete understanding of the SSO in a computer program may have implications on how algorithms are treated for copyright purposes and, in turn, whether a creator of an algorithm can be assigned authorship under s9(3).

2.2 The formalist conceptual model

The conceptual model used by the judiciary to understand whether a specific form constitutes an aesthetic work within a category under the CDPA, corresponds with the formalist theory of art.¹⁰⁹ The theory is important to copyright as it helps the judiciary understand aesthetic works, without necessarily having aesthetic expertise.¹¹⁰

2.2.1 A formalist abstraction of a copyright work

A copyright work may take a specific form to be eligible for copyright protection under the CDPA.¹¹¹ The forms are legally recognised through a categorisation system under the Act. There are eight forms which are categorised in the following way: original literary, dramatic,

¹⁰⁸ *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 cited in Brian Bandey, 'Over-categorisation in copyright law: computer and internet programming perspectives' (2007) 29 European Intellectual Property Review 461, 465.

¹⁰⁹ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 231.

¹¹⁰ Frank Sibley, 'Aesthetic Concepts' (1959) 68 The Philosophical Review 421, 439.

¹¹¹ Although the forms of a work have arguably never been fully compatible with the EU Aquis Communautaire. See Intellectual Property Office, 'IP and Metaverse(s) -An Externally Commissioned Research Report' (IPO, 7 March 2024) <[IP and Metaverse\(s\) – an externally commissioned research report – GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/research-reports/ip-and-metaverse-s-an-externally-commissioned-research-report)> accessed 18 April 2024.

musical¹¹² artistic,¹¹³ sound recordings, films, broadcasts and cable programmes.¹¹⁴ These objects or vessels are a by-product of copyright being classed as a property right which a person can have exclusive control over.¹¹⁵ However, CGWs are dealt with separately within the Act.¹¹⁶ Although CGWs exist in a separate section, for the purposes of examining s9(3), this thesis also examines a computer program, which takes the form of a literary work.¹¹⁷

The Berne Convention explains that ‘literary and artistic works shall include every production in the literary, scientific and artistic domain, whatever may be the mode or form of expression’.¹¹⁸ Article 2 (2) allows scope for national states, to use categories to fix works in some material form,¹¹⁹ which the UK has opted for as is evidenced in s3-8 of the CDPA. Although these categories have been called into question by the CJEU in *Levola*,¹²⁰ leaving English judges in a difficult position,¹²¹ the Berne Convention can be read so that a computer program takes the form of a literary work.¹²² Moreover, this is also made clear in the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).¹²³ On this basis, how a copyright work takes a specific form will be examined to assess whether the SSO of a computer program is likely to be fully understood as this may have implications on addressing the research question in this thesis.

¹¹² CDPA, s3.

¹¹³ CDPA, s4.

¹¹⁴ CDPA, s5-7.

¹¹⁵ Anne Baron, ‘Copyright, Art and Objecthood’ in Daniel McClean, Karsten Schubert (eds), *Dear Images, Art, Copyright and Culture* (Ridinghouse 2002) 292.

¹¹⁶ CDPA, s9(3).

¹¹⁷ CDPA, s3(1)(b).

¹¹⁸ Berne Convention for the Protection of Literary and Artistic Works (of September 9 1896 and amended on September 28 1979) Art 2 (1).

¹¹⁹ Berne Convention for the Protection of Literary and Artistic Works (of September 9 1896 and amended on September 28 1979) Art 2 (2).

¹²⁰ Case-C-310/17 *Levola Hengelo BV v Smiled Foods BV* [2018] ECR I-00000.

¹²¹ *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch) [2013], RPC 17 [27]; Response Clothing Ltd v The Edinburgh Woollen Mill Ltd [2020] EWHC 148 (IPEC), [2020] FSR 25 [61], [63].

¹²² WIPO Copyright Treaty (Geneva, Dec 20 1996) art 4; Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) art 2.

¹²³ Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 10(1). The UK is a member of this TRIPS.

Determining whether a copyright work fits one of the aesthetic works within the categorisation system in the CDPA can be done by examining the aesthetic features or non-aesthetic properties of the work. For example, an aesthetic work can be understood by referring to the aesthetic features of a work.¹²⁴ If a drawing is said to have an extraordinary vitality, another aesthetic term to describe vitality could involve the free and vigorous style of the drawing.¹²⁵ If the aesthetic term ‘dainty’ is used, it may follow the use of other aesthetic terms such as the delicacy and harmony of the work’s colour.¹²⁶ However, engaging in the use of aesthetic terms to identify an aesthetic work can be quite complex.¹²⁷ Instead, formalism can be used to focus on the non-aesthetic features of a work, which are easier to grasp and the judiciary do not need to be experts in understanding aesthetic works.¹²⁸ Concentrating on the non-aesthetic properties compared to the aesthetic features appears to be a more favourable approach.

The non-aesthetic features of a work can determine whether the judiciary perceive the material to be a copyright work.¹²⁹ Pila utilises Sibley’s research on aesthetic concepts to explain how the non-aesthetic qualities appear to be used by the judiciary to understand works in copyright¹³⁰. The non-aesthetic features of a work are described by Sibley as:

¹²⁴ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 423.

¹²⁵ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 423.

¹²⁶ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 423.

¹²⁷ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 424-437.

¹²⁸ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 439.

¹²⁹ Justine Pila, ‘Copyright and its categories of original Works’ (2010) 30 *Oxford Journal of Legal Studies* 229, 231.

¹³⁰ Justine Pila uses Frank Sibley’s work. Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421. See Justine Pila, ‘Copyright and its Categories of Original Works’ (2010) 30 *Oxford Journal of Legal Studies* 229, 231. Walton also uses the research from Sibley to accept that aesthetic properties depend on non-aesthetic properties. See Kendall Walton, ‘Categories of Art’ (1970) 79 *The Philosophical Review* 337-338. Further, Zangwill uses Sibley work to assume that aesthetic properties are determined by non-aesthetic properties. See Nick Zangwill, ‘Feasible Aesthetic Formalism’ (1999) 33 *Nous* 610.

[the] curving or angular lines, [colour] contrasts, placing of masses, or speed of movement, are visible, audible or otherwise discernible without any exercise of taste or sensibility.¹³¹

The non-aesthetic features such as arrangements of lines, shapes and colours on the surface of a painting, for example, help illuminate the aesthetic properties of the painting. Aesthetic properties of music are thought to be defined by the arrangements in time. In the above two examples, the sensory properties of colour and sound as non-aesthetic features are crucial in determining the aesthetic work. In works such as abstract sculptures, the three-dimensional spatial relations between the physical parts of the sculpture are significant instead. In short, aesthetic works are to be determined solely on the sensory or physical properties as long as the latter are not related to other things or times.¹³²

The non-aesthetic features of an aesthetic work form the legal reasoning of judges in determining whether a work can qualify legally for copyright protection. For example, in *Antiquesportfolio.com Plc*,¹³³ Mr Justice Neuberger was of the view that:

in the case of photographs of a three-dimensional object.....it can be said that the positioning of the object (unless it is a sphere), the angle at which it is taken, the lighting and the focus, and matters such as that, could all be matters of aesthetic or even commercial judgement, albeit in most cases at a very basic level.¹³⁴

The spatial relations of the object coupled with the sensory features were non-aesthetic properties used to determine aesthetic features of the work for copyright purposes. Mr Justice

¹³¹ Frank Sibley, 'Aesthetic Concepts' (1959) 68 *The Philosophical Review* 421, 424.

¹³² Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 611.

¹³³ *Antiquesportfolio.com Plc v Rodney Fitch & Co Ltd* [2000] 7 WLUK 214, [2001] ECDR 5, 59.

¹³⁴ *Antiquesportfolio.com Plc v Rodney Fitch & Co Ltd* [2000] 7 WLUK 214, [2001] ECDR 5, [34].

Neuberger J explains that this is how most artistic works for copyright can be perceived.¹³⁵ This statement is corroborated by Mr Justice Laddie in *Metix Ltd*,¹³⁶ when he suggests that ‘a sculpture is a three-dimensional work made by the artist’s hand’.¹³⁷ The physical properties of the aesthetic work were used to determine whether a sculpture is legally a copyright work. Moreover, Lord Justice Lawton remarked in *Merchandising Corp of America*,¹³⁸ that a painting must be on a surface of some kind’.¹³⁹ The non-aesthetic features relate to the surface of a painting which meant that the facial make-up of Adam Ant (a pop star) was not considered to be a sufficient surface to qualify as a copyright work. The non-aesthetic features make visible a work for copyright purposes.

These non-aesthetic properties act as a tool so the court can see the aesthetic features without necessarily having the expertise in the area. It ensures that the court can bring others to see what they have not seen.¹⁴⁰ The above examples demonstrate how the judiciary employ the non-aesthetic properties to determine an artistic copyright work,¹⁴¹ but literary works¹⁴² will also be used as further examples.

Literary works are interpreted by their sensory and physical properties. It is important to note that according to the CDPA, computer programs and preparatory design material for a computer program take the form of a literary work.¹⁴³ Mr Justice Peterson in *University of London Press Ltd*¹⁴⁴ opined that ‘literary works cover [works] which [are] expressed in print or

¹³⁵ *Antiquesportfolio.com Plc v Rodney Fitch & Co Ltd* [2000] 7 WLUK 214, [2001] ECDR 5 [31].

¹³⁶ *Metix Ltd v GH Maughan (Plastics) Ltd* [1997] FSR 718.

¹³⁷ *Metix Ltd v GH Maughan (Plastics) Ltd* [1997] FSR 718, 722.

¹³⁸ *Merchandising Corp of America Inc and Others v Harphond Ltd and Others* [1981] 12 WLUK 161, [1983] FSR 32

¹³⁹ *Merchandising Corp of America Inc and Others v Harphond Ltd and Others* [1981] 12 WLUK 161. [1983] FSR 32, 46.

¹⁴⁰ Frank Sibley, ‘Aesthetic Concepts’ (1959) 68 *The Philosophical Review* 421, 439.

¹⁴¹ CDPA, s4.

¹⁴² CDPA, s3.

¹⁴³ CDPA, s3(1)(a) (b) (c) (d).

¹⁴⁴ *University of London Press Ltd v University Tutorial Press Ltd* [1916] 2 (Ch) 601.

writing, irrespective of the question whether the quality or style is high.’¹⁴⁵ Mr Justice Peterson drawing attention to the sensory properties of a literary work for copyright purposes.

A computer program takes the form of a literary work.¹⁴⁶ Pila draws attention to how a computer program may take this form. Pila correctly explains that *writing* ‘includes any form of notation or code, whether by hand or otherwise and regardless of the method or medium in or on which, it is recorded’.¹⁴⁷ One notes that the sensory properties of the code are made visible in the CDPA to make a computer program take the form of a literary work.¹⁴⁸ The sensory properties of the code are also illuminated in Mr Justice Jacob’s judgment in *IBCOS*.¹⁴⁹ Although a case on infringement, part of the reasoning illustrates the use of the sensory properties to help understand a computer program as a literary copyright work. Mr Justice Jacob’s reasoning in finding the code was infringed as a literary work focused on the sensory properties associated to the common mistakes, identical comment headings, redundant and unexplained code in both programs, amongst other properties.¹⁵⁰ Focusing on the sensory of a computer program makes sense of how a program is categorised as a literary work.

CGWs are works distinct from its materials, namely, the computer program, according to the CDPA. CGWs *appear* by brief mention in the minor definitions section of 178, as a work that is generated without a human. Based on the minor definition, and as copyright is anthropocentrically defined,¹⁵¹ Parliament intended that these works would not qualify as a

¹⁴⁵ *University of London Press Ltd v University Tutorial Press Ltd* [1916] 2 (Ch) 601, 608.

¹⁴⁶ CDPA, s3 (1) (b).

¹⁴⁷ Pila mentions s178 of the CDPA. See Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 231 and CDPA s178 (minor definitions).

¹⁴⁸ CDPA, s178.

¹⁴⁹ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275.

¹⁵⁰ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 297-298.

¹⁵¹ Although this has not been made explicit in the legal instruments, it can be inferred. See the Berne Convention which refers to the nationality of authors. Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) Art 3. The CDPA refers to the ‘person’ in s9(1) when defining an author.

work for copyright purposes. It should be noted that s9(3) acts as an exception to this understanding.¹⁵²

It is contended that for one to address whether a creator of an algorithm can be assigned authorship under s9(3), an understanding of whether the SSO in a computer program is fully understood will serve as a building. What this means is that precedents on computer programs will be examined. As Pila demonstrates how judicial interpretations in copyright jurisprudence correspond with the formalist theory of art, precedents on computer programs will be examined through a formalist lens. More specifically, whether using the sensory and physical properties of a computer program equips the judiciary to understand the SSO. Before the thesis uses the formalism as an analytical lens, it is prudent to understand the criticisms that are levied at formalism.

2.2.2 The limitations of formalism

Formalism does not allow enough scope to perceive all the material that exists within a work. This is due to the narrow formalist theory that is applied by the judiciary to help bring the aesthetic features to the forefront so an aesthetic work can metamorphosis into a copyright work.

Sensory or physical non-aesthetic qualities are used to determine a copyright work while ignoring other properties in a work. The physical properties are only relevant if the physical features are not related to other things or times.¹⁵³ The sensory and physical properties, which were described earlier, correspond with the formalist art theory, most notably

¹⁵² An author who is responsible for the arrangements necessary for the creation of a CGW will be assigned authorship. See CDPA, s9(3).

¹⁵³ Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 611.

from Sibley.¹⁵⁴ However, the type of formalism that is adopted in copyright is of a very narrow nature or to borrow a term from Zangwill reflects ‘extreme formalism.’¹⁵⁵ This is insofar as the properties that are visible to the judicial eye are only the sensory and physical properties of the work. A broader definition of formalism can include more wide ranging non-aesthetic properties such as the history of production of a work. The latter can comprise of the artists’ intentions and the context of the work. Parsons refers to this as being moderate formalism.¹⁵⁶ There is another even broader type of formalism known as latent formalism. Latent formalism examines properties that feature underneath the surface of a work that are akin to the work’s underlying syntax.¹⁵⁷ It would appear that copyright adopts a narrow interpretation to formalism.

The purpose for employing narrow non-aesthetic properties of an art theory such as formalism to copyright is that the theory allows *specific* aesthetic features of a work to be seen.¹⁵⁸ Arguably, it may be easier to understand a work using those properties rather than engaging in artists’ intentions and contextual matters when determining the aesthetic properties of a work.¹⁵⁹ These narrow non-aesthetic properties can be used to argue *towards* the existence of an aesthetic work, however, it should be stressed that they cannot be used to deny the existence of additional aesthetic features.¹⁶⁰ This is a noteworthy point as although the courts may decide that a work is not a literary work under the categorisation system within the CDPA,

¹⁵⁴ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 231.

¹⁵⁵ Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 611.

¹⁵⁶ Glenn Parsons, 'Moderate Formalism as a Theory of the Aesthetic' (2004) 38 *The Journal of Aesthetic Education* 19, 20.

¹⁵⁷ Richard Wolheim, 'On Formalism and Pictorial Organisation' (2001] 59 *Journal of Aesthetics and Art Criticism* 127, 130-132.

¹⁵⁸ Frank Sibley, 'Aesthetic Concepts' (1959) 68 *The Philosophical Review* 421, 439.

¹⁵⁹ Kendall Walton, 'Categories of Art' (1970) 79 *The Philosophical Review* 334, 361-362.

¹⁶⁰ Frank Sibley, 'Aesthetic Concepts' (1959) 68 *The Philosophical Review* 334, 425-426.

it does not prohibit further arguments in the future that suggest other aesthetic features exist to make a claim to the contrary.¹⁶¹

Conversely, new materialism can be used as an alternative conceptual theory making visible additional aesthetic properties of a computer program for copyright purposes.¹⁶² New materialism makes visible additional properties within a copyright work by exploring the legal materials on computer programs. Kang and Kendall confirm that legal materials can include text of rulings and statutory interpretive techniques, which are (re) examined in this thesis.¹⁶³ The main aim is to bring understanding to CGWs under s9(3). The analysis will contribute to the existing scholarly literature on the meaning of *arrangements necessary* in a CGW for authorship to be assigned under s9(3).¹⁶⁴ Having drawn on the academic literature on

¹⁶¹ New materialism will be discussed in chapters 3 & 4 as a possible alternative conceptual theory that can be used by the judiciary to help make visible additional aesthetic properties. This is done by exploring the legal materials/legal processes, including the context, to better understand a CGW. The aim is to understand more fully CGWs and the human involvement and contribution in creating them. This will contribute to the scholarly literature that exists on the meaning of *arrangements necessary* in a CGW for authorship to be assigned under s9(3).

¹⁶² Cross refer to chapter 5, s5.3 240.

¹⁶³ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

¹⁶⁴ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 1-19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024. Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (Photograph and Painting) Under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 198-217; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 225-244; Gunther Teubner, 'Rights of Non-Humans? Electronic agents and Animals as New Actors in Politics and Law' (2006) 33 Journal of Law and Society 497-521; Madeleine de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 511- 535; Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 International Review of Intellectual Property and Competition Law 1174-1200; Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 International Journal of Law and Information Technology 279-296; Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 Melbourne University Law Review 46-102; Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 Cambridge Law Review 62-85; Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 European Intellectual Property Review 457-460; Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 Columbia Law Journal and Arts 395, 399; David Komuves et al, 'Monkeying around with Copyright – Animals, Ai's and Authorship in Law' (2015) CREATE 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 5 Nov 2023; Enrico Bonadio and Nicola Lucchi,

formalism, which indicates that the judiciary use an extreme form of formalism to interpret the meaning of a copyright work, it is important to examine the material effects, if any, on judicial reasoning in copyright cases associated to computer programs and CGWs.

2.3 Formalism and the reductionist approach to computer programs

The section reveals the likelihood that the SSO of a computer program is not fully understood. It is contended the difficulty is associated with the formalist conceptual model utilised by the judiciary to interpret copyright works. The formalist model makes visible an aesthetic work for copyright purposes through the work's non-aesthetic properties. These non-aesthetic features are the physical and sensory properties of a work.¹⁶⁵ As such, a computer program expressed as a literary work attracts copyright.¹⁶⁶ Formalism allows the judiciary to understand an aesthetic work for copyright purposes without having aesthetic expertise.¹⁶⁷ Nevertheless, the research suggests that formalism produces a limited or incomplete understanding of the SSO of a computer program. Not all the materials of the SSO are made visible by the formalist approach. This manifests in the SSO of a computer program being interpreted as a static object or thing. The rigid interpretation reduces the SSO *within* a computer program to an idea beyond the scope of copyright protection.¹⁶⁸

'How Far Can Copyright Be Stretched? Framing The Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 Intellectual Property Quarterly 115, 131; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, AI And Machine Learning' (2017) 39 European Intellectual Property Review 12, 17; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

¹⁶⁵ Justine Pila uses Frank Sibley's work. Frank Sibley, 'Aesthetic Concepts' (1959) 68 The Philosophical Review 421. See Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 231.

¹⁶⁶ CDPA, s3(1)(b), (c).

¹⁶⁷ Frank Sibley, 'Aesthetic Concepts' (1959) 68 The Philosophical Review 421, 439.

¹⁶⁸ If the SSO is expressed in preparatory design documents, then copyright protection may be granted. CDPA, s3(1) (c).

2.3.1 The controversy over the abstractions: The idea from the expression of an idea

The non-aesthetic physical and sensory properties of a work made visible by the formalist theory *should* determine if a work is expressed in a form under the CDPA, or alternatively, if the work remains a mere idea. Nonetheless, abstracting the idea from the expression of an idea to determine copyright has proved difficult for the judiciary. This is significant since there is no copyright in the idea alone but only in the expression of an idea.

Although the idea/expression dichotomy, a term of art used in copyright law, is not explicitly recognised within the CDPA, the UK has international obligations to recognise the dichotomy. The obligations are provided by the Agreement on Trade-Related Aspects of Intellectual Property, the World Intellectual Property Organisation (WIPO) Copyright Treaty, and, indirectly, the Berne Convention.¹⁶⁹ The dichotomy is referred to in the case law on computer programs throughout this thesis. There is merit to this dichotomy as arguably on an evidential basis, it proves the existence of a work, but also prevents a monopoly over ideas.¹⁷⁰ The latter being an extremely important utilitarian value embedded into English copyright law since 1774 in *Donaldson v Beckett*.¹⁷¹

The exposition by Laddie et al on the idea/expression dichotomy proves helpful as a way of explanation. The authors illuminate the relationship between originality and the dichotomy. An original expression is only required for literary, dramatic, musical, and artistic

¹⁶⁹ The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 9(2); World Intellectual Property Organisation Treaty (adopted in Geneva on Dec 20, 1996) art2; Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) art2(1)(2). These agreements were also discussed in the context of the idea/expression dichotomy by Guido Noto La Diega, in 'Idea' (2023) in Paul Torremans, Irini Stamatoudi, Peter K Yu and Bernd Justin Jütte (eds), *Encyclopaedia of Intellectual Property Law* (Edward Elgar 2023) < [Idea by Guido Noto La Diega :: SSRN](#) > accessed 30 April 2024.

¹⁷⁰ Deming Liu, 'Reflections on the Idea/Expression Dichotomy in English Copyright Law' (2017) 1 *Journal of Business Law* 71, 72; Patrick Masiyakurima, 'The Futility of Idea/Expression in UK Copyright Law' (2007) 38 *International Review of Intellectual Property and Competition Law* 548, 551.

¹⁷¹ *Donaldson v. Becket* [1774] 1 ER 837.

work.¹⁷² That said, a computer program is classed as an original literary expression.¹⁷³ Laddie et al refer to the dichotomy in the context of painting a dog listening to his master's voice on a gramophone. The painting is an expression of the idea of the dog and the gramophone. Others are free to copy the idea within the painting, namely, to produce their own painting of a man with a dog. However, the combination of ideas, such as the breed of the dog and the type of gramophone, in addition to some obvious, perhaps striking, or unusual ideas, such as the expression on the animal's face and its posture, may form a material part of original expression in the work. What this means is that an imitator who copied these or omits some and adds a few of their own ideas in their painting may be in breach of the original expression of the painting.¹⁷⁴

The clear exposition of Laddie et al of an original expression of an idea; a rather complex subject, can be used to illuminate meaning in Mr Justice Jacob's explanation of the distinction between an idea and an expression of an idea in a computer program. Mr Justice Jacob in *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] states:

where an idea is sufficiently general, then even if the original work embodies it, the mere taking of an idea will not infringe. But if the "idea" is detailed, then there may be infringement. It is a question of degree.¹⁷⁵

¹⁷² CDPA, s1(1)(a).

¹⁷³ CDPA, s3(b)(c); The Berne Convention can be read to include a computer program as a literary work. See World Intellectual Property Organisation Copyright Treaty (Geneva, Dec 20 1996) art 4 and the Berne Convention for the Protection of Literary and Artistic works (of September 9 1896 and amended on September 28 1979) art 2. See also the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 1(1).

¹⁷⁴ Laddie, Prescott & Vitoria, *The Modern Law of Copyright* (5th ed, LexisNexis Butterworths 2018) 4.52. Works from this author have been used in the past by the judiciary.

¹⁷⁵ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 302

Drawing on Laddie et al, not all expressions of an idea, will attract copyright protection. The more detailed the expression, the more likely the expression can convey the originality within the expression as otherwise it may be classed as an idea. This seems to make sense as the explanation by Laddie et al aligns with how an original expression is understood by the CJEU and how English law understands an original expression at the time of submitting the thesis.¹⁷⁶ This is insofar as the work needs to be an intellectual creation of the author, reflecting the author's personality, through expressing their free and creative choices.¹⁷⁷ Nevertheless, the judiciary are often uncertain on where the boundaries lie between these two nebulous concepts of an idea and an expression. Lord Justice Lloyd very aptly demonstrates the difficulties between the distinction of an idea and an expression of an idea in *Baigent v Random House Group Ltd* when noting:

copyright does not subsist in ideas; it protects the expression of ideas, not the ideas themselves. No clear principle is or could be laid down in the cases in order to tell whether what is sought to be protected is on the ideas side of the dividing line, or on the expression side.¹⁷⁸

Lord Justice Lloyd opines that there is no clear principle for recognising the material embodiment of an idea expressed in the *form* of a work. Distinguishing between an idea and an expression of an idea is no doubt difficult for the judiciary, which may indicate there are some limitations with using the formalist model.

¹⁷⁶ Case C-5/08 *Infopaq International A/S v Danske Dagblades Forening* [2009] ECR I-6569 [37]; Case C-145/10 *Painer v Standard Verlags GmbH* [2011] ECR I-12533 [89]. These cases were cited in *TJH Systems Ltd, Optionnet LLP and Sheridan, Sheridan Options Corp* [2023] EWCA Civ 1354 [15],[16] which confirmed that English law adhere to the decision in *Infopaq* on the meaning of an original expression.

¹⁷⁷ Case C-145/10 *Painer v Standard Verlags GmbH* [2011] ECR I-12533 [89].

¹⁷⁸ *Baigent v Random House Group Ltd* [2007] EWCA Civ 247; [2008] EMLR.7 [5]. Liu also quotes this case. See Deming Liu, 'Reflections on the Idea/Expression Dichotomy in English Copyright law' (2017) 1 Journal of Business Law 71, 73.

The non-aesthetic physical and sensory properties of a work which correspond with formalism do not appear to be assisting the judiciary with abstracting the idea from the expression of an idea. For example, *Designers Guild Ltd* concerned a decision given by the former House of Lords in determining whether a fabric design had been substantially copied.¹⁷⁹ The court held that the Court of Appeal (CA) erred in their findings.¹⁸⁰ In trying to abstract the idea from the expression of the idea within the design, the CA confused the two. The CA found that the techniques that were used were ideas but had failed to see the material expression as the CA had not considered the visual *effects* of such techniques.¹⁸¹ By not recognising the visual effects, which is one of the non-aesthetic sensory features of the formalist theory which helps determine a work for copyright purposes demonstrates confusion with applying the formalist model.

Lord Hoffman attempts to bring clarity with propositions for the judiciary to consider when abstracting an idea from an expression of an idea in *Designers Guild Ltd*.¹⁸² For example, a copyright work must have a connection to a literary, dramatic, musical or artistic work for it to be said to be an expression of an idea. Liu questions the credibility of such a generalisation, especially as Lord Hoffman uses *Kleeneze* to underpin the proposition.¹⁸³ Liu suggests that the decision was largely based on policy reasons rather than a clear demarcation between the idea and the expression.¹⁸⁴ On one hand, Mr Justice Whitford, focuses his reasoning on the lack of copying of a literary work in the *form* of the design documents,¹⁸⁵ whilst on the other hand,

¹⁷⁹ *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2416.

¹⁸⁰ *Designers Guild Ltd v Russell Williams (Textiles) Ltd*. [2000] 1 WLR 2416.

¹⁸¹ *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2421.

¹⁸² *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2423. The first is that copyright work must have a connection to a literary, dramatic, musical or artistic work for it to be said to be an expression of an idea.

¹⁸³ Liu discusses both *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2416 and *Kleeneze Ltd. v DRG (UK) Ltd* [1984] FSR 399. See Deming Liu, 'Reflections on the Idea/Expression Dichotomy in English Copyright Law' (2017) 1 Journal of Business Law 71, 81.

¹⁸⁴ See Deming Liu, 'Reflections on the Idea/Expression Dichotomy in English Copyright law' (2017) 1 Journal of Business Law 71, 82. *Kleeneze Ltd. v DRG (UK) Ltd* [1984] FSR 402.

¹⁸⁵ *Kleeneze Ltd. v DRG (UK) Ltd* [1984] FSR 400, 402.

policy reasons appear to heavily influence the decision.¹⁸⁶ Mr Justice Whitford held that a balance needs to be taken to protect the work in the creation of the drawings, whilst also considering the need to keep producing these articles, namely, a draught excluder.¹⁸⁷ The reasoning raises questions over the efficacy of using the formalist model to understand a literary *expression* for copyright purposes.

The second proposition advanced by Lord Hoffmann is that some ideas expressed in a copyright work may not be protected insofar as they are not original.¹⁸⁸ Liu observes that the second proposition appears to confuse ideas with the original expression of ideas.¹⁸⁹ As noted earlier, original ideas do not attract copyright.¹⁹⁰ However, the explanation by Laddie et al of the distinction between an idea and an expression of an idea could be used as a way to clarify Lord Hoffmann's proposition.¹⁹¹ Not all expressions of an idea will be deemed to be an original expression, especially if the idea is very general or common. Nevertheless, the clarity that the propositions by Lord Hoffmann may have brought to the judiciary does not appear to have materialised.

One may glean from *Kleeneze* that at times, the courts stray from understanding the literary work as a thing or object, which the formalist model manifests, to viewing a literary work more as a process reflecting public interests. If this is the case, there may be space in the copyright discourse for a literary work not to be solely understood as a static thing or object, such as designs,¹⁹² but rather more broadly interpreted to reflect human input. This aligns quite

¹⁸⁶ Whitford J held that a balance needs to be taken to protect the work in the creation of the drawings, whilst also considering the need to keep producing these articles (draught excluder). *Kleeneze Ltd. v DRG (UK) Ltd* [1984] FSR 402.

¹⁸⁷ *Kleeneze Ltd. v DRG (UK) Ltd* [1984] FSR 400, 402.

¹⁸⁸ *Designers Guild Ltd v Russell Williams (Textiles) Ltd.* [2000] 1 WLR 2423.

¹⁸⁹ Deming Liu, 'Reflections on the Idea/Expression Dichotomy in English Copyright law' (2017) 1 Journal of Business Law 71, 79.

¹⁹⁰ TRIPS, art 9(2).

¹⁹¹ Laddie, Prescott & Vitoria, *The Modern Law of Copyright* (5th ed, LexisNexis Butterworths 2018) 4.52.

Works from this author have been used in the past by the judiciary.

¹⁹² Preparatory design documents may be protected. See CDPA, s3(1)(c).

closely to Nicholson's comments on the direction the courts should take when interpreting CGWs during a parliamentary debate on the enactment of the CDPA.¹⁹³

Mr Justice Ferris decided to take a different direction to abstracting an idea from an expression of an idea in *John Richardson*.¹⁹⁴ Mr Justice Ferris looked beyond English copyright law to the US for a variation on the idea/expression dichotomy.¹⁹⁵ The authority derived from the US Court of Appeal in *Computer Associates v Altai*.¹⁹⁶ *Altai* featured a three-stage test. The first step involves the abstraction stage. This is where a computer program is abstracted or dissected into literal elements such as the source code and object code.¹⁹⁷ The source code is comparable to when a writer crafts paragraphs to convey their idea.¹⁹⁸ The source code can be written in any of the computing languages.¹⁹⁹ On the other hand, the object code is a binary language that a machine can read which is represented in zeros and ones.²⁰⁰ The abstraction part of the *Altai* test is not limited to the code within the computer program but also includes the non-literal elements (the SSO) such as aspects associated to the program's structure or the modules within the program.²⁰¹ Once the abstraction stage is complete, the judiciary move on to apply the second and third steps.

The second and third steps involve the filtering and comparison stages. The courts have a filtering method so any element connected to the idea of the computer program or incidental to it will not be protected by copyright. Further, elements dictated by efficiency, by external factors such as *scènes à faire* doctrine or elements taken from the public domain are also filtered

¹⁹³ Hansard, HC Vol 132 col 577 (28 April 1988).

¹⁹⁴ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497.

¹⁹⁵ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497.

¹⁹⁶ *Computer Associates v Altai* 982 F 2d 693 (CA 2d Cir 1992).

¹⁹⁷ *Computer Associates v Altai* 982 F 2d 702 (CA 2d Cir 1992).

¹⁹⁸ *Computer Associates v Altai* 982 F 2d 698 (CA 2d Cir 1992).

¹⁹⁹ *Computer Associates v Altai* 982 F 2d 698 (CA 2d Cir 1992).

²⁰⁰ *Computer Associates v Altai* 982 F 2d 698 (CA 2d Cir 1992).

²⁰¹ *Computer Associates v Altai* 982 F 2d 698, 702 (CA 2d Cir 1992).

out as ideas.²⁰² A comparison made with the first and second stages apparently produces the core of protectable expression. The third stage allows the judiciary to examine the core protectable expression in the original program against the alleged infringing program to ascertain whether there is a substantial similarity to justify a finding of copyright infringement.²⁰³ Trying to abstract the core protectable expression *assumes* that the expression can be measured and identified with precision as pre-determined units.

What is likely to have attracted Mr Justice Ferris to the *Altai* test is that there is more guidance to abstract the idea from the expression of an idea in a computer program than using the formalist model. Moreover, Samuelson appears to generally support the *Altai* test as she maintains retaining it with some modifications.²⁰⁴ That said, the *Altai* test has not been used by any other English judge²⁰⁵ and Mr Justice Ferris attracted criticism for its use in *John Richardson*.²⁰⁶ Moon is also very critical of the test, as the test only illuminates the structure and not the sequence and organisation of the computer program.²⁰⁷ This is a concern as Moon is suggesting that it does not make the SSO in a computer program fully visible to the judicial eye. This seems to make sense as according to Justice Walker in *Altai* the non-literal elements are the structure or modules.²⁰⁸ Moon argues that the SSO needs to be abstracted at the level of design which would align with the software development models used in designing the SSO

²⁰² *Computer Associates v Altai* 982 F 2d 706-711 (CA 2d Cir 1992).

²⁰³ *Computer Associates v Altai* 982 F 2d 704 (CA 2d Cir 1992).

²⁰⁴ Pamela Samuelson, 'Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement' (2016) 31 Berkeley Tech L J 1215, 1230-1237.

²⁰⁵ To the best of the author's knowledge at the time of submitting the thesis.

²⁰⁶ By way of example, see David I Bainbridge, 'The Look and Feel of Computer Programs after *Richardson v Flanders*' (1993) 2 Law Computers & Artificial Intelligence 275. Although the latter was more to do with how the *Altai* test was used as opposed to the test itself. Further, Mr Justice Jacob was of the opinion that the *Altai* test would only complicate matter further in the sense of overciting US authority when the UK has a different statute. Nevertheless, he did concede that there was nothing in English law that would conflict with the general approach taken to the *Altai* test. See *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 301-302.

²⁰⁷ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 Journal of Intellectual Property Law & Practice 921, 924.

²⁰⁸ *Computer Associates v Altai* 982 F 2d 698, 702 (CA 2d Cir 1992).

for the SSO to be visible in a meaningful way.²⁰⁹ Overall, research indicates concern with judicial use of the *Altai* variation on the idea/expression dichotomy. As the *Altai* test has not been applied in any of the cases subsequent to *John Richardson*, the thesis turns to examining the application of the formalist model in abstracting the idea from the expression of the idea in a computer program.

An examination of the judicial reasoning on the SSO of a computer program will follow to assess the efficacy of the formalist model, as a conceptual model, for the judiciary to use as an interpretative tool.

2.3.2 Computer programs (the SSO) and judicial reasoning

Understanding the SSO in a computer program is a building block to a more meaningful appreciation of the *arrangements necessary* in a CGW under s9(3), with a specific focus on the creation of algorithms. Although the judiciary accept that copyright is not limited to the text of the code,²¹⁰ the lack of copyright protection for the SSO raises the question whether the SSO has been fully understood. If the findings suggest that the SSO has not been fully understood, this may indicate that a re-examination of algorithms for copyright purposes is required, potentially shaping the copyright narrative on authorship of a CGW under s9(3).

²⁰⁹ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 Journal of Intellectual Property Law & Practice 921, 924-930.

²¹⁰ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 527; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch) RPC 1 [232]; *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 302.

There have been no English cases, except for one,²¹¹ where the judiciary have protected the SSO *within* the computer program itself.²¹² The formalist model appears to lead to a very narrow understanding of the SSO for copyright purposes. Formalism focuses the judicial eye on the sensory and physical properties of a computer program. The model makes visible the textual nature of the code, but also the preparatory design documents of a computer program as a literary work.²¹³ Preparatory design documents attract copyright protection as a literary work under s3(1)(c) of the CDPA, which was transposed into law from EU Directive 1991.²¹⁴ The restrictive nature of formalism led Lord Justice Jacob in *Nova* to a restrictive interpretation of the preparatory design materials.²¹⁵ The design of a program can be referred to the SSO of a computer program.²¹⁶ Although the case focused on the alleged infringement, the reasoning can be used also to help understand the relationship between the SSO and a copyright work. Lord Justice Jacob's interpretation of the design materials within the computer game appears to correspond with a literal reading of the CDPA. The CDPA states that a literary work is any work that is written, spoken or sung.²¹⁷ S178 elaborates on what is meant by *writing* as writing includes any form of notation or code. In an *obiter* remark, Lord Justice Jacob states:

²¹¹ See *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497. However, Ferris J decided that three textual materials out of seventeen attracted copyrights. These materials consisted of the line editor, amendment routines and dose codes. Nonetheless, this decision was based on United States law and attracted criticism. For a full account of the decision, see *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497. To read a critical review of the judgment, see David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v Flanders (1993) 2 Law Computers & Artificial Intelligence 275.

²¹² The design can be protected with separate preparatory design materials. CDPA, s3(1)(C).

²¹³ CDPA, s3(1)(b)(C); s 178.

²¹⁴ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42. The directive was transposed into the CDPA by virtue of SI 1992/3233, reg 3.

²¹⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1047 [51].

²¹⁶ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 82 [232].

²¹⁷ CDPA, s3(1).

if Mr Jones had actually written a description of the pulsing, rotating cue, and synchronised power meter his description would (if not too trivial at least) be protected as a literary work. People could not copy that.²¹⁸

In other words, the design materials within the computer pool game could not be classed as a literary work under the CDPA as the design lacked the sensory properties, namely, the textual features of a literary work. This is despite Lord Justice Jacob stating that Council Directive 1991 (amended in 2009),²¹⁹ which was implemented by the CDPA to deal with the copyright of programs, may have contemplated just one copyright work for both the computer program and the preparatory design materials.²²⁰ The reasoning in *Nova* suggests that the narrowest interpretation of the design material in a computer program was given.

Art 1(1) of Directive 1991 addresses a computer program in the following way: ‘the term computer program shall *include* their preparatory design material’ suggesting a more expansive interpretation can be given. This indicates that Lord Justice Jacob is correct to moot a wider interpretation. There is no explicit mention that the preparatory design materials must be interpreted separately from the computer program. The travaux préparatoires, in the form of the original Commission proposal for the directive, states that the preparatory design documents which have made the creation of the program possible can be called computer software.²²¹ The proposal for the directive does seem to suggest that the design material is the

²¹⁸ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1047 [51].

²¹⁹ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42.

²²⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1041.

²²¹ Original Commission “Proposal for a Council directive on the Legal Protection of Computer Programs” COM (88) 816 final -SYN 183 (OJ C 91) [1.1]. These documents were also referred to in *Nova*.

computer program, and a literal reading of the directive does not appear to alter this. A wider interpretation of the design appears to be possible.

Nova raises a degree of uncertainty over how to interpret the design within a computer program for copyright purposes. Mr Justice Pumfrey warns that until technology is understood in a more meaningful way the process of sound reasoning cannot take place.²²² Arguably, the level of uncertainty in Lord Justice Jacob's reasoning in *Nova* can be used as evidence to support the lack of sound reasoning. Nevertheless, Lord Justice Jacob appears to have applied the CDPA in a literal way which corresponds with a formalist approach, only making visible the textual nature of the design documents for copyright. Using Mr Justice Pumfrey's line of reasoning that technology needs to be more meaningfully understood, I draw on Angius and Primiero, experts in the philosophy of computer science.²²³ Angius and Primiero's reasoning recognises the design *within* the computer program as the SSO.²²⁴ Angius and Primiero's interpretation aligns with the more expansive interpretation first mooted by Lord Justice Jacob, but not followed in *Nova*.²²⁵

The trouble with what seems to be a literal interpretation of the CDPA is that not all the design materials *within* the computer program are considered for copyright protection. Lord Justice Jacob believed the possible mismatch in the interpretation between the directive and the CDPA did not affect the outcome of the case.²²⁶ However, it is difficult to be convinced by

²²² *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 cited in Brian Bandey, 'Over-Categorisation in Copyright Law: Computer and Internet Programming Perspectives' (2007) 29 European Intellectual Property Review 465.

²²³ Nicola Angius, Giuseppe Primiero 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 283.

²²⁴ Nicola Angius, Giuseppe Primiero 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 304. Arnold J discusses the design of the program being referred to as the structure, sequence, and organisation of the computer program. See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 82 [232].

²²⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1041.

²²⁶ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1041 [51].

this, since one of the grounds of appeal by *Nova* was associated to the design, skill and labour invested in creating the computer program. More specifically, in relation to *what* was to appear on the screen, *how* the objects within the game would move around and *how* the objects would react to user input.²²⁷ Essentially, *Nova* was asking the court to conceptually understand the design material *within* the program for copyright consideration.

It is perhaps unsurprising that Lord Justice Jacob interpreted the CDPA in such a restrictive way when the use of the formalist conceptual model is considered.²²⁸ Formalism corresponds with art formalist theory.²²⁹ Wolheim expounds further on how art formalism operates. Wolheim refers to analytic formalism, which is where the work is organised in a certain way, and that is all that is needed to understand it.²³⁰ What this means is that formalism, as a philosophical art theory, is conveyed by judges, as legal positivism, through the interpretation of the CDPA. Accordingly, a reasonable person will just accept the outcome that is produced.²³¹ However, choosing to use art formalism represents a copyright work as ontologically static, meaning the design is limited to the design documents.²³²

The limited nature of the formalist model is visible when the CA in *Nova* had to decide whether a series of frames which provided an illusion of movement in the computer pool game could be a graphic work according to the CDPA.²³³ The legal issue is not inviting judges to

²²⁷ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1034.

²²⁸ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 225, 231.

²²⁹ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 225, 231.

²³⁰ Richard Wolheim, 'On Formalism and Pictorial Organisation' (2001) 59 Journal of Aesthetics and Art Criticism 127.

²³¹ Jeremy Bentham, 'An introduction of the principles of Morals and Legislation' (1970 Methuen London and New York) xlvii-iii.

²³² Margaret Davies refers to this in the context of legal positivism, although the spirit of the statement is apt for art formalism. See Margaret Davies, 'Law Unlimited Materialism, Pluralism, and Legal Theory' (2017 Routledge) 81.

²³³ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [12].

interpret a literary work, as it is more to do with work produced with the assistance of a computer program. That said, the reasoning may provide insight into the obstacles associated to protecting what appears to be the design (the SSO) of the computer video game. Lord Justice Jacob held:

I think this must be right. “Graphic work” is defined as including all the types of things specified in section 4(2) which all have in common, namely that they are static, non-moving: A series of drawings is a series of graphic works, not a single graphic work in itself.

Since a series of frames was not a single graphic work it was not protected as an artistic work for copyright purposes.²³⁴ Some minor rules of language can be used to assist the judiciary in providing a literal meaning to a word. For example, the *ejusdem generis* rule can be used. This applies where there is a list of words within the provision, followed by some general words, the general words are limited to the same kind of words in the list.²³⁵ S 4(2) provides a list of items that are classed as a graphic work. These consist of a painting, drawing, diagram, map, chart, plan, any engraving, etching, lithograph, woodcut or similar work.²³⁶ The in-time movement was not classed as a similar work as the works listed were of a static nature. As the in-time movement of the game was visible only by the sensory and physical features, the in-time movement was limited to a single graphic work which does little to meaningfully understand the movement of the game.

Arguably, the best avenue to understand the in-time movement for copyright was missed. The judiciary could have considered a film copyright but as *Nova* reserved its position

²³⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032.

²³⁵ Yule Kim, *Statutory Interpretation General Principles and Recent Trends* (2009 Nova Science Publishers Inc) 6.

²³⁶ CDPA, s4(2).

in relation to film for a possible argument on appeal but chose not to do so,²³⁷ this avenue remains unexplored. The reason *Nova* chose not to raise film copyright for the in-time movement of the computer game was because of a persuasive precedent from *Norowzian Arks* (No1).²³⁸ The High Court in *Norowzian Arks* (No1) explains that film copyright would only apply if there was photographic copying of the images of the film.²³⁹ This was in the context of interpreting s17(4) of the CDPA. Since *Nova* did not involve photographs of the frames of the game, *Nova* did not rely on film copyright to protect the in-time movement of the game.²⁴⁰

If an argument around film copyright was raised by the claimants the judges may have found it possible to *distinguish* between *Norowzian Arks* and *Nova*, based on the facts, which may have left the judges open to consider the in-time movement as a film. This is especially the case when the precedent of *Norowzian Arks* (No1) is only of persuasive value. Nevertheless, as the judiciary use the formalist conceptual model, it is likely that this would give rise to a literal interpretation to the reading of s17(4) CDPA. This is insofar as the movement of game would be unprotected, despite the design of the game arguably being of significant commercial value.²⁴¹

The above hypothesis regarding the direction of the law gathers strength when considered with another *obiter* statement made by Lord Justice Jacob. Lord Justice Jacob hints at the legislative constraint he was under in creating a new kind of copyright or expanding film to cover the in-time movements of games. In his view, ‘it is unlikely that Parliament intended

²³⁷ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [3].

²³⁸ *Norowzian Arks* (No1) [1998] FSR 394.

²³⁹ *Norowzian Arks* (No1) [1998] FSR 394, 398.

²⁴⁰ *Norowzian Arks* (No1) [1998] FSR 398

²⁴¹ Thomas Dubuisson discusses the value of the design within programs. See Thomas Dubuisson ‘IP Protection for Graphical User Interfaces in the EU, US and China’ (2015) 10 *Journal of Intellectual Property Law & Practice* 773.

this’.²⁴² Whilst Lord Justice Jacob is most probably correct that Parliament would not have intended for film to cover the in-time movements of games, the *obiter* statement is enmeshed in a materialisation of a time-period. The material conditions were vastly different when the CDPA was created, as both the gaming industry and technology has grown exponentially since the creation of the Act in 1988. Statements from both Sir Pattie and Gould during a parliamentary debate on the bill of the CDPA illuminate this point.²⁴³ There is an option for the judiciary to use an alternative interpretative technique such as the golden rule, if the judiciary perceive that the literal meaning of film would lead to an absurdity.²⁴⁴

Alternative interpretative approaches may be used to avoid a literal interpretation of film copyright under s17(4) of the CDPA. For example, the golden rule can be used to avoid an absurdity caused by interpreting words literally.²⁴⁵ However, whether requiring photographs of the frames of the game for the ‘in-time’ movement of the game to be considered under film copyright is an absurdity is debatable. Conversely, judges can use the mischief rule, if the literal interpretation of the Act is not remedying the gap posed by the common law. *Heydon’s Case* sets out how a judge would approach this, but the rule involves examining the common law prior to the Act to assess the gap within the law.²⁴⁶ This rule is not likely to assist the judiciary in cases associated to the SSO of a program, namely, the in-time movement of the game, as the technology within computer games was not so advanced prior to the 1988 Act in comparison with the facts of *Nova*. This leaves one final option for the judiciary. This is in the form of the purposive approach. The purposive approach can be used which would allow

²⁴² *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [17].

²⁴³ Hansard, HC vol 132 col 541 (28 April 1988).

²⁴⁴ *Sigsworth, Re* [1935] Ch 89.

²⁴⁵ For more detailed explanations of the different interpretative approaches see Michael Zander, ‘*The Law Making Process*’ (6th ed, 2004 CUP) 127-211.

²⁴⁶ *Heydon’s Case* (1584) 3 Co Rep 7a; 76 ER 637, 638.

the judiciary to evolve the law to meet technological change.²⁴⁷ Although the purposive approach will be explored later in the thesis,²⁴⁸ hints to its potential are illuminated for the treatment of the design (the SSO) of a computer program for copyright purposes. There are various alternative interpretative techniques available to the judiciary to provide understanding on the meaning of a copyright work, but nonetheless existing interpretations correspond with formalism.

The formalist conceptual approach contributes to the incomplete understanding of the SSO of a computer program which only allows judges to focus on the sensory and physical properties of a work for copyright purposes. The difficulty with applying formalism to help understand the rules and logic of a computer program for copyright purposes is highlighted in *Navitaire* by Navitaire's computer expert witness, Dr Hunt.²⁴⁹ The rules and logic are important to understanding *arrangements necessary* in a CGW for authorship under s9(3). This is demonstrated in Mr Justice Kitchin's reasoning in *Nova*.²⁵⁰ *Navitaire* concerned infringement of a computer program in an airline booking system called OpenRes. Parts of the case is used to highlight how the rules and logic of a computer program are understood in the context of copyright law. It was argued by *Navitaire* that the defendants, easyJet and BulletProof had infringed the business logic of Navitaire's program.²⁵¹ *Navitaire* alleged the defendants had infringed the business logic to replicate the look and feel of the running of OpenRes software for their own computer program called eRes.²⁵² The business logic was described by Dr Hunt

²⁴⁷ Lord Bingham's interpretation of the word 'embryo' in the context of the Human Embryology and Fertilisation Act 1990 allowed the law to develop and to keep up-to-date with science. See *R v (Quintavalle) v Secretary of State for Health* [2003] UKHL 13; [2003] 2 AC 687, 692 [2].

²⁴⁸ Cross refer to chapter 4 ('n 66') and chapter 5 ('n 174').

²⁴⁹ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3.

²⁵⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [107].

²⁵¹ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [1-3], [108].

²⁵² *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [1-3], [108].

as the relationship between the commands and the screens.²⁵³ Dr Hunt explained that many computer terms, like business logic, lacked a precise definition.²⁵⁴ This statement by an expert witness raises a red flag about the efficacy of the formalist model in bringing a meaningful understanding to the judiciary of computer terms associated to the SSO. As the model only makes visible material through the sensory and physical properties for copyright, material is limited to a static thing or an object. Therefore, Navitaire's legal team had to attempt to conceptually frame business logic as a literary work akin to a plot of a novel despite a warning about the inappropriateness.²⁵⁵

It is argued that formalism contributed to the undermining of Dr Hunt's evidence and the credibility overall of Navitaire's arguments. This is visible in the criticism by Mr Justice Pumfrey of the legal team's use of the analogy of a plot of a play to describe business logic. Mr Justice Pumfrey observes:

To say these programs possess a plot is precisely like saying that the book of instructions for a booking clerk acting manually has a plot; but a book of instructions has no theme, no events, and does not have a narrative flow.²⁵⁶

A computer program consists of instructions rather than having a theme, events and a narrative flow, so comparing a computer program to a plot in a literary work is not a useful analogy to understand the SSO of a program. Consequently, Navitaire's legal team changed how they conceptualised business logic to that of a dynamic user interface, which became central to

²⁵³ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC [109].

²⁵⁴ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC [108].

²⁵⁵ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [108], [118], [129-131].

²⁵⁶ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3. [125].

Navitaire's case in its submissions.²⁵⁷ However, the metamorphosis of business logic led to criticism by Mr Justice Pumfrey, undermining the creditability of Navitaire's case.²⁵⁸

Overall, Mr Justice Pumfrey decided that business logic was not material that could attract copyright. Mr Justice Pumfrey was persuaded by Lord Hoffmann's judgment in *Designers' Guild*.²⁵⁹ Akin to Lord Hoffmann, Mr Justice Pumfrey states policy reasons associated to Directive 1991 (as amended in 2009) for his decision, purporting that business logic was an 'unjustifiable extension of copyright protection'.²⁶⁰ Mr Justice Pumfrey was of the view business logic was no more than an underlying idea of the interface of the computer program.²⁶¹ This finding is significant as only the expression of ideas rather than ideas themselves attract copyright.²⁶² And whilst it may be unjustifiable to extend copyright to business logic, nonetheless, the point of contention remains, that this claim is difficult to validate, when the ontological nature of business logic from the case facts appear unstable.

The above analysis reveals that it was very difficult for Mr Justice Pumfrey to understand business logic with any degree of certainty. The lack of uncertainty around the meaning of business logic stems from *Navitaire* struggling to conceptualise logic for the courts due to the narrow properties of a literary work made visible by the formalist model. It follows that logically the decision taken by Mr Justice Pumfrey whereby business logic is no more than an underlying idea of an interface of a computer program must also be ontologically unstable.

²⁵⁷ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [131].

²⁵⁸ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [131].

²⁵⁹ The judgment refers to *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2416. See *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [128]. Also cross refer to 71-72 for an analysis of Lord Hoffman judgment in *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2416.

²⁶⁰ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

²⁶¹ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3.

²⁶² *Baigent v Random House Group Ltd* [2007] EWCA Civ 247; [2008] EMLR 7 [5].

The ontological uncertainty is despite the clear reasoning from Mr Justice Pumfrey. Mr Justice Pumfrey appears to rely literally on art 1(2) of Directive 1991 (as amended in 2009) which reads that ideas and principles which underlie any element, including the interface, of a computer program, should not be protected by copyright.²⁶³ Although not explicit about referring also to recital 14, there is evidence to suggest that Mr Justice Pumfrey read art 1(2) in conjunction with recital 14, as it is the only provision in the directive that refers to programming languages and logic. Recital 14 states that logic, algorithms and programming languages comprise of ideas. As part of Mr Justice Pumfrey's reasoning that it was the policy of the Directive 1991 not to protect business logic, he also refers to programming languages.²⁶⁴ A plain reading of the Directive 1991 does *produce* the outcome that Mr Justice Pumfrey reached, namely, that logic comprises of an idea. However, the above legal provisions are meaningless without a sound understanding of business logic. The irony behind this is that it was Mr Justice Pumfrey that warned the courts about requiring comprehensive knowledge on technology for there to be sound judicial reasoning in copyright law. This warning was given four years prior to this judgment.²⁶⁵

From a new materialist perspective, the meaning of the SSO in a computer program is ontologically uncertain without examining the legal materials associated to the directive. This includes the travaux préparatoires of the directive.²⁶⁶ Lord Justice Jacob in *Nova* recognises the value of these materials if they are a clear indication of what was intended and meant by the directive.²⁶⁷ The aim is to understand more clearly the ontological nature of the SSO from

²⁶³ Council Directive 1991/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42, art 1(2).

²⁶⁴ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

²⁶⁵ *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 cited in Brian Bandey, 'Over-Categorisation in Copyright Law: Computer and Internet Programming Perspectives' (2007) 29 European Intellectual Property Review 465.

²⁶⁶ Cross refer to chapter 5 ('n 186').

²⁶⁷ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1045 [2].

the external legal sources. This is an important contribution to the literature on the SSO,²⁶⁸ which may provide insight into the meaning of *arrangements necessary* for a CGW under s9(3).

The case of *Bezpečnostní softwarová asociace* (BSA) invites the Court of Justice of the European Union (CJEU) to decide on whether a graphic user interface (GUI) is the expression of a computer program or part of a computer program for the purposes of interpreting art 1(2) of the Directive 1991.²⁶⁹ Although the UK has the power to depart from this decision under the European Union (Withdrawal) Act 2018, if appropriate, the decision remains binding.²⁷⁰ Advocate General Bot, delivering an opinion, reminded the court that the directive does not provide a definition of a computer program, drawing on the Commission's proposal, which suggest this is deliberate. This avoids a rigid interpretation that could become outdated.²⁷¹ Bot drew attention to interfaces taking many different forms. He grouped these into two categories; physical interfaces which could include the hardware, such as the screen, the keyboard or the mouse and logical or software interfaces.²⁷² Bot held that a form of a computer program would enable the computer to perform a task for which it was created. The function of a GUI is to facilitate easier communication between the computer and the user.²⁷³ Since a GUI, on its own,

²⁶⁸ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 Journal of Intellectual Property Law & Practice 921; Pamela Samuelson, 'Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement' (2016) 31 Berkeley Tech Law Journal 1216; David I Bainbridge, 'The Look and Feel of Computer Programs after *Richardson v Flanders*' (1993) 2 Law Computers & Artificial Intelligence 275; Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 International Review of Intellectual Property and Competition Law 428, 443; Jakub Menci, 'When the Court of Justice Interferes with Interfaces – Case C-393/09 *Bezpečnostní Softwarová Asociace* – *Svaz Softwarové Ochrany v Ministerstvo Kultury*, Court of Justice of the European Union (Third Chamber)' (2010) 2 Queen Mary Journal Intellectual Property 90; Stephen Vousden, 'Protecting GUIs in EU Law: *Bezpečnostní Softwarová Asociace*' (2011) 6 Journal of Intellectual Property Law & Practice 728; Nicola Angius, Giuseppe Primiero 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 304.

²⁶⁹ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [29].

²⁷⁰ The European Union (Withdrawal) Act 2018, s2. See also *Wright v BTC Core* [2023] EWCA Civ 868, [2023] FSR 21 [34].

²⁷¹ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [47].

²⁷² *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [54].

²⁷³ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18.

would not enable a computer to perform a task for which it was created, the court held it was not an expression of a computer program.²⁷⁴

The decision to not recognise the interface in any form of a computer program is based on clear reasoning. Bot drew on the objective of the Directive 1991 (as amended in 2009), and what appears to be recital seven. Bot discussed how preparatory design work can be included in the expression of a computer program but only if the computer program can result from it at a later stage. The reasoning for his guidance seems to align with recital seven of the directive.

However, it should be noted that the question that Bot answered was not the exact question that was posed to him by the national court.²⁷⁵ One may recall the national court asked whether the GUI could also be part of the expression. This is a very different question that could lead to different guidance.²⁷⁶ The opinion is less helpful on how to protect the design (the SSO) within a computer program when it is not re-transcribed in the code of the program.

I now turn to the CJEU judgment in *BSA*.²⁷⁷ The CJEU followed Bot's opinion, arriving at the same decision, whilst altering the original question from the domestic Court in the same way as Bot.²⁷⁸ However, Vousden correctly makes some observations about the CJEU's judgment,²⁷⁹ which point to the ontological instability within the law on computer programs. A few comments of interest focus around the TRIPS agreement and a specific passage in *Infopaq* which was used by way of analogy to support the CJEU's reasoning.²⁸⁰ Vousden

²⁷⁴ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [64], [65]. [66].

²⁷⁵ Compare [29] and [41] in *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18. See also Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 *Journal of Intellectual Property Law & Practice* 728, 730.

²⁷⁶ A point also made in Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 *Journal of Intellectual Property Law & Practice* 730.

²⁷⁷ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18.

²⁷⁸ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [42].

²⁷⁹ Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 *Journal of Intellectual Property Law & Practice* 728.

²⁸⁰ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [30],[33].

observes that the passage from *Infopaq* to demonstrate that an EU Directive should be interpreted in the light of international obligations was not that robust since Directive 1991 predates the TRIPS agreement.²⁸¹ Though this may not be problematic, the court fails to engage with the provisions of TRIPS.²⁸² With the original question being altered and some authority not been applied, Vousden correctly concludes that the judgment demonstrates the uncertainty around the law on GUI's under Directive 1991.²⁸³ Both Bot's guidance and the CJEU's judgment do extend beyond the question posed by the domestic court in interpreting Directive 1991, perhaps, signalling the importance of clarification within the area.

However, both Bot's opinion and the CJEU judgment also focus on art 2(a) Directive 2001/29. Although this is separate from understanding an expression of a computer program for copyright purposes, it is important to examine the ontology of decision-making processes on computer programs more generally. This is especially the case since these types of decisions are binding for the English judiciary. Although a GUI is not regarded as an expression of a computer program, it can be protected by copyright under art2(a) Directive 2001/29.²⁸⁴

Copyright protection will be given if the GUI is an original intellectual expression of an idea. Both Bot and the Court correctly refer to *Infopaq* for authority on an intellectual creation.²⁸⁵ The CJEU followed Bot's guidance that GUIs which have a technical function will not be an intellectual creation.²⁸⁶ However, Bot's guidance on this point implants the US merger test into EU law when differentiating between an idea and an expression of an idea. Bot explains this insofar as originality will not be satisfied if there are limited ways of expressing

²⁸¹ Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 Journal of Intellectual Property Law & Practice 728, 732.

²⁸² *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18. Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 Journal of Intellectual Property Law & Practice 728, 732.

²⁸³ Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 Journal of Intellectual Property Law & Practice 732.

²⁸⁴ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [AG 70].

²⁸⁵ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [AG 71].

²⁸⁶ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [49].

the idea. To borrow Bot's word the expression of the idea and idea become 'indissociable'.²⁸⁷ Implanting a US test into EU law needs to be treated with caution as the legal systems are different. Furthermore, variations of the idea/expression dichotomy may only add an extra layer to the law for the judiciary to determine in an already complex area.²⁸⁸

The complexity around interpreting the SSO of a computer program in the context of Directive 1991 is made abundantly clear in the High Court by Mr Justice Arnold in *SAS Institute*.²⁸⁹ *SAS Institute* focused on several legal issues but one that is of specific relevance to this thesis is on the alleged infringement of the components in the analytical software known as SAS by the defendant, World Programming Ltd (WPL).²⁹⁰ The components comprised of the programming language, including keywords and syntax used in the program, the interface, and the data files.²⁹¹ Mr Justice Arnold dismissed the components for copyright purposes, referring to the CJEU for guidance.

The CJEU re-formulated Mr Justice Arnold's nine questions, instead preferring to group them into themes.²⁹² The sheer number of questions Mr Justice Arnold had insofar as how to interpret the existing law on copyright to the SSO of SAS's computer program also indicates uncertainty with formalism. The re-formulated questions consisted of whether the functionalities of a computer program and the programming language are regarded as an expression of the computer program under Directive 1991. Second, whether art 1(2) and (6)

²⁸⁷ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [AG 76]. See also Ken Moon, 'Another Nail in the Coffin for Non-literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921, 926; Jakub Menci, *When the Court of Justice Interferes with interfaces – Case C-393/09 Bezpečnostní Softwarová Asociace – Svaz Softwarové Ochrany v Ministerstvo Kultury*, *Court of Justice of the European Union (third chamber)* (2010) 2 *Queen Mary Journal Intellectual Property* 90, 92.

²⁸⁸ Cross refer to chapter 2, 2.3.1, 68.

²⁸⁹ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch); [2011] RPC 1, 14

²⁹⁰ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch); [2011] RPC 1, 14 [5].

²⁹¹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [35].

²⁹² A comparison can be made of the original questions in *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [332] with *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [36-40].

are to be interpreted as not being an act of infringement subject to authorisation for a licensee to reproduce the code or to translate the code of the data file to write the source code in another program using the file format.²⁹³ Thirdly, whether art 5(3) of Directive 1991 only applies to the acts that are authorised by the license.²⁹⁴ The re-formulated questions had to be considered by the CJEU.

Advocate General Bot provided guidance of the following nature. Functional material will not be classed as an idea.²⁹⁵ This classification will not depend on the nature, extent or level of detail of the functionality.²⁹⁶ Moreover, the nature of the skill, judgment and labour in devising the functionality of the program will not be relevant skill and labour.²⁹⁷ Art 5(3) permits one to observe, study or test the functioning of the program, to determine the underlying ideas whilst performing acts of loading and running the program. This is irrespective of the terms of a signed license²⁹⁸ Finally, it is possible that a reproduction of the elements of the SAS manual in the WPL manual could be subject to copyright protection if the elements were an expression of an intellectual creation. The latter being expressed through, choice, sequence and combination of the elements in the expression of the manual.²⁹⁹

Bot's opinion on functional material not attracting copyright is incomplete. Bot refers to art 1(3) of Directive 1991 which makes it clear that copyright protection only extends to the author's own intellectual creation.³⁰⁰ Bot correctly explains that the degree of originality in the writing is what is relevant rather than the amount of time devoted to the work.³⁰¹ Copyright has

²⁹³ Art 1(6) is to do with decompilation of the computer program for interoperability.

²⁹⁴ Art 5(3) is where one is legally permitted to observe, study and test the functioning of a program in order to determine underlying ideas while performing loading, displaying, running or storing the program.

²⁹⁵ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [57].

²⁹⁶ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [63].

²⁹⁷ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [63].

²⁹⁸ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [94], [95], [96], [97].

²⁹⁹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [120].

³⁰⁰ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [65].

³⁰¹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [66].

never protected all expressions of an idea, if one recalls the explanation given by Laddie et al.³⁰² However, Bot's judgment, in my view, is not complete. The argument is advanced based on when one compares the original questions posed by Mr Justice Arnold to the CJEU. One of the key original questions was whether copyright in computer programs protects interfaces which have been copied *without* decompiling the object code.³⁰³ The outstanding issue requires addressing by Bot. Weston makes a similar observation regarding the omission in Bot's judgment.³⁰⁴ By Bot reformulating the questions into themes, Bot's focus was on art 6 which discusses the right to decompile the code to obtain information necessary to achieve interoperability. This is insofar as the SSO of a computer program would be deemed necessary for the function of another program. In other words, the SSO would be only of a functional nature. By Mr Justice Arnold making it explicit that he was not referring to decompiling the code, he was asking whether the interface could be conceptualised as an expression of an idea without the code. Moreover, WPL made it clear from the outset that they had not copied the code or had access to it.³⁰⁵ Since the original question was reformulated, the question was recast to represent an interface as solely functional material. It is evident that the reformulation of the original questions by Bot had a material effect on how an interface is understood for copyright. Although the criticism of the reformulation of the questions can be levelled at the CJEU, the material effects are visible on English copyright law of the SSO in a computer program, when Mr Justice Arnold uses the reformulation to conclude that copyright protection should not be granted.³⁰⁶ The omission points to the incomplete nature of the judgment in *SAS Institute*.

³⁰² Laddie, Prescott & Vitoria, *The Modern Law of Copyright* (5th ed, LexisNexis Butterworths 2018) 4.52.

³⁰³ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch); [2011] RPC 104 [332].

³⁰⁴ Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 *International Review of Intellectual Property and Competition law* 428, 443.

³⁰⁵ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch); [2011] RPC 104 [23].

³⁰⁶ *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch), [2013] RPC 17 [42].

Despite the above omission in the judgment, Bot controversially asserts that copyright is not restricted to the literal elements of the program, namely, the code, but extends to other elements that express the creativity of the author.³⁰⁷ Bot elaborates by explaining that the elements of a program, like formulae or algorithms, are excluded from copyright protection. However, the way in which all of these elements are arranged like the style in which the program is written, may reflect the author's own intellectual creation.³⁰⁸ Bot's response from the Court of Justice is proving difficult to apply insofar as making visible the original expression of an idea.³⁰⁹ It is not clear what Bot means about the style in which the functional material is arranged as if the SSO is transposed into the code, the code will be protected.³¹⁰ The question remains how the SSO of a computer program can be protected without being expressed in code. At the time of writing, and to the best of the author's knowledge, there have been virtually no cases where the SSO has been successfully protected.³¹¹ Moon corroborates these findings also.³¹²

A couple of factors may be contributing to the difficulty of making visible the SSO of a computer program for copyright purposes. Firstly, as the courts use the formalist model to understand aesthetic works by drawing on non-aesthetic sensory and physical properties, the model struggles to make visible the SSO *within* the computer program. The model conceptualises the SSO as a static thing or object, illuminating only the functional nature as interpretations are not dependent on the advances in technology. Lord Justice Jacob comments on this:

³⁰⁷ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50].

³⁰⁸ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [55].

³⁰⁹ This is when there have been no accompanying design documents.

³¹⁰ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [55].

³¹¹ With the exception of the controversial decision of *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497. The findings in this chapter suggest the SSO is not being protected.

³¹² Ken Moon, 'Another Nail in the Coffin for Non-literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921.

It is a remarkable feature...that it is unnecessary actually to know how any of the games concerned are played or even what they are other than computer games based on pool.³¹³

Lord Justice Jacob appears to be corroborating Sibley's point about formalism and how expertise is not required since one is only examining the non-aesthetic properties of the work to understand whether it fits the form of a literary work for copyright purposes.³¹⁴ Logically, using this model, it is reasonable to advance an argument that material can be overlooked or hidden to the judicial eye. Secondly, the problem is exacerbated as a computer program is different to a literary work regarding its utilitarian nature. It is a more process-oriented expression.³¹⁵ These two problems contribute to the judicial difficulties in protecting the SSO for copyright protection.

It is argued in replacing the formalist model with an ontological model such as new materialism would equip the judiciary with a better understanding of the ontological nature both of the law and the SSO within a computer program.³¹⁶ New materialism allows for the material process of a copyright work to be examined rather than just the sensory and physical properties of a copyright work. Pila also contends that a more coherent theory should be found for interpreting copyright works.³¹⁷ Pila's research, although not on computer programs/CGWs, also found that the formalist model is not able to recognise that different

³¹³ *Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus Law Review 1032, 1036 [6].

³¹⁴ Frank Sibley, 'Aesthetic Concepts' (1959) 68 *The Philosophical Review* 421, 439.

³¹⁵ Bot J notes this in Case C-393/09 *Bezpečnostní softwarová asociace v Ministerstvo kultury* [2010]; [2011] FSR 18 [47]; *Computer Associates v Altai* 982 F 2d 704 (CA 2d Cir 1992). Although in the latter case, Walker CJ states this in a US case, the statement can be used in this context as it is about the ontological nature of a computer program.

³¹⁶ Cross refer to chapter 3 (n 21')

³¹⁷ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 241.

kinds of works have different modes of material.³¹⁸ Replacing formalism is an attractive option that the judiciary should consider.

The formalist model was abandoned in replace of employing the *Altai* test from *Computer Associates International* in *John Richardson* to find an original expression of an idea in a computer program.³¹⁹ *John Richardson* focused on whether the defendants, Flanders and Another, had infringed the structure and organisation of the BBC program, which belonged to the claimant's, John Richardson Computers Ltd.³²⁰ Mr Justice Ferris used the *Altai* test from *Computer Associates International*, a case decided by Mr Justice Walker in the United States Court of Appeals, Second Circuit, to support his reasoning.³²¹ The *Altai* test involves the abstraction, filtration and comparison stages to abstract the SSO for copyright purposes.³²² In applying the *Altai* test Mr Justice Ferris decided that three textual materials out of seventeen attracted copyright. These materials consisted of the line editor, amendment routines and dose codes.³²³ Although the *Altai* test was used, the test faced criticism.³²⁴

Mr Justice Ferris's judgment is not without criticism. Bainbridge argues that Mr Justice Ferris dealt too superficially with the variation of the idea/expression dichotomy from the *Altai* test.³²⁵ According to Bainbridge the superficial treatment led to a misunderstanding of the SSO within the BBC computer program for copyright purposes.³²⁶ Bainbridge asserts that Mr Justice

³¹⁸ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 237.

³¹⁹ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 refers to a test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992).

³²⁰ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497.

³²¹ *Computer Associates v Altai* 982 F 2d 692 (CA 2d Cir 1992).

³²² *Computer Associates v Altai* 982 F 2d 692, 698-711 (CA 2d Cir 1992). Cross refer to chapter 2 ('n 196') for a detailed explanation of the *Altai* test.

³²³ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 552-561.

³²⁴ It is worth underlining that this approach, namely, using the *Altai* test, was not followed in all the other cases, which were held after *John Richardson*.

³²⁵ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, computers & Artificial Intelligence 269.

³²⁶ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, computers & Artificial Intelligence 269, 276.

Ferris approved a statement by Mr Justice Millett affecting the test on substantial infringement.³²⁷ Secondly, Bainbridge purports that Mr Justice Ferris did not robustly apply US precedents.³²⁸ Bainbridge advances this argument on the basis that both programs contained substantial use of public domain materials or techniques that were commonly used by programmers, so should have been filtered out as ideas not deserving of copyright.³²⁹

Bainbridge is correct insofar as Mr Justice Ferris approved Mr Justice Millett's statement.³³⁰ Mr Justice Ferris decided that certain features associated to the program required less attention as following Mr Justice Millett's statement, meant focus was only on the *part* of the work that is alleged to have been reproduced. Logically, small elements of a program could be protected putting decisions in conflict with the requirement that copying must be of a substantial nature. However, there is scope for an alternative interpretation to Bainbridge's understanding, as Mr Justice Millett's statement can also illustrate how a small portion of the program may be perceived to qualitatively comprise of a substantial part of the program.

In terms of the second criticism by Bainbridge, if Bainbridge's argument is accepted insofar as both computer programs used substantial materials from the public domain or the techniques used were common, it is likely that the US judiciary may have arrived at a different outcome. This argument is made as the filtration step of the abstraction-filtration-comparison stages of the *Altai* test instruct the judiciary to filter materials derived from the public domain or materials that are in common use.³³¹ Moreover, emphasis on keeping materials in the public domain is codified in the Copyright Act 1976.³³² Cases used by the district court to underpin

³²⁷ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, computers & Artificial Intelligence 269, 274.

³²⁸ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, computers & Artificial Intelligence 269, 275.

³²⁹ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders' (1993) 2 Law, computers & Artificial Intelligence 269, 275.

³³⁰ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 533.

³³¹ *Computer Associates v Altai* 982 F 2d 692, 698-711 (CA 2d Cir 1992).

³³² 17 USC § 102 (b).

the decision in *Oracle v Google* also suggest there is merit in Bainbridge's arguments as judges can apply the precedents in a very narrow manner.³³³

Leaving aside the criticisms of Mr Justice Ferris's reasoning, the judgment of *John Richardson* reveals the complicated judicial decision making on the SSO of a computer program. Transplanting a US test into English law to enhance judicial understanding of the SSO for copyright consideration ultimately puts a strain on English precedent and judicial decision-making on the area.

John Richardson is not the only case where US law infiltrates English law. The adoption of a US style idea/expression filter is visible in the CA decision of *SAS Institute*.³³⁴ Although the CA decision was not related to the copyright infringement of the SSO within the SAS program, nonetheless, it is useful to examine the decision of the CA as the reasoning will help to understand copyright law on computer programs more generally.³³⁵ Lord Justice Lewison in *SAS Institute* adopts a US style idea/expression filter.³³⁶ The US style filter, namely, the US merger doctrine is visible in the reasoning on the meaning of an original expression of an idea. The merger doctrine is where there will be no expression of an idea if the idea merges with the expression.³³⁷ Lord Justice Lewison explains how the court considered the meaning of an intellectual creation as a term to indicate the author's exercise in expressive and creative choices while producing the work. If choices are restricted, the less likely the

³³³ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 985, 994-997 (ND Cal 2012).

³³⁴ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8 [31],[32].

Previously, it was noted that Bot implanted a similar style version in the case of BSA ('n 287').

³³⁵ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8,

³³⁶ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 927; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8 [31].

³³⁷ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 927; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8 [31].

work will be interpreted as an expression of an idea, illustrating the adoption of the merger test.³³⁸

Implanting a US test like in *John Richardson*³³⁹ and a US style filter in *SAS Institute*³⁴⁰ complicates judicial reasoning on computer programs as it fuses law from two very different jurisdictions together affecting the logical coherence of English precedent and the principle of *stare decisis*. Moon raises a similar argument.³⁴¹ Moon's research is largely based on his expertise representing Fisher and Paykel Finance in *Karum v Fisher & Paykel Finance*.³⁴² Although a New Zealand (NZ) case, which would only be of persuasive authority for the English judiciary, his expertise is extremely relevant. As there was no New Zealand case on the SSO of a computer program, the NZ CA declared both UK and US authorities relevant in *Karum v Fisher & Paykel Finance*.³⁴³ Moon expresses his disappointment with how the UK, amongst other jurisdictions, have adopted variations of the idea/expression dichotomy from the US.³⁴⁴ Moon correctly claims that this causes unnecessarily complex, almost metaphysical reasoning, on the part of the judiciary, without any successful conclusion for owners of computer programs.³⁴⁵ Abstracting the idea from the expression of the idea has proved difficult as is evidenced by the lack of success in protecting the SSO of a computer program for copyright.

³³⁸ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8 [31].

³³⁹ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497.

³⁴⁰ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482 (CA) [2014] RPC 8 [31].

³⁴¹ Ken Moon, 'Another nail in the coffin for non-literal software copyright infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921.

³⁴² [2014] NZCA 389 quoted by Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921.

³⁴³ [2014] NZCA 389 [99].

³⁴⁴ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921, 929.

³⁴⁵ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 929.

Judicial decision-making struggles to understand the SSO for copyright purposes. Both Moon, and to a lesser extent, Samuelson, have criticised the *Altai* test in how the test abstracts the SSO of a computer program for copyright consideration.³⁴⁶ However, it is reasonable to advance that the *Altai* test would not have been implanted into English law, had Mr Justice Ferris felt confident in employing the existing formalist model to abstract the idea from the expression of an idea in a computer program. The formalist model struggles to bring a meaningful understanding to the judiciary of both the nature of the SSO and the law on the SSO. Both remain ontologically uncertain. The SSO remains allusive to copyright, while judicial interpretations appear limited in nature.

There is concern over the reliability of the existing legal discourse on the SSO of a computer program. Employing the formalist model represents copyright knowledge as a static predetermined unit. In other words, legal knowledge on the SSO of a computer program does not evolve. The SSO of a computer program is enmeshed in materialisations of a fixed time-period. Having knowledge on the SSO predetermined is concerning when formalism is applied to understand works from the technology sector which is so fast moving.

Academics such as Bandey, Baron, Griffiths, Christie, Booton, Bonadio, Lucchi and Finchett-Maddock all raise similar concerns over the reliability of copyright law. The authors' concerns are associated to the narrow categorisation system of the CDPA and how new creative endeavours, including those of a technological nature, may struggle to get recognition as a work for copyright purposes.³⁴⁷ However, I contend it is more than the narrow structure of the

³⁴⁶ 'n 204', 'n 207'.

³⁴⁷ Brian Bandey, 'Over-categorisation in Copyright Law: Computer and Internet Programming Perspectives' (2007) *European Intellectual Property Review* 461; Ann Baron, 'Copyright Art and Objecthood' in D McClean, K Schubert (eds), *Dear Images Art, Copyright And Culture* (Ridinghouse 2002) 292; Jonathan Griffiths, 'Dematerialization, Pragmatism and the European Copyright Revolution' (2013) 33 *Oxford Journal of Legal Studies* 767, 788; Andrew Christie, 'A Proposal for Simplifying United Kingdom Copyright Law' (2001) 23 *European Intellectual Property Review* 26; Dan Booton, 'Framing Pictures: Defining Art in UK Copyright Law' (2003) *Intellectual Property Quarterly* 38, 51-61; Enricho Bonadio and Nicola Lucchi, 'How Far Can Copyright

categorisation system that is problematic. It is how the categories are interpreted. The findings in this thesis strongly suggest that formalism, as a conceptual model, is contributing to the narrow understanding of the SSO of a computer program.

Even formalists Zangwill, Wollheim and Parsons all agree that the extreme formalist model is too narrow.³⁴⁸ The model corresponds with how copyright works have been interpreted.³⁴⁹ Zangwill advocates for non-aesthetic properties to include the history of the production of a work. This means examining the purpose or function of a work, which would include the artist's intentions as a source of function.³⁵⁰ Parsons makes very similar suggestions.³⁵¹ Wollheim discusses latent formalism, where non-aesthetic properties laying underneath the surface of a work need to be understood.³⁵² Scholarly literature suggests a move away from the most limited version of formalism is the direction that should be taken.

Pila judges the narrow formalist art theory to be a defective conceptual tool to determine an aesthetic copyright work and advocates for expanding the non-aesthetic properties that are considered for a copyright work.³⁵³ Pila claims that a more coherent theory other than formalism needs to be found which better represents the ontology of a work.³⁵⁴ She

Be Stretched? Framing the Debate on Whether New and Different Forms of Creativity Can Be Protected' (2019) 2 Intellectual Property Quarterly 115; Lucy Finchett-Maddock, 'Forming The Legal Avant-Garde: A Theory of Art/Law' (2019) 19 Law Culture and the Humanities 1-32. This is, perhaps, less so because of Case-C-310/17 *Levola Hengelo BV v Smiled Foods BV* [2018] ECR I-00000.

³⁴⁸ Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 614; Richard Wollheim, 'On Formalism and Pictorial Organisation' (2001) 59 *Journal of Aesthetics and Art Criticism* 127, 130-132; Glenn Parsons, 'Moderate Formalism as a Theory of the Aesthetic' (2004) 38 *The Journal of Aesthetic Education* 19, 20.

³⁴⁹ Justine Pila uses Frank Sibley's work. Frank Sibley, 'Aesthetic Concepts' (1959) 68 *The Philosophical Review* 421. See Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 231.

³⁵⁰ Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 614.

³⁵¹ Glenn Parsons, 'Moderate Formalism as a Theory of the Aesthetic' (2004) 38 *The Journal of Aesthetic Education* 19, 20.

³⁵² Richard Wollheim, 'On Formalism and Pictorial Organisation' (2001) 59 *Journal of Aesthetics and Art Criticism* 127, 130-132.

³⁵³ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal studies* 234 (2010) 30 *Oxford Journal of Legal Studies* 229, 230.

³⁵⁴ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 237, 241.

recommends widening the non-aesthetic features that are currently examined to illuminate the properties of a work. Pila draws on Walton's art theory to demonstrate how other non-aesthetic features could be considered in helping the judiciary determine which category the form of work best fits within the CDPA.³⁵⁵ The non-aesthetic features that Pila is referring to comprise of the artist's intentions, societal perceptions and the category that best demonstrates the work's aesthetic properties. If a relatively large number of standard features correspond with a work within a category, a minimum of non-standard features would indicate that it does not fit into a specific category.³⁵⁶ Walton asserts that these non-aesthetic properties should be considered before determining the category of a work.³⁵⁷ Expanding the non-aesthetics features of formalism is contended by Pila.

The spirit of all the suggestions is welcomed by this thesis in terms of the recognition that the formalist conception of a work needs to be broadened. Walton outlines the limitations of his proposals which would encompass some of the other suggestions made by Zangwill and Parsons.³⁵⁸ Walton observes that his approach leaves a lot undone. Artists' intentions can be frequently unclear, many works belong to borderline categories, some works possess standard features across a number of categories and the question of what relative weight can be accorded to the various conditions when standard and non-standard features exist in a work.³⁵⁹ Walton's questions illuminate concern on how to reliably apply Pila's proposal to a copyright work.

Dismissing Walton's theory which Pila proposed and returning to Pila's comment that a new ontological theory should be found, I propose a cutting-edge ontological theory of new

³⁵⁵ Pila uses Walton's work to suggest changes to the formalist theory. She refers to Kendall Walton, 'Categories of Art' (1970) 79 *The Philosophical Review* 334 in Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 248-249.

³⁵⁶ Kendall Walton, 'Categories of Art' (1970) 79 *The Philosophical Review* 334, 356-357.

³⁵⁷ Kendall Walton, 'Categories of Art' (1970) 79 *The Philosophical Review* 334, 356-357.

³⁵⁸ Nick Zangwill, 'Feasible Aesthetic Formalism' (1999) 33 *Nous* 610, 614; Glenn Parsons, 'Moderate Formalism as a Theory of the Aesthetic' (2004) 38 *The Journal of Aesthetic Education* 19, 20.

³⁵⁹ Kendall Walton, 'Categories of Art' (1970) 79 *The Philosophical Review* 334, 361-362.

materialism. The theory should be used as a conceptual tool by the judiciary instead of art formalism. The theory of new materialism is an alternative theory that corresponds with physics to explain how material is formed. It may be argued that the aesthetic properties of a CGW are more grounded in the science of creating the work than the work itself. This makes sense when viewed against s9(3) as authorship is based on the *arrangements necessary* rather than whether the work is an original expression of an idea. On this basis, an art theory, may not be as suitable as new materialism to aid the court's understanding of its properties that may help with ascertaining authorship over CGWs.

2.4 Conclusion

A question central to this thesis is whether a creator of an algorithm can be assigned authorship of a CGW under s9(3) of the CDPA. Upon a plain reading of Directive 1991 (as amended in 2009), art 1(2) in conjunction with recital eleven, produce algorithms as ideas. The interpretation is further corroborated by Mr Justice Arnold's *obiter* statement in the High Court of *SAS Institute*.³⁶⁰ The research suggests that algorithms may not be fully understood by the judiciary. The argument is advanced based on how the judiciary interpret the SSO of a computer program for copyright purposes. The research reveals that judicial interpretations on the SSO correspond with an extreme form of formalism. The SSO is only understood by the physical and sensory properties for copyright purposes. If this is accepted, some material within a computer program is likely to be hidden from copyright protection, which gives the impetus to re-examine algorithms, for the purposes of s9(3).

Understanding the SSO of a computer program by the phenomena's physical and sensory features leads to the narrowest interpretation of the SSO. This is despite Lord Justice Jacob indicating a wider interpretation of the preparatory design materials may have been

³⁶⁰ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229].

intended by Directive 1991 (as amended in 2009). The travaux préparatoires, namely, the original Commission proposal states that the preparatory design documents can be understood as the computer program rather than being visible *separate* to the computer program. A plain reading of the directive does not alter this meaning. The limited nature of the interpretation of the SSO is illuminated through further examples when Lord Justice Jacob interprets the in-time movement of a computer game as a single graphic work, despite a graphic work not being defined within the Act. Further, Mr Justice Arnold's sheer number of questions for the CJEU indicates problems with applying a narrow formalist model to the SSO of a computer program. Moreover, Mr Justice Arnold's application of Bot's guidance did not address whether an interface could be protected without decompiling the code. Tracing back to Bot's guidance reveals that Mr Justice Arnold's questions were reformulated by Bot, which led to the omission. The limited interpretation of the SSO manifests in virtually no copyright protection for the SSO within a computer program.

The limited judicial interpretations on the SSO of a computer program led to Mr Justice Ferris and Mr Justice Pumfrey controversially abandoning formalism. Mr Justice Ferris looked to the US for an alternative approach to understand the SSO within a computer program. Moreover, Mr Justice Pumfrey appears to abandon the formalist model in place of policy reasons as a justification for not recognising business logic for copyright protection. And although policy reasons can be used for judicial decision-making, it poses a question over the efficacy of formalism. Further, resorting to policy reasons does little to help judicial understanding of the SSO of a computer program. Mr Justice Pumfrey warns that until technology is understood in a more meaningful way, the process of sound reasoning cannot take place.

It is contended that as formalism only focuses the judicial eye on the sensory and physical properties of a copyright work, the *look and feel* of a computer program is only protected. Formalism does not equip the judiciary to fully understand the sequence and organisation within a computer program as focusing on the physical and sensory properties acts as a distraction to understanding the material *within* the computer program. This is very likely to be contributing to why designers of the SSO do not tend to get copyright protection.

Even Bot's guidance from the CJEU does very little to advance the law on the SSO. In discussing the SSO, he refers to the formulae or algorithms as obtaining copyright protection in the style in which the program is written. However, Bot's reasoning does very little to illustrate Bot's claim that copyright extends beyond the source and object code to other elements within the computer program.

The findings suggest that the SSO of a computer program is interpreted in a very limited way, which may influence understanding of arrangements necessary in the creation of a CGW which is why an alternative model is mooted. The thesis suggests an alternative model of new materialism could be used to provide a more meaningful understanding of the material processes in a CGW for copyright purposes. New materialism focuses on the process of creating a work rather than the work as a static thing or object. It is argued that the ontological nature of new materialism aligns with s9(3), as s9(3) focuses the judicial eye on the processes involved in creating a CGW. Further, although algorithms are understood as an idea, a closer examination of the material process of Directive 1991 is warranted. The material analysis of Directive 1991 may reveal more material in algorithms that have not been considered, and which could contribute to understanding more fully the creators' involvement in a CGW for the purposes of s9(3). It is hoped that the discussion around how these findings might apply to s9(3) will contribute to the existing literature and discussion around authorship of a CGW.

I now turn to a discussion on how new materialism can operate as the alternative theory which may be helpful in underpinning judicial interpretations.

CHAPTER THREE

NEW MATERIALISM AS AN ALTERNATIVE MODEL FOR UNDERSTANDING COMPUTER-GENERATED WORKS

3.0 Introduction

Discursive practices produce, rather than merely describe, the “subjects” and “objects” of knowledge practices.¹

Legal discursive practices, namely, the use of the formalist conceptual model by the judiciary *produce* rather than *describe* a copyright work. Legal discursive practice is not what is said, it is that which limits and enables what can be said.² Formalism reduces or limits a copyright work for the SSO of a computer program.³ By reducing a copyright work for the SSO, concern is raised on the reliability of formalism as a conceptual model for the judiciary to understand the meaning of *arrangements necessary* for authorship to be attributed to the designer of a CGW.⁴

In *Nova*, Mr Justice Kitchin’s reasoning for assigning authorship to the designer of a CGW was attributed not only to the writing of the program but also to the rules and logic of a computer program.⁵ Notwithstanding Mr Justice Kitchin’s reasoning, the judgment is seventeen years old, and does not address explicitly some of the more recent questions. An example of a question is whether a creator of an algorithm can be assigned authorship of a

¹ Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813, 819.

² Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

³ Cross refer to chapter 2 ‘n 132’.

⁴ CDPA, s9(3).

⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

CGW under s9(3) of the CDPA.⁶ The rules and logic point to the functions of a computer program, which includes algorithms. The thesis serves to better understand algorithms by focusing on the SSO of the program. Re-examining the SSO in the light of new materialism is likely to have implications for designers of algorithms in attaining authorship of CGWs under s9(3).

The chapter offers an alternative conceptual model to be considered by the judiciary to help to meaningfully understand the SSO of a computer program, and by extension, the *arrangements necessary* of a CGW under s9(3). Through a new materialist lens, discursive practices explain a copyright work by tracing the material context and materials of a computer program for copyright purposes.⁷ This means that copyright matter, which is conceptual, and in the context of this thesis, consists of tracing the materials to ascertain whether the creator of an algorithm can be deemed an author under s9(3) of the CDPA.⁸ The chapter acts as a building block to meaningfully understand some of the arrangements necessary in a CGW. An understanding is reached by exploring the idea/expression dichotomy in copyright law. An

⁶ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) <<https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>>accessed 26 June 2023; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 European Intellectual Property Review 6,12, 17; *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23; *DOE 3 and DOE 4, Individually and on Behalf of all Others Similarly Situated v Github Inc v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC* Case 3: 22-cv-07074 Document 1 filed 11/10/22; Kevin Roose, 'An AI-Generated Picture Won an Art Prize. Artists Aren't Happy' *The New York Times* (2 September 2022); Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, , Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1111; Robert Mahari, Jessica Fjeld, Ziv Epstein, 'Generative AI is a Minefield for Copyright Law' (The Conversation 15 June 2023); Andres Guadamuz, 'California Judge reaches Decision in Peta's Monkey Selfie case' (30th Jan 2016) <www.technollama.co.uk/california-judge-reaches-decision-in-petas-monkey-selfie-case> accessed 1st July 2023, Deming Liu, 'Forget The Monkey Copyright Nonsense for Goodness Sake, Dude!' (2018) 40 European Intellectual Property Review 64 (2018) 40 European Intellectual Property Review 61, 64.

⁷ I have used Karen Barad's discussion around matter to apply it to copyright legal discourse. Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 813, 819.

⁸ Kang and Kendall explain what matter is, in the context of law. The authors do not discuss copyright or computer programs /CGWs. Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

idea cannot attract copyright but if the idea is expressed in one of the eight forms under the categorisation system in the CDPA, a work will be assigned copyright protection.⁹ A computer program must take the form of a literary work.¹⁰ Once a computer program is understood through the material context, it is hoped a more meaningful understanding can emerge around the authorship of CGWs.

The chapter reveals some insights from new materialism which go some way to addressing the findings in chapter two insofar as to why formalism limits a copyright work for the SSO in a computer program. The insights expose the ontological nature of formalism, which makes visible a copyright work for the SSO as a static object or thing. The ontology of formalism raises three concerns around the efficacy of the model for firstly, understanding the SSO of a computer program, secondly, understanding the *arrangements necessary* under s9(3), and thirdly, whether the SSO has been reliably understood as an idea, not deserving of copyright protection.

It is hoped that the chapter will contribute to the existing scholarly literature on the SSO of a computer program insofar as providing a reasonable argument for the lack of copyright protection for the SSO.¹¹ Further, the chapter can be used to draw insights on formalism as a

⁹ CDPA, s3-8.

¹⁰ CDPA, s 3(1)(b).

¹¹ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) *Journal of Intellectual Property Law & Practice* 921; Pamela Samuelson, 'Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement' (2016) 31 *Berkeley Tech L J* 1216; David I Bainbridge, 'The Look and Feel of Computer Programs after *Richardson v Flanders* (1993) 2 *Law Computers & Artificial Intelligence* 275; Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 *International Review of Intellectual Property and Competition law* 428, 443; Jakub Menci, *When the Court of Justice Interferes with Interfaces – Case C-393/09 Bezpečnostní Softwarová Asociace – Svaz Softwarové Ochrany v Ministerstvo Kultury*, Court of Justice of the European Union (Third Chamber) (2010) 2 *Queen Mary Journal Intellectual Property* 90; Stephen Vousden, 'Protecting GUIs in EU law: *Bezpečnostní Softwarová Asociace*' (2011) 6 *Journal of Intellectual Property Law & Practice* 728; Nicola Angius, G Primiero 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 304.

conceptual tool to understanding authorship of CGW under s9(3).¹² The chapter commences with an examination on new materialism, including what the theory has to offer the judiciary in interpreting CGWs. The section closely follows legal materialism. This section demonstrates how new materialism is emerging in legal research. Thirdly, a new materialist perspective is employed to reflect on the roots of formalism. The penultimate section considers how new materialism can be used as a conceptual tool by the judiciary to better understand the legal discourse on the SSO of a computer program as either an idea or an expression of an idea. A conclusion follows, feeding forward into the chapter four. The chapter begins by examining new materialism.

3.1 New materialism

New materialism can be used as a conceptual tool to understand the ontological nature of matter. Matter is conceptual and involves understanding the meaning of *arrangements necessary* under s9(3).¹³ Copyright matter is inseparable from the materiality. Materiality is concerned with the process of *how* copyright matter comes to matter.¹⁴ The law on the SSO of a computer program, matter considered useful to understanding the arrangements necessary for a CGW,¹⁵ emerges out of, and includes as part of its being, the ongoing reconfiguring of the

¹² Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169; Paul Lambert, 'Computer-generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 European Intellectual Property Review 12, 15; Enrico Bonadio and Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing the Debate on Whether New and Different Forms of Creativity can be Protected' (2019) 2 IPQ 115; Shlomit Yanisky-Ravid, Luis Antonio Velez- Hernandez, 'Copyrightability of Artworks Produced by Creative Robots and Originality: The Formality-Objective Model' (2018) 19 Minnesota Journal of Law, Science & Technology 1; Annemarie Bridy, 'The evolution of Authorship: Work Made by Code' (2015) 39 Columbia Law Journal and Arts 395.

¹³ Kang and Kendall explain what matter is, in the context of law. The authors do not discuss copyright or computer programs /CGWs. Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

¹⁴ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 5.

¹⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

boundaries between an idea and an expression of an idea.¹⁶ The theory recognises the importance of considering *all* material, the material conditions, and the material effects in the on-going re-configuring of copyright phenomena.¹⁷ It follows that discursive practice can never be static or inert, just as the material it deals with, e.g. the SSO of a computer program, and by extension, the arrangements necessary in the creation of a CGW.¹⁸

New materialism avoids understanding matter as an object or a subject, enmeshed in materialisations and defined in an anthropocentric manner.¹⁹ Instead, a new materialist theory allows matter to be understood as a process,²⁰ or an assemblage of materials.²¹ What this means is that the legal discourse on the copyright of the SSO, and by extension s9(3), is stripped back to the phenomena's materials, which will be understood as part of (re) examining the copyright discourse on CGWs. The material process is the first stage in allowing new material to emerge before the material can be considered for copyright purposes. New materialism allows the judiciary to (re) examine the relationship between the SSO of a computer program and the boundaries between the idea and the expression of the idea, for the purposes of s9(3).

New materialism allows the law to emerge not just from the materials but also from the materiality. In other words, the law and a CGW should be understood as being reflective of the material world and those that are involved in the interpretative process. The latter including

¹⁶ The interpretation has been influenced by Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 813, 822.

¹⁷ I use the word phenomena to describe a copyright work as it is not understood as a thing or an object. This is inspired from the work of Karen Barad, but also other works of new materialism do not understand matter as a thing or an object. See Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813, 820.

¹⁸ CDPA, s9(3).

¹⁹ Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 2; Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 809; Rosi Braidotti, *The Posthuman* (Polity 2013) 56; See Diana Coole, Samantha Frost, 'Introducing the New Materialism' in D Coole, S Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 13.

²⁰ Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

²¹ Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 21.

the judiciary and academics.²² The way new materialism understands matter aligns very much with a point made during a parliamentary debate on the proposed provision of s9(3) in 1988. Nicholson suggested that CGWs should be interpreted to reflect new methods of disseminating human thought.²³ Nicholson's comments can be used to offer support for a new materialist perspective on CGWs. Nevertheless, logically the theory could face the same criticism voiced by new materialists on formalism, namely, that the law is enmeshed in political, cultural, and historical materialisations.²⁴ However, there is a distinct difference between formalism and new materialism. New materialism allows for the (re) conceptualising of copyright matter through a process or an assemblage of materials, rather than being understood as a static thing or object. Legal boundaries enmeshed in materialisations can be (re) configured on an on-going basis.

New materialism is a useful theory to consider the existing boundaries in copyright law on CGWs under s9(3). Boundaries such as the idea or an expression of an idea,²⁵ human and non-human arrangements,²⁶ textual (code) and non-textual (the SSO) contributions,²⁷ which appear to manifest from the use of the formalist model.²⁸ Formalism only makes visible the non-aesthetic properties, namely, the physical and sensory properties of a copyright work.²⁹ In sharp contrast, new materialism examines the material processes of a work.³⁰ Although it is correct to (re) examine the judicial configuring of these boundaries, it is important for a new

²² This would also include myself as doctoral researcher.

²³ Nicholson is a computer programmer. Hansard, HC Vol 132 col 577 (28 April 1988)

²⁴ See Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813, 819. Karen Barad does not discuss formalism but the law more broadly speaking.

²⁵ The idea/expression dichotomy is very important in deciding upon copyright protection. Cross refer to chapter 2 'n 170'

²⁶ CDP, s9(3).

²⁷ The textual phenomena appear to be understood as the code, however, it is less clear how the SSO can be understood without being transposed into the code. The doctrinal research exposes the ontological instability around the legal reasoning on this issue. Cross refer to chapter 2, s2.3.3.

²⁸ Cross refer to chapter 2 'n 109'.

²⁹ Cross refer to chapter 2 'n 131'.

³⁰ Cross refer to chapter 3 'n 7'.

materialist to note that these boundaries are not only part of the materiality but are also matter in an ongoing process.

Using new materialism to examine copyright matter illuminates the ontological nature of legal knowledge, and how knowledge is enmeshed in the materiality of the legal discourse, whilst also being produced as copyright matter, conveyed as legal positivism.³¹ New materialists focus on the ontological nature of matter rather than epistemological debates. This avoids arguments between realists who believe that knowledge of the world can be gained independent of the observer, whilst idealists are of the view that knowledge is socially constructed. Instead, the theory helps address assumptions of what matter is and what it does.³² The next section will attempt to explain the nuances in how academics approach new materialism.

3.1.1 The strands within new materialism

BRAIDOITTE: THE POSTHUMAN

Bradotite, a feminist continental philosopher, develops a posthuman theory of subjectivity which does not rely on humanism and is careful to avoid anthropocentrism.³³ The aim of the theory is to help understand matter in a non-deterministic and post anthropocentric

³¹ Although not discussed in the context of legal knowledge, see useful discussions around the reliability of existing knowledge. Nick J Fox, Pam Alldred, 'New Materialism' in Paul A Atkinson, Sara Delamont, M A Hardy and M Williams (eds) *The SAGE Encyclopedia of Research Methods* (London Sage 2018); Giles Deleuze, Felix Guattari, '*A thousand plateaus*' (University of Minnesota Press London 1987) 21; Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822; Rosi Braidotti, *The Posthuman* (Polity 2013) 56; See Diana Coole, Samantha Frost, '*Introducing the New Materialism*' in D Coole, S Frost (eds), '*New Materialism ontology, agency and Politics* (Duke University Press 2010) 13.

³² Nick J Fox, Pam Alldred, 'New Materialism' in Paul A Atkinson, Sara Delamont, M A Hardy and M Williams (eds) *The SAGE Encyclopedia of Research Methods* (London Sage 2018) 5.

³³ Rosi Braidotti, *The Posthuman* (Polity 2013) 56.

manner.³⁴ Matter is understood through relations by tracing transversal connections among material and discursive lines of relations.³⁵ Braidotti draws on the Dutch philosopher Spinoza's monistic perspectives of the world.³⁶ Monism is where substance exists in itself and is infinite.³⁷ The monistic perspectives confront the understanding that the human and the world are dualist entities, structured according to internal and external oppositions.³⁸ Braidotti draws on Spinoza's theory as a way of forming building blocks for the development of her posthuman theory.³⁹

Posthuman theory, a theory of subjectivity avoids humanism, emerges out of and includes the 'principle of not-one'.⁴⁰ The *principle of not one*, acknowledges the ties that bind humans to others in an essential web of complex interrelations.⁴¹ Braidotti uses the work of Guattari as support for her 'principle of not one'.⁴² To provide a more meaningful understanding of machines, Guattari uses the system of autopoiesis usually associated to biological organisms to understand inorganic matter such as that of a machine.⁴³ Autopoiesis used in this way helps Guattari to discover the ontological nature of a machine.⁴⁴ For example, machines have their own temporality and develop through generations. Machines have their own virtuality and futurity.⁴⁵ Braidotti uses Guattari's way of applying autopoiesis as an example to support her *principle of not-one*. The 'principle of not one' illuminates logically

³⁴ Rosi Braidotti, *The Posthuman* (Polity 2013) 94.

³⁵ Rosi Braidotti, *The Posthuman* (Polity 2013) 95.

³⁶ Rosi Braidotti, *The Posthuman* (Polity 2013) 56.

³⁷ Benedict de Spinoza, *Spinoza's Ethics* (George Eliot tr, Claire Carlisle ed, Princeton University Press 2020) 75-80.

³⁸ Rosi Braidotti, *The Posthuman* (Polity 2013) 56.

³⁹ Rosi Braidotti, *The Posthuman* (Polity 2013) 56.

⁴⁰ Rosi Braidotti, *The Posthuman* (Polity 2013) 95.

⁴¹ Rosi Braidotti, *The Posthuman* (Polity 2013) 100.

⁴² Rosi Braidotti refers to Felix Guattari, *The Three Ecologies* (The Athlone Press, London 2000) in Rosi Braidotti, *The Posthuman* (Polity 2013) 94.

⁴³ Rosi Braidotti refers to Felix Guattari, *The Three Ecologies* (The Athlone Press, London 2000) in Rosi Braidotti, *The Posthuman* (Polity 2013) 94.

⁴⁴ Felix Guattari, *The Three Ecologies* (The Athlone Press, London 2000) 100.

⁴⁵ Felix Guattari, *The Three Ecologies* (The Athlone Press, London 2000) 100; Rosi Braidotti, *The Posthuman* (Polity 2013) 94. Felix Guattari, *The Three Ecologies* (The Athlone Press, London 2000) 100.

how matter can be uncovered and understood in a more meaningful way. Braidotti's posthuman theory is used to advocate for post-anthropocentrism on global warming, neuroscience, animal rights, critical legal theory and most notably, robotics.⁴⁶ The *principle of not one* is used to better understand matter in many divergent areas but can be used also to understand copyright matter on CGWs.

The *principle of not one* can be used by the judiciary to (re) examine the efficacy of legal positivism, couched in formalism. Recognising the unity in all matter avoids a narrow understanding of matter, while the process of materiality, as phenomena, is not determined by differences. It follows that a spotlight appears on the formalist model as the model limits the properties of a copyright work to the non-aesthetic physical and sensory features. More specifically, the 'not one principle' shines a light on the non-space between an idea and an expression of an idea and whether the SSO is reliably understood within these confined boundaries. The SSO of a computer program is generally understood by the judiciary as an idea not deserving of copyright.⁴⁷ Ideas can be difficult to pinpoint, and, as the SSO is conceptualised as an idea, this is likely to affect understanding of the contributions in creating the SSO of a computer program for the purposes of authorship under s9(3). Drawing on Bradoitte's theory, provides a direction for the judiciary to better understand the space between an idea and an expression. What this means is that the relations between the materials governing the discourse regarding the SSO of a computer program can be (re) examined to make the ontology of matter more visible for copyright purposes.⁴⁸

Nonetheless, one needs to also recognise the limitations of using new materialism, as the existing materials used as part of the materiality on the SSO of a computer program, will

⁴⁶ Rosi Braidotti, *The Posthuman* (Polity 2013) 57-58.

⁴⁷ Cross refer to chapter 2, s 2.3.2, 77.

⁴⁸ Cross refer to chapter 5 'n 173'.

also be enmeshed in historical and social materialisations. Examples of materials can comprise of texts of rulings and the use of statutory interpretative techniques.⁴⁹ It is hoped that by examining more material than the formalist model allows, will help to confront the concern above. It is important to remember that any new copyright matter, will emerge out of, and include materiality, which is arguably a more reliable way to describe copyright phenomena.⁵⁰ The following section focuses on an approach from Guattari and Deleuze.

GUATTARI, DELEUZE – THE METAPHYSICS OF MATERIAL AND ASSEMBLAGES

The work of psychoanalyst Guattari, who worked also with philosopher Deleuze have both, in many ways, been the starting point for much of new materialism. Guattari and Deleuze discuss how matter is made up of a collection of assemblages.⁵¹ An assemblage does not have a beginning or an end but has a middle. The middle constitutes linear multiplicities, which can change dimension and undergo a metamorphosis.⁵² This metamorphosis makes visible matter. How much matter is visible depends on the multiplicities. The example of the orchid and wasp forming a rhizome is used. The wasp's ontological nature changes as it becomes part of the orchid's reproduction cycle, while also changing the nature of the orchid.⁵³ Similarities are drawn with Bradoitte's reasoning, as matter is also not understood as an object by both Guattari and Deleuze.

Not understanding matter as an object but as an assemblage helps to comprehend the legal discourse on copyright law for the SSO of a computer program, Further, Guattari and

⁴⁹ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

⁵⁰ Cross refer to chapter 5 'n 173'.

⁵¹ The authors refer to a book not being an object or a subject but is made up of various materials. Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 4.

⁵² Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 21.

⁵³ Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 10.

Deleuze's reasoning can contribute to understanding the arrangements necessary in a CGW.⁵⁴ The argument is advanced as copyright matter, i.e. the SSO of a computer program for copyright purposes may appear to take the form of an object such as a literary work, but when the legal reasoning is examined closer, the object starts to dissolve.⁵⁵ This is highlighted in the reasoning from both Mr Justice Pumfrey in *Navitaire* and Mr Justice Arnold in *SAS Institute*.⁵⁶ Both judges refer to abstract policy reasons rather than formalism to abstract the SSO as a literacy *form* for copyright. Guattari and Deleuze explain that a book only exists through the outside and from the outside.⁵⁷ Put differently, matter is enmeshed in materialisations from the material world. If this is the case, the research on the SSO of a computer program can be used to further support the argument for a new materialist conceptual model for judicial interpretations on the SSO, and by extension s9(3).

Similarly, Guattari and Deleuze's reasoning can be used to metamorphise copyright matter by adopting an interpretive technique that corresponds with new materialism. The interpretative technique, known as the purposive approach, resembles Guattari and Deleuze's reasoning.⁵⁸ The purposive approach can be used to create more multiplicities, as more materials are open to the judiciary when finding the law. What this means is, if there are more multiplicities, the assemblage will grow, making copyright matter ontologically different from what is known akin to the orchid and the wasp.⁵⁹ The ontology of both the orchid and the wasp changes as the orchid and the wasp merge with other materials. If this is the case, new material

⁵⁴ CDPA, s9(3).

⁵⁵ Cross refer to chapter 4, s 4.2, 156.

⁵⁶ Cross refer to chapter 4 'n 34' and 'n 51' for a more in-depth discussion on the legal reasoning from both cases.

⁵⁷ Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 4.

⁵⁸ For a more detailed explanation, cross refer to chapter 4 ('n 86').

⁵⁹ Cross refer to chapter 5 224. where the philosophy from computer science and the philosophy from law intra-acts with the SSO of a computer program for new material to emerge which can be considered for copyright purposes under s9(3). Intra-action is a term used by Barad to describe how matter comes to matter. Matter is not a discrete unit with fixed boundaries when matter meets other matter. Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 816-817.

may appear and be considered for copyright matter.⁶⁰ It should be noted that the next approach, consisting of Latour's actor network theory is somewhat similar insofar as the theory also involves the tracing of associations.

LATOUR: ACTOR NETWORK THEORY

French philosopher, anthropologist and sociologist, Latour, focuses on the ontological nature of the social. Latour argues that the social is an umbrella term, and to understand the term, one needs to trace its original meaning and its connections.⁶¹ A point of interest that Latour raises surrounds around understanding the ontology of controversies. Latour purports rather than attempting to solve these, a preferable approach would be to trace the connections between the controversies.⁶² This could be a useful approach for the judiciary to adopt for authorship of CGWs. Rather than getting bogged down in the language of the legal provision and demarcating between arrangements and arrangements necessary, the law on CGWs could be understood by its associations to legal materials, legal context and legal effects. Furthermore, Latour's theory could be used to confront the suitability of formalism as the formalist model limits the combinations of connections insofar as only the physical and sensory properties of a work are considered for copyright purposes.⁶³ It follows that limiting the connections provides a reductive understanding of matter, which is evidenced in this research on the copyright of computer programs.⁶⁴

It should be noted that Guattari, Deleuze and Latour's theory is metaphysical in nature, whilst Bradoitte's theory is also influenced by metaphysics.⁶⁵ However, this thesis does not rely

⁶⁰ New materialism is considered in chapter 5, s5.2.3.1, 223.

⁶¹ Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005) 2.

⁶² Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005) 23.

⁶³ Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005) 11.

⁶⁴ Cross refer to chapter 5 240..

⁶⁵ The metaphysical theories of Spinoza, Guattari and Deleuze are used by Bradoitte. See Rosi Braidotti, *The Posthuman* (Polity 2013) 56,94

solely on their theories, but uses them in conjunction with Barad's approach to better understand new materialism. Barad's theory is grounded in the more recent scientific evidence from physics, as is Coole and Frost's account of new materialism also.⁶⁶ Nevertheless, the distinction between metaphysical theories and physics should not be important since scientific knowledge is enmeshed in materialisations and is a continual phenomena. I now turn to Barad's approach.

BARAD: AN AGENTIAL REALIST ACCOUNT

Feminist Barad is a key proponent of new materialism and employs quantum theory and the work of physicist Bohr to philosophise about matter.⁶⁷ Barad's agential realist account focuses on *phenomena* rather than units of *things* or *objects*. She understands phenomena as dynamic reconfigurings/entanglements/relationalities/r(re) articulations.⁶⁸ Words are not semantic units but material-discursive practices through which boundaries are formed.⁶⁹ Barad provides a posthumanist account of material-discursive practices.

Barad supports her agential realist account through logical reasoning and drawing on insights from Bohr. The latter winning a Nobel Prize for his quantum model of the atom.⁷⁰ Bohr's philosophy-physics, although he did not treat the two separately, pose a challenge to

⁶⁶ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 812; Diana Coole, Samantha Frost, 'Introducing the New Materialism' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 13. Coole and Frost also refer to astronomical research that suggests that only three or four per cent of the universe may be composed of ordinary matter, leaving dark energy to account for the rest.

⁶⁷ Karen Barad utilises the work of physicist Bohr (1885-1962). See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 813; D Coole, S Frost, 'Introducing the New Materialism' in D Coole, S Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 13.

⁶⁸ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 818.

⁶⁹ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 818.

⁷⁰ Karen Barad draws on the work of physicist Bohr (1885-1962) in ⁷⁰ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

Newtonian physics and Cartesian epistemology regarding knowledge and things.⁷¹ Bohr's theory denounced the atomistic metaphysics that understands things as ontological entities. Instead, Bohr's theory reveals that things do not have determinate boundaries and words do not have determinate meanings. According to Bohr, theoretical concepts are only meaningful as a material arrangement of movable parts.⁷² Barad draws on the work of Bohr to provide a posthumanist account which focuses on the discursive practices insofar as not what is said but which limits and enables what can be said.⁷³ Barad builds on Bohr's theory to illuminate discursive practices as not being static arrangements but material practices through ontological determinacy are intra-actively enacted.⁷⁴ These discursive practices, which are material (re)configurings produce material phenomena in their discursively differentiated becoming.⁷⁵

The thesis is inspired by Barad's approach to new materialism. Weight is given to the material process that produced her theory insofar as she draws on quantum physics and has a PhD also in theoretical particle physical and quantum field theory.⁷⁶ Barad's theory on discursive practices emerges from quantum physics theory and philosophy. I use Barad's theory to reflect on the material discursive practice in copyright on the SSO of a computer program, and by extension CGWs. The agential realist account illuminates how the formalist model appears to manifest in the judiciary using the literal rule in the materiality on the SSO

⁷¹ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

⁷² Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

⁷³ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

⁷⁴ Barad distinguishes between intra-action and interactions. Interactions are where material relates with other material but both material have deterministic units of matter. Intra-actions are the opposite. See Karen Barad in Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 815.

⁷⁵ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

⁷⁶ University of California, 'Karen Barad' (USCS) < [Karen Barad, UCSC](#) > accessed 31 March 2023.

of a computer program for copyright purposes.⁷⁷ Matter, which includes matter on CGWs, is produced as a material effect.

The material effects produce a limited understanding of the SSO of a computer program which is unsurprising when examining the discursive practice. The SSO is only visible to the judicial eye if it is on preparatory design documents, yet judges have been adamant that copyright extends beyond the textual nature of the work.⁷⁸ The outcome produced by the judiciary is predictable when one examines the *interactions* in the material process of the SSO for copyright phenomena.⁷⁹ As the formalist model limits the discourse to the physical and sensory properties of the SSO, the judiciary are hamstrung by the model and have no alternative but provide a very limited interpretation.

However, copyright matter could be understood in an alternative way that recognises materiality as an ongoing (re)configuring. The thesis contends that the purposive approach, an interpretative tool, may be useful to the copyright discourse on CGWs. The research suggests that the purposive tool emerges out of new materialism.⁸⁰ The purposive technique allows for a wide range of materials to be considered by the judiciary during the interpretative process of giving effect to the true meaning of Parliament's words within a statute.⁸¹ In the context of this thesis, this is the meaning of *arrangements necessary* in s9(3) of the CDPA. The likelihood of (re) configuring the boundaries between an idea and expression of an idea for the SSO of a computer program is high. If this is the case, more meaning can be given to the *arrangements necessary* for authorship under s9(3). The reason the likelihood is high of reconfiguring the

⁷⁷ Cross refer to chapter 2, 'n 215'

⁷⁸ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 500 [7]; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch) RPC 1 [232]; *IBCO Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 302.

⁷⁹ Interactions refers to how matter is formed by formalism. Interactions between material involve material having discrete separate units.

⁸⁰ For a more detailed explanation, cross refer to chapter 4 'n 74'.

⁸¹ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693 [8] (Lord Bingham).

boundaries is because through a new materialist lens, the legal discourse is made up of *intra-actions* rather than *interactions* to borrow Barad's term, which focuses on the vibrancy of the material process.⁸² Put another way, material reacts with other material without presuming the prior existence of independent entities.⁸³ Without the said presumption, there is more room for material to be (re) emerge and to be (re) examined in the light of copyright law.

Conversely, the research suggests room for new material is virtually impossible with the use of formalism as the conceptual model. Judges are often occupied with semantic exercises such as whether the design should be recognised as separate from the computer program or are part of the computer program for copyright protection.⁸⁴ Moreover, whether the in-time movement of a computer game fits neatly into a graphic work.⁸⁵ Similarly, whether the original expression depends on the degree, extent or level of detail of the functionality in the expression.⁸⁶ Occupying the judiciary with these exercises prevents the judiciary from re-examining the legal discourse.

Overall, Barad's material-discursive theory will shed light on the copyright discourse for CGWs by examining *how* the judiciary understand a work for copyright purposes. The theory enables one to avoid assumptions about the law but also assumptions about the technology. Interesting, and of noteworthy importance, is the synopsis of both Coole and Frost who use theoretical physics, akin to Barad, to underpin the authors' explanations on new materialism.⁸⁷

⁸² 'text to n 68'

⁸³ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 815.

⁸⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1041, 1047 [51].

⁸⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032.

⁸⁶ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [63].

⁸⁷ Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010).

Coole and Frost, professors in political science and political and social theory, provide a helpful synopsis of new materialism. Their synopsis commences with how a human being's very existence depends on a myriad of micro-organisms, bodily and cellular reactions, on material and natural artefacts, as well as the socioeconomic structures that shape and direct life on a daily basis.⁸⁸ Like Barad, Coole and Frost draw on theoretical physics, but from Albert Einstein, whose work influenced Bohr, to bring meaning to new materialism.⁸⁹

Coole and Frost refer to Einstein's research on particles and sub-atomic particles to substantiate their explanations.⁹⁰ In doing so, the authors' note how Einstein's research is a direct challenge to Newtonian and Cartesian accounts of matter.⁹¹ Like Barad, Coole and Frost explain that Newtonian theoretical physics understood the world to be made up of mass that is quantifiable and measurable.⁹² Einstein's theory reflects on how condensed matter, even when a vast number of atoms are accumulated, consists of subatomic behaviour that emerges fluctuates, attracts, repulses and shifts nodes of charge.⁹³ The way Coole and Frost approach new materialism as part of their expositions aligns with Barad's reasoning insofar as understanding that matter is not made up of identifiable and measurable units. Coole and Frost explanations can be used as supportive material when drawing on Barad's reasoning.

⁸⁸ Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism Ontology, Agency and Politics' (Duke University Press 2010) 3.

⁸⁹ Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism Ontology, Agency and Politics' (Duke University Press 2010) 3.

⁹⁰ Only a small percentage of an atom's volume is mass, as it comprises of a positively charged nucleus, encircled by cloudlike, three-dimensional spinning electrons. The atom is a distributed charge whose subatomic particles are like flashes of charge that appear from and disperse in the empty space from which they are composed. See Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism Ontology, Agency and Politics' (Duke University Press 2010) 13.

⁹¹ Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, Agency and Politics' (Duke University Press 2010) 8, 12-13.

⁹² See Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism Ontology, Agency and Politics' (Duke University Press 2010) 8, 12-13.

⁹³ Coole and Frost also refer to astronomical research that suggests only three or four per cent of the universe may be composed of ordinary matter, leaving dark energy to account for the rest. Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism Ontology, Agency and Politics' (Duke University Press 2010) 14.

The different stands to new materialism are made visible, but patterns emerge from the different approaches. What the approaches have in common is an understanding that matter cannot be seen as determinate, independent units, whilst simultaneously neither can knowledge. Such approaches confront the Newtonian and Cartesian way of theorising about matter. Perhaps, very aptly, alluding to the iterative intra-activity of materiality and matter.⁹⁴ Despite the attractive nature of new materialism, it is equally important to also understand the criticisms faced by new materialist researchers.

3.1.2 The critics of new materialism

Most notably, critics such as Kang, Kendall and Pottage raise arguments that are significant when employing new materialism. Kang calls for new materialist researchers to have a better understanding of matters of law. Questions of legal ontology and epistemology are often merged together rather than being addressed separately.⁹⁵ Kang purports that it is necessary to first find out what materials exist before discussing how they are perceived as legal.⁹⁶ Pottage advances a similar argument expounding that it is prudent for a new materialist to begin with the materiality of law rather than the law itself.⁹⁷ This is in sharp contrast to sociolegal research.⁹⁸ Clarity over law's matters is paramount for new materialist research.

For clarity on law's matters, Kang proposes a solution on how this can be achieved. The examples that Kang uses on what can be deemed to be law's matters are used in this

⁹⁴ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

⁹⁵ Hyo Yoon Kang, 'Law's Materiality' in A Philippopoulos-Mihalopoulos, *'Routledge Handbook of Law and Theory'* (Routledge 2018) 460.

⁹⁶ Hyo Y Kang, 'Law's Materiality' in A Philippopoulos-Mihalopoulos, *'Routledge Handbook of Law and Theory'* (Routledge 2018) 460.

⁹⁷ Alain Pottage, 'The Materiality of What?' (2012) 39 *Journal of Law and Society* 167, 178, 183.

⁹⁸ Cross refer to 123.

research. Kang refers to two kinds of matters, firstly, physical matters relevant to law such as legal texts, the language and forms of transmission.⁹⁹ The research involves the examination of case law to assess the extent to which judicial reasoning is sound.¹⁰⁰ Moreover, the language within the judgments is examined through a formalist lens and related interpretative tools. The thesis (re) examines the case-law and legal texts related to CGWs using a new materialist conceptual model.¹⁰¹ Secondly, Kang refers to physical matters of the world which the law deals with such as the status of organic and non-organic matters and the relationship between those.¹⁰² The thesis focuses on the legal discourse of non-organic matter such as computer programs (the SSO) and CGWs. Although Kang raises concerns with how new materialist research is conducted, the thesis attempts to clarify copyright matters before analysing how matter may be perceived legally.¹⁰³

Harman, another critic of new materialism, is arguably less persuasive in the points that he makes regarding the use of the theory.¹⁰⁴ Harman asserts that new materialism fails to precisely define matter on the basis that the focus of new materialism is on how the thing performs. Interestingly, and noteworthy, for this thesis, Harman makes a direct challenge to Coole and Frost's synopsis. Harman suggests that new materialism undermines objects and cannot explain change as it reduces objects to their material rather than seeing the object as a separate thing.¹⁰⁵ It is difficult to be convinced by Harman's assertions on the issue of new materialism undermining the object, when one draws on Barad, Coole and Frost's reasoning which emerges from theoretical physical and quantum field theory. The latter revealing that

⁹⁹ Hyo Y Kang, 'Law's Materiality' in A Philippopoulos-Mihalopoulos, *Routledge Handbook of Law and Theory* (Routledge 2018) 464-65.

¹⁰⁰ Cross refer to chapter 2, s2.3.2 77.

¹⁰¹ Cross refer to chapter 5 'n 171'

¹⁰² Hyo Y Kang, 'Law's Materiality' in A Philippopoulos-Mihalopoulos, *Routledge Handbook of Law and Theory* (Routledge 2018) 464.

¹⁰³ Cross refer to chapter 2 'n 170'.

¹⁰⁴ Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 7-8.

¹⁰⁵ Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 8.

material is not separate from its materiality¹⁰⁶ Harman counters this by explaining that relying on materiality to bring understanding to the forefront has always been a method employed in physics but is less common in the social sciences.¹⁰⁷ The trouble with this line of argument is that social sciences are there to understand social behaviour. Social science translates science as science translates reality.¹⁰⁸ In copyright terms, considering the materials and the material conditions translates the ontological nature of phenomena (copyright work) which translates who we are, as we are immersed in both copyright matter and the materiality of copyright.

Moreover, Harman also alleges that new materialism overmines, in terms of the theory relying on describing objects based on their relations and effects.¹⁰⁹ This is evidenced in all the different strands of new materialism examined in this thesis. Harman's assertion is not convincing as his research lacks the scientific grounding of the likes of Barad, Coole and Frost. Rather, Harman's reasoning is based on the serial endosymbiosis theory.¹¹⁰ The serial endosymbiosis theory is used to illustrate that an object can be independent. For example, Harman includes a case-based demonstration illustrating how organelles inside eukaryotic cells can be independent before becoming subordinate components of a unified cell.¹¹¹ Harman provides a case-based demonstration rather than evidence that it can be used to define an object.¹¹² Even Harman claims that he is not criticising new materialism entirely, as Harman recognises that new materialism is based on new scientific evidence. Instead, Harman advocates for an alternative theory of immaterialism which arguably brings about less

¹⁰⁶ Cross refer 'text to n 78' and 'text to n 92'.

¹⁰⁷ Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 7.

¹⁰⁸ Norah Campbell, Stephen Dunne and Paul Ennis, 'Graham Harman, Immaterialism: Objects and Social Theory' (2019) 36 *Theory Culture & Society* 121,132.

¹⁰⁹ Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 7-8.

¹¹⁰ For a fuller explanation see Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 45.

¹¹¹ Graham Harman, *Immaterialism: Objects and Social Theory* (2016 Polity) 45.

¹¹² Norah Campbell, Stephen Dunne, Paul Ennis, 'Graham Harman, Immaterialism: Objects and Social Theory' (2019) 36 *Theory Culture & Society* 121, 130-133.

incremental change.¹¹³ Harman appears to be assuming that incremental changes would be better than wholesale change, however, he does not fully support this assertion.

Although new materialism has its critics, it is worth noting that Harman's reasoning is based on a case-based demonstration rather than evidence that it can be used to define an object.¹¹⁴ Kang and Pottage's observations can be avoided if careful consideration is given to law's materials, as this thesis attempts to do. It is now time to turn to a fairly new phenomena, where new materialism is incorporated into law; a phenomena, which this thesis will contribute to.

3.2 Legal materialism

Adopting new materialism in law, in other words, legal materialism, is a relatively new development with a lot of scope to be used more widely in areas such as CGWs. This section will demonstrate the creative potential that new materialism, as a conceptual tool, has to offer to the field of law.

Most notably, Burk's use of new materialism in copyright law¹¹⁵ can be employed to demonstrate the potential that the debate both on authorship of a CGW can be better reconsidered in the light of new materialism. Burk uses new materialism in copyright law to understand the first sale doctrine.¹¹⁶ The first sale doctrine stipulates that after the first sale of a copy of a computer program, the distribution rights of the copyright holder will be exhausted.

¹¹³ Harman explains that new materialism is based on physics. Refer to G Harman, *Immaterialism: Objects and Social Theory*, (Polity 2016) 7.

¹¹⁴ Norah Campbell, Stephen Dunne, Paul Ennis, 'Graham Harman, Immaterialism: Objects and Social Theory' (2019) 36 *Theory Culture & Society* 121, 130-133.

¹¹⁵ Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44.

¹¹⁶ Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 53-62.

Burk discusses this in the context of art 4(2) of the EU Directive 2009.¹¹⁷ Burk's research draws on two decisions from the CJEU; namely, *UsedSoft GmbH* and *Art & Allposters Int'l* to demonstrate the problems with digital file transfers and the lack of clarity as to whether they qualify as a material copy.¹¹⁸ The judiciary can get bogged down in distinctions between the material and the virtual, tracing copies, deciding on what a copy is, and whether they have been transferred into space.¹¹⁹ Instead, Burk suggests that the answer lies in examining the social and material practices surrounding a specific digital reproduction.¹²⁰ For example, a collaborate relationship among the server, consumer and artist is not the same as buying the product as part of peer to peer network.¹²¹ Burk's suggestion is very apt as, likewise, in the context of understanding the SSO in a computer program and the *arrangements necessary* in s9(3), the SSO is not always the same as the textual code in a program.¹²² Similarly, the answer within this thesis lies in tracing the material process of copyright phenomena, then re-materialising the phenomena with the material that emerges, akin to Deleuze, Guattari, and Barad's reasoning.¹²³

In similar vein to this thesis, Davies makes visible the value of Barad's theory to reflect on legal positivism. Like Barad, the thesis examines the discursive practices, but in copyright

¹¹⁷ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42.

¹¹⁸ Burk discusses C128/11 *UsedSoft GmbH v Oracle Int'l Corp* [2012] EU C 2012 407; C-419/13 *Art & Allposters Int'l BV v Stichting Pictoright* [2016] FSR 6 in Dan L Burk, 'Copyright and the new materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 56-57. The latter case was not to do with computer programs but it focused on the first sale doctrine.

¹¹⁹ Dan L Burk, 'Copyright and the New Materialism' Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016).

¹²⁰ Dan L Burk, 'Copyright and the New Materialism' Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 62.

¹²¹ Dan L Burk, 'Copyright and the New Materialism' in J C Lai and Dominice, *Intellectual Property and Access to Im/material Goods* 62.

¹²² This has been acknowledged by the judiciary. See *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50]; *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 527.

¹²³ Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987); Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801.

law for CGWs. The thesis strongly suggests that formalism, canvassed as legal positivism, restricts judicial interpretations on the SSO of a computer program, and therefore will also restrict interpretation on s9(3) for the authorship of CGWs.¹²⁴ Davies makes similar observations that correspond with the findings in this thesis. Davies contends that positivism limits law to definitions and prevents innovative and expansive approaches to understanding law.¹²⁵ Davies purports that the law is often viewed from the outside itself;¹²⁶ a point made earlier not only about how formalism operates.¹²⁷ Davies draws on Barad to illuminate the fallacy of the law being an object, as the law is about relationships with others.¹²⁸ The reasoning by Davies demonstrates the fallacy of the law as an object by providing examples such as enacting, sentencing, murdering and contracting with other parties.¹²⁹ These examples are unimaginable without interrelated bodies passing through space and time in specific ways. Objects and locations such as the hall, the seat, the gown, the elevated positions and the letters all play a vital part.¹³⁰ Similar to the arguments presented later on in the thesis, Davies explains that materiality is the way matter is organised in material considerations.¹³¹ The potential of Barad's work to re-articulate the law in a different light is visible.

Other academics illuminate the importance of tracing assemblages in materiality of matter. Scheffer draws on Deleuze's reasoning to conduct his research.¹³² Scheffer's research demonstrates how materials can enable or restrict copyright matter; a finding corroborated by

¹²⁴ Cross refer to chapter 2, s 2.3.2, 77.

¹²⁵ Margaret Davies refers to Barad's work in Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 40.

¹²⁶ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 75.

¹²⁷ Cross refer to chapter 2, 'n 153'.

¹²⁸ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 93.

¹²⁹ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 69.

¹³⁰ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 69. Cross refer to chapter 4, s 4.2, 156 where a (re) examination of the doctrinal law on the SSO is conducted, using a new materialist lens, which exposes the myth that formalism treats the law as object of a literary work.

¹³¹ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 60.

¹³² Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 *International Journal of the Semiotics of Law* 365. Deleuze's theory featured earlier in the chapter. Cross refer to 'text to n 51'.

the research in this thesis.¹³³ More specifically, Scheffer explores the materialities within the assemblages of the criminal proceedings in England.¹³⁴ Scheffer examines legal discourse through the court, the files and the narrative of the parties. He uses semiotics in discourse analysis as part of his methodology.¹³⁵ Scheffer finds that the materialities add a sense of stability to the proceedings. The materialities also have an additional function as Scheffer contends that the materialities often disrupt, distract and in his words ‘trouble the hearing’.¹³⁶ Similar to the findings in this thesis, Scheffer purports that the materialities can act as a constraint on discovering the truth and do not provide room for the ‘full story’.¹³⁷

Work conducted by Bellido into music copyright also illustrates how materials can give insight into how copyright matter is established.¹³⁸ Bellido uses new materialism to examine the tools, the materials and the experts, that are all employed by the courts to decide on music copyright cases.¹³⁹ Bellido examines the use of technologies such as cassette tapes which affect the material conditions and listening experience essential to the outcome of the case.¹⁴⁰ Moreover, Bellido explores how knowledge and expertise is gained by the experts used in court cases. He traces specific techniques that the courts employ and the impacts they have on the development of the law. Interestingly, Bellido finds the courts tend to rely on the same musicologists. These experts, and their techniques, stabilize the conceptual tensions in music copyright disputes.¹⁴¹ Bellido advocates that tracing past encounters between specific experts

¹³³ Cross refer to chapter 2, s2.3.3 and Chapter 4, s4.2, 155.

¹³⁴ Thomas Scheffer, ‘Materialities of Legal Proceedings’ (2004) 17 *International Journal of the Semiotics of Law* 365.

¹³⁵ Thomas Scheffer, ‘Materialities of Legal Proceedings’ (2004) 17 *International Journal of the Semiotics of Law* 365, 366.

¹³⁶ Thomas Scheffer, ‘Materialities of Legal Proceedings’ (2004) 17 *International Journal of the Semiotics of Law* 365, 388.

¹³⁷ Thomas Scheffer, ‘Materialities of Legal Proceedings’ (2004) 17 *International Journal of the Semiotics of Law* 365, 388. Cross refer to chapter 2, s2.3.2 77.

¹³⁸ Jose Bellido, ‘Forensic Technologies in Music Copyright’ (2016) 25 *Social and Legal Studies* 441.

¹³⁹ Jose Bellido, ‘Forensic Technologies in Music Copyright’ *Forensic* (2016) 25 *Social and Legal Studies* 441.

¹⁴⁰ Jose obtained the cassette tapes from an interview from one of the experts giving evidence in court. See Jose Bellido, ‘Forensic Technologies in Music Copyright’ (2016) 25 *Social and Legal Studies* 441, 443.

¹⁴¹ Jose Bellido, ‘Forensic Technologies in Music Copyright’ (2016) 25 *Social and Legal Studies* 441, 456.

and legal practices whilst linking them to their legal settings may provide a better understanding of music copyright whilst illuminating the fact that music copyright is continually in the making.¹⁴²

There are similarities between some of the findings in the existing legal research and the findings in this thesis, although none of the research is on CGWs and computer programs. It is contended that formalism acts as a constraint for the judiciary in understanding the materiality and matter of copyright on the phenomena of the SSO, and by extension CGWs. Akin to the arguments presented in the scholarly literature, formalism acts as a distraction as it focuses the judiciary only on the non-aesthetic features of the SSO rather than the material discursive practices.

The research presented later in the thesis (re) examines the law on the SSO by taking a new materialist perspective of the language within the legal texts, where a reconfiguring of the SSO emerges for copyright consideration. It follows that the reconfiguring will contribute to the materiality and copyright matter of CGWs under s9(3), corroborating Bellido's argument that copyright is continually in the making. This chapter will provide new materialist insights into the idea/expression dichotomy, a dichotomy used to ascertain whether the SSO attracts copyright protection. Formalism appears to be used by the judiciary to aid in this linguistic exercise. Before embarking on the idea/expression dichotomy, it is important to (re) examine the formalist model using a new materialist perspective to uncover the ontological nature of formalism which will contribute to the material discourse on copyright law.

3.3 Old materialist roots of formalism

¹⁴² Jose Bellido, 'Forensic Technologies in Music Copyright' (2016) 25 Social and Legal Studies 441.

Whilst discussing the materiality of copyright matter for CGWs and the SSO of a computer program, what emerges from both Barad, Coole and Frost's work is that formalism corresponds with old Cartesian and Newtonian materialism. The material process brings formalism into sharp focus and indicates why the model produces static, determinate meanings for the judiciary on copyright.

As a new materialist, the discourse on copyright matter for CGWs and computer programs has given rise to several multiplicities, one of which is Newtonian and Cartesian physics on matter.¹⁴³ Drawing on the reasoning from Barad, Coole and Frost, the understanding that matter is based on units of mass is reflective of old materialism.¹⁴⁴ What this means is that matter is understood in a Newtonian and Cartesian way where matter is measurable, identifiable, and pre-determined.¹⁴⁵ The research in this thesis suggests that formalism is a discrete, predetermined model that reacts with matter as a separate unit. The formalist unit interacts with the SSO as a separate unit which appears to produce copyright matter for the SSO as a static object or thing.¹⁴⁶ The model does not allow the judiciary to engage with materials such as CGWs or computer programs. Even Lord Justice Jacob in *Nova* remarked on how the law does not invite the judiciary to know about these inorganic materials.¹⁴⁷ Unsurprisingly, the way the formalist model relates with inorganic matter produces predictable

¹⁴³ Karen Barad's research draws on Bohr's theory which confront old materialist Newtonian and Cartesian physics about matter. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801-813; Diana Coole, Samantha Frost, 'Introducing the New Materialism' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 9, 12-15.

¹⁴⁴ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 812-814; See Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 7-15

¹⁴⁵ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 812-814; See Diana Coole, Samantha Frost, 'Introducing the New Materialisms' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 7-15

¹⁴⁶ Cross refer to chapter 2, s2.3.3, 75.

¹⁴⁷ *Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1036 [6].

results. The formalist model operates as a pre-determined unit separate from the materials and the materiality in the process of making matter.

The way formalism treats materials as static units is revealed in chapter two, but a discussion will ensue to re-articulate the material discourse through a new materialist lens.¹⁴⁸ Copyright matter is produced using the formalist model which limits judicial gaze to words within the legal texts. This is where the intent of the legal text is abstracted from the text itself according to a plain ordinary meaning.¹⁴⁹

The Cartesian and Newtonian properties of the formalist model are visible in some of the doctrinal legal research conducted which arguably leads to the law being straightforward, easy to understand, while appealing to principle.¹⁵⁰ Principles in this context can refer to *stare decisis*. For example, in an *obiter* statement from the CA by Lord Justice Jacob in *Nova*, when discussing the SSO in a computer pool game, Lord Justice Jacob observes:

if Mr Jones had actually written a description of the pulsing, rotating cue, and synchronised power meter his description would (if not too trivial at least) be protected as a literary work. People could not copy that.¹⁵¹

The SSO of a computer program or the design¹⁵² may be visible for copyright protection if the design materials are expressed in a written form.¹⁵³ Being visible in an identifiable and measurable unit as is suggested by Mr Justice Jacob's statement corresponds with

¹⁴⁸ Cross refer to chapter 2, s2.3.2, 77. Cross refer to chapter 4. S4.2, 155.

¹⁴⁹ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 270.

¹⁵⁰ See both MacCormick and Zander on the strengths of using the literal rule. Neil MacCormick, *Rhetoric and the Rule of Law: A Theory of Legal Reasoning* (OUP 2005) 126; Michael Zander, *The Law-Making Process* (8th edn, Hart 2020) 155.

¹⁵¹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1047 [51].

¹⁵² Mr Justice Arnold refers to the SSO as the design in a computer program. See *SAS Institute Inc v World Programming Ltd* [2011] RPC 1, 85 [232].

¹⁵³ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1047 [51].

understanding the SSO in a Cartesian and Newtonian nature. Understanding the SSO in this way is no doubt a straight-forward and easy way to understand the SSO, and by extension CGWs, for copyright purposes.

This simplicity, resulting from matter being understood as a pre-determinate unit is on show again in *Nova* but in the context of artistic works i.e., graphic work. Lord Justice Jacob held that the in-time movement of a computer pool game did not constitute a *single* graphic work and was therefore not expressive copyright matter.¹⁵⁴ Lord Justice Jacob's reasoning emerges from understanding the legal text, namely, art 4(2) of the CDPA *separately* from the inorganic materials he deals with. Art 4(2) states that a graphic work includes a painting, drawing, diagram, map, chart, plan, to name, but a few. Since the in-time movement of a game is not 'static, non-moving'¹⁵⁵ akin to materials listed in art 4(2), Lord Justice Jacob deemed it not to be a single graphic work for the purposes of the section.¹⁵⁶ Although this decision appeals to principle, the decision does very little to meaningfully understand the movement within the game.

The material effects of having Newtonian and Cartesian features in formalism arguably contribute to why *Nova* did not rely on film copyright to protect the in-time movement of the game. The case materials clearly state that film copyright was originally relied upon.¹⁵⁷ However, since the High Court decision in *Norowzian Arks* (No1), *Nova* reserved raising this until the appeal court. It should be noted that film copyright never materialised in the CA.¹⁵⁸ One can read into this that *Nova* predicted that the in-time movement of the computer

¹⁵⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [16].

¹⁵⁵ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [16].

¹⁵⁶ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1038 [16].

¹⁵⁷ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1035 [2].

¹⁵⁸ For further discussion on this, cross refer to chapter 2 'n 240'.

game would only be visible in a pre-determined and isolated way from its materials. I make this argument based on the plain meaning of s17 (4) of the CDPA, which was the focus of the legal discourse by Mr A G Steinfield QC, sitting as a deputy judge in *Norowzian Arks* (No 1). It was held that film only protected the recording of the film, which could either be by taking another film or photograph of the film, but nothing else.¹⁵⁹ Unsurprisingly, this plain reading of s17(4) already pre-determines that an in-time movement would not be visible as copyright matter. This is very likely to be the reason why *Nova* did not rely on film copyright in the CA, despite *Norowzian Arks* (No1) being only persuasive authority.

Pre-determining matter in the way described above is a side-effect of Cartesian and Newtonian material which seems to correspond with the underlying properties of formalism. Inevitably, the SSO of a computer program has not been made visible as copyright matter.¹⁶⁰ It should be noted that a legal positivist such as Hart is likely to argue that judicial outcomes such as those visible are compliant with the concept of law.¹⁶¹ Hart posits that the concept of law is brought about through the acceptance of rules, which derive from the legislator's *authority* to legislate,¹⁶² and it follows, the judges' role is to interpret the words of the legislator. However, Newtonian and Cartesian understanding of matter is confronted by new materialism.¹⁶³ Logically, new materialism challenges the formalist approach as being the most appropriate model to make visible the ontology of copyright matter. This aligns with the findings as overall the research lays bare the ontological instability of the law on copyright matter in the context of the SSO of a computer program.¹⁶⁴

¹⁵⁹ *Norowzian Arks* (No1) [1998] FSR 398.

¹⁶⁰ Unless it is on preparatory design documents.

¹⁶¹ H L A Hart, *The Concept of Law* (3rd ed, OUP 2012).

¹⁶² H L A Hart, *The Concept of Law* (3rd ed OUP 2012) 57. See also Davies who refers to Hart as well. M Davies, *'Law Unlimited Materialism, Pluralism, and Legal Theory'* (Routledge 2017) 115.

¹⁶³ Cross refer to chapter 3 'n 143'.

¹⁶⁴ The doctrinal research demonstrates a limited or incomplete understanding of a copyright work for the SSO of a computer program.

Applying a plain meaning to the legal text for the SSO is symptomatic of the formalist approach but is not without criticism from academics. MacCormick argues that legal materials are constructed in the context of the legal system, and this involves a whole web of legal, political and factual circumstances.¹⁶⁵ This critical comment from MacCormick makes sense from the perspective of new materialism. When the theory is used to (re) examine some of the doctrinal legal research later in the thesis, the research indicates how legal matter is not so identifiable and measurable as the way formalism manifests it to be.¹⁶⁶

Barak raises an interesting point which can be explained by the underlying properties of formalism. If the plain meaning can be provided to a text, there is no meaningful need in interpretation.¹⁶⁷ This makes sense when reflecting on the materiality of matter, for example, in deciding whether a computer program is literary matter. As the code is visible in an identifiable and measurable way there is more certainty over its protection unlike the contrasting position with the SSO of a computer program.¹⁶⁸ This finding offers further reasoning as to why the formalist model is not the most suitable for understanding the SSO within a computer program, and by extension CGWs, under s9(3).

The argument that formalism is not ontologically suitable due to the Cartesian and Newtonian properties gathers strength when Pila's comments are considered. It is argued that the use of a formalist model contributes to the ontological instability; an argument also raised by Pila but not in the context of inorganic matter such as CGWs or computer programs. Whilst Pila rests her argument on formalism, the research in this thesis indicates that the Newtonian

¹⁶⁵ Neil MacCormick, *Rhetoric and the Rule of Law : A Theory of Legal Reasoning* (OUP 2005) 139.

¹⁶⁶ Cross refer to chapter 4, s 4.2, 156.

¹⁶⁷ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press 2020) 273-274.

¹⁶⁸ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1041 [16]; *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [78], [119]; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch); [2011] RPC 14 [310]. [332]; *John Richardson v Flanders* [1993] (No 2) FSR 497, 527.

and Cartesian properties of formalism contribute to the limited nature of copyright law. Therefore, considering the scholarly literature, and the doctrinal legal research, calls for an ontological theory to better understand copyright matter makes perfect sense.

The findings in this thesis are very likely to contribute to research such as Pila's on copyright, but it is also likely to contribute to the scholarly literature on statutory interpretation too.¹⁶⁹ Whilst contributing to the literature in these areas is helpful, it is important that the thesis also addresses CGWs. To do this, one needs to apply the findings to better understand CGWs under s9(3). However, as the law on computer programs is contingent on understanding CGWs for this thesis, first, I will start to apply new materialism to the idea/expression dichotomy. The dichotomy is used with formalism to understand whether the SSO of a computer program emerges into copyright matter.

3.4 The SSO of a computer program and computer-generated works – the 'non-space' between an idea and an expression of an idea

Nova demonstrates the close relations between the SSO of a computer program and a CGW under s9(3).¹⁷⁰ Mr Justice Kitchen's reasoning for assigning authorship to the designer of a computer pool game included designing the appearance of the game and the rules and logic for each computer-generated frame.¹⁷¹ Nonetheless, questions remain about the meaning of the *arrangements necessary* for authorship under s9(3), and more recent questions have begun to

¹⁶⁹ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press 2020; Neil MacCormick, *Rhetoric and the Rule of Law: A Theory of Legal Reasoning* (OUP 2005); Michael Zander, *The Law-Making Process* (8th edn, Hart 2020).

¹⁷⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹⁷¹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

emerge about whether the creator of an algorithm can be assigned authorship under s9(3).¹⁷² The questions put the spotlight on the SSO of a computer program, especially as the doctrinal legal research suggests the SSO may not be fully understood.¹⁷³ Having an incomplete understanding of the SSO may indicate the functions of a computer program, including algorithms, may also not be meaningfully understood. This, in turn, may have implications on the authorship of a CGW under s9(3).¹⁷⁴

To understand the SSO of a computer program as a copyright work, the work must be expressed as a literary thing or object and not remain as an idea.¹⁷⁵ Judicial interpretations correspond with formalism; a model that attempts to help the judiciary draw the line on whether the SSO is merely an idea or being expressed as an idea⁴ Demarcating between an idea and an expression of an idea has proved problematic for the judiciary.¹⁷⁶

Drawing a boundary around matter so matter falls on the right side of the idea/expression dichotomy for copyright purposes is difficult. As Justice Learned Hand

¹⁷² Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>>accessed 26 June 2023; Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16. Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 225; Andres Guadamuz, 'California Judge reaches Decision in Peta's Monkey Selfie case' (30th Jan 2016) <www.technollama.co.uk/california-judge-reaches-decision-in-petas-monkey-selfie-case> accessed 1st July 2023, Deming Liu, 'Forget the Monkey Copyright Nonsense for Goodness Sake, dude!' (2018) 40 European Intellectual Property Review 64 (2018) 40 European Intellectual Property Review 61, 64; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 European Intellectual Property Review 12, 17; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, , Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1111; Robert Mahari, Jessica Fjeld, Ziv Epstein, 'Generative AI is a Minefield for Copyright Law' (The Conversation 15 June 2023);

¹⁷³ Cross refer to chapter 2, 2.3.2, 77.

¹⁷⁴ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16 < <https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

¹⁷⁵ CDPA, s3(1)(b), (c).

¹⁷⁶ Cross refer to chapter 2, s2.3.2 77.

purports ‘nobody has ever been able to fix that boundary [between the idea and the expression], and nobody can’.¹⁷⁷ Justice Hand reminding the judiciary of the difficulty ahead with applying the dichotomy to inorganic matter as part of the discourse in copyright law. The quote, although used in a US case, has been quoted in English law. Mr Justice Jacob refers to the quote to illustrate the enormity of the task the judiciary face when determining a computer program for copyright purposes.¹⁷⁸ Further, Mr Justice Walker, uses the same quote in *Altai*, another US case,¹⁷⁹ which has been implanted into *John Richardson*, to illustrate the difficult exercise.¹⁸⁰ The difficulties are made apparent by a few judges who have been very vocal about the complex task.

As formalism focuses on the sensory and physical properties of a work, the model does not appear to be helping with understanding how to abstract the SSO of a computer program so it can be reliably conceptualised as either an idea or an expression of an idea. Despite judges reiterating many times that copyright matter is not limited to the text of the code in the program,¹⁸¹ judicial decisions have not *found* material to be copyright matter.¹⁸²

Interestingly, Mr Justice Ferris in *John Richardson* understands that copyright should extend beyond the text of the code but highlights the uncertainty around how to abstract the SSO for the purposes of being conceptualised as an idea or an expression of an idea. Mr Justice Ferris purports on the argument:

¹⁷⁷ *Nichols v Universal Pictures* (1930) 45 F (2d) 119, 121.

¹⁷⁸ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 291.

¹⁷⁹ *Computer Associates v Altai* 982 F 2d 69, 704 (CA 2d Cir 1992).

¹⁸⁰ *John Richardson v Flanders* [1993] 3 WLUK 398, [1994] FSR 497.

¹⁸¹ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 302; *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 500 [7]; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch) RPC 1 [232]

¹⁸² Cross refer to chapter 2, s2.3.2 77..

consideration should not be limited to the “structure and organisation” of the program imports an unacceptable degree of uncertainty, because it is unclear at what level of abstraction (to use that term in the sense in which it was used in *Computer Associates*) the structure and organisation is to be discerned.¹⁸³

Mr Justice Ferris allowing scope to go beyond the structure and organisation due to the unacceptable levels of uncertainty in abstracting the material in a computer program. The quote by Mr Justice Ferris can be read to allow material in a computer program to be abstracted in more than one way which may uncover more material, a statement this thesis builds upon.¹⁸⁴

It appears that the SSO is understood differently. For example, Mr Justice Pumfrey in *Navitaire* moots there being plenty of scope to uncover material in a computer program for copyright consideration. In Mr Justice Pumfrey’s view the SSO can include unconscious or unintentional or in some other way making use of knowledge that amounts to copying.¹⁸⁵ Mr Justice Arnold in *SAS Institute* refers to the SSO as the design of the program.¹⁸⁶ Taking the above into account, there appears to be merit in the argument by Mr Justice Ferris that there is uncertainty in abstracting the SSO of a computer program.

Drawing on Braidotti’s and Barad’s theory as a building block for my own reflections on the difficulties with applying the dichotomy to the SSO, I make the following observation.¹⁸⁷ Putting boundaries around material when using the formalist model assumes that the law is settled and well established. It follows that using formalism as a conceptual tool to help understand the SSO of a computer program is rather peculiar, when considering the research in this thesis. This argument is advanced through a new materialist lens. The Newtonian and

¹⁸³ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 527.

¹⁸⁴ Cross refer to chapter 5, s5.2.3.1 224.

¹⁸⁵ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [122].

¹⁸⁶ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 85 [232].

¹⁸⁷ Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987).

Cartesian properties of formalism treat inorganic matter such as the SSO as predetermined and identifiable units. In other words, there is an assumption that knowledge on the SSO of a computer program as a literary work is established. However, the research raises doubt about the existing knowledge on the SSO as knowledge is limited and incomplete.¹⁸⁸

The thesis contends that the formalist conceptual model is not a suitable accompaniment to the idea/expression dichotomy. Employing formalism to conceptualise inorganic matter as either an idea or an expression keeps the judiciary too distant from the materiality and the materials that is being treated for copyright. In other words, used together as an interpretative technique for the legal texts does not allow scope to (re) examine the legal discourse in a meaningful way.

The implications from the combined use of formalism and the idea/expression dichotomy result in incremental changes that have very little meaning. For example, in striving to provide further clarity on the idea/expression dichotomy, Mr Justice Jacob opined:

‘United Kingdom copyright cannot prevent the copying of a mere general idea but can prevent the copying of a detailed idea. It is a question of degree....’¹⁸⁹

From a new materialist perspective, it is difficult to understand how Mr Justice Jacob’s statement can provide more clarity as his answer seems to lie in putting more boundaries rather than fewer boundaries around the legal language. A distinction needs to be made between a general and a detailed idea, adding another layer of language for the judiciary to interpret.

Creating division within copyright matter is not an isolated case. The division within matter is visible in Mr Justice Arnold’s questions for a preliminary referral to the CJEU in SAS

¹⁸⁸ Cross refer to chapter 2, s2.3.2, 77 and chapter 3, s 3.3 132.

¹⁸⁹ *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 302.

Institute. The questions are in the context of understanding the legal texts, most notably Directive 1991/250 and the CDPA.¹⁹⁰ The CJEU reformulated the questions into themes, and I note some of interest:

- (a) the nature and/or extent of the functionality of the First Program;
- (b) the nature and/or extent of the skill, judgement and labour which has been expended by the author of the First program in devising the functionality of the First Program;
- (c) the level of detail to which the functionality of the First Program has been reproduced in the Second Program.¹⁹¹

The questions indicate whether an original expression of a literary work would depend on either the degree, nature or detail of the functional material in the SSO for copyright matter. It is worth noting that originality aligns with the CJEU's interpretation from *Infopaq* insofar as the work is original if it is the author's own intellectual creation.¹⁹² Bot concluded that the SSO as an original literary work would not depend on the degree or detail of functionality, which *prima facie* suggests an interpretation more aligned with new materialism. However, Bot proceeds to assert that the way functional material is expressed could amount to an original work for copyright protection. Mr Justice Arnold does not alter the guidance from Bot.¹⁹³ From a new materialist's perspective Bot is asking the judiciary to neatly abstract the original

¹⁹⁰ The CDPA transposed Directive 91 into domestic law.

¹⁹¹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [35].

¹⁹² In the recent case of *TJH Systems Ltd, Optionnet LLP and Sheridan, Sheridan Options Corp* {2023} EWCA Civ 1354 [15] Mr Justice Arnold confirmed that the English judiciary would follow the CJEU's interpretation on an original expression. See *Case C-5/08 Infopaq International A/S v Danske Dagblades Forening* [2009] ECR I-6569.

¹⁹³ *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch), [2013] RPC 17 [42].

expression in functional material. Through a new materialist's lens, it is perhaps not surprising why the judiciary have found it almost impossible to apply this.¹⁹⁴

As the formalist model allows too much focus on the language within the legal texts, which result in linguistic exercises that provide very little meaning, another theory should be found. The thesis advocates for the ontological theory of new materialism. It would seem that Pila would support this proposal, as after all, her research suggests a theory should be sought that would provide a more meaningfully understanding of the ontology of a copyright work.¹⁹⁵

New materialism focuses on the materiality of making copyright matter. As there are differences in understanding the SSO of a computer program for copyright and evidence points to incomplete knowledge on the SSO, new materialism may be more appropriate. It allows the SSO as a literary work to be deterritorialised¹⁹⁶ from the phenomena's materials, making no assumptions about the existence of the law. This is useful as new materialism can attempt to deal with political, cultural and historical materialisations within the legal materials. This confronts issues such as where judges erroneously reformulate rules or where judges depart from formalism into the realms of policy which does little to help understand the SSO of a computer program in a meaningful way.¹⁹⁷ A material analysis is conducted by examining the material process and context of the SSO as a literary work for copyright. It follows that once the material of the SSO is understood in a more meaningful way, a space will emerge in the dichotomy for some of the SSO to be considered for copyright matter. The material effects on the authorship of CGWs according to s9(3) will be examined.

¹⁹⁴ There have been virtually no cases protecting the SSO. Cross refer to chapter 2, s2.3.2, 77.

¹⁹⁵ Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 241

¹⁹⁶ A word used by Deleuze and Guattari. See Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987) 4.

¹⁹⁷ Cross refer to chapter 2 87, 90, 92.

S9(3) requires judicial understanding of the *arrangements necessary* in creating a CGW which may include arrangements connected to the SSO of a computer program. Adopting a formalist model invites the judiciary to focus on the language within the provision. Drawing on the patterns that have arisen in the legal discourse on computer programs, what can be learnt is that s9(3) may involve the judiciary engaging in empty exercises searching for the boundary line within law's matters. Focus on the SSO may be likely in future litigation on CGWs, without the judiciary having full visibility of the material. This argument is premised on the literature that is emerging on the authorship of generative AI works. Questions pertaining to the functions of a computer program, which include algorithms, more specifically, whether the creator of an algorithm can be assigned authorship, appear in the literature.¹⁹⁸ The research suggests the likelihood is that algorithms will remain understood as a static idea if formalism is continued to be used. Formalism is not likely to bring the judiciary any further forward in understanding in a meaningful way whether the creator of an algorithm can be assigned authorship of a CGW under s9(3).

Overall, it is contended that following in the footsteps of the existing legal discourse; shaped and manipulated by the cumulative effects of formalism and the idea/expression dichotomy is heading in the wrong direction. Call is made for a new materialist conceptual model on the legal discourse of CGWs.

3.5 Conclusion

¹⁹⁸ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 225; Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2021; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111

There are different approaches to new materialism but a common thread running through the approaches is the agreement on how matter is formed. Matter does not come into being in isolation from the phenomena's materials but includes the material and the material process. What is visible is how new materialism is different to critical legal and social theory. Although the latter can be said to focus also on the material context, where the theory differs, is that new materialism focuses on the ontology of the law. More specifically, the theory does not assume knowledge of the legal rules.

The thesis has been very careful to try not to fall into the traps of other new materialist researchers. Care has been taken to explain legal materiality and the legal materials. It is important to understand that legal materiality involves examining *how* the law is made and that matter is not physical but conceptual. For example, to understand how the meaning of *arrangements necessary* is likely to be interpreted for the purposes of s9(3), one need to examine the materials that are likely to give meaning to this matter. The research suggests this can be done by examining the legal texts and interpretative techniques. The research on the legal texts, namely, Directive 1991 (as amended in 2009) and relevant case law applying the legal instrument are the legal materials that help create copyright matter on the SSO of a computer program. Further, in the light of *Nova*, the legal materials connected to a computer program will also give meaning to the authorship of CGWs under s9(3) of the CDPA. The thesis attempts to understand the meaning of the texts, firstly, by using the formalist conceptual model, and secondly, by new materialism. This allows the thesis to examine and (re) examine the legal materials to discover any new matter that can be perceived later in the thesis as copyright matter. Therefore, it is hoped that there is clarity over the materials used to examine copyright matter.

Arguably, the most significant contribution of this chapter is drawing on Barad, Coole and Frost's theory to challenge the efficacy of using the formalist model to understand the *arrangements necessary* for the creation of a CGW under s9(3). New materialism confronts old materialist views on how matter is formed. Old materialism is associated to Newtonian and Cartesian understanding that matter is measurable and identifiable. New materialism exposes the Newtonian and Cartesian properties of formalism, which go some way to explaining why the judiciary interpret the SSO in a limited way, and in a way that does not attract copyright. This is insofar as there is assumption that the SSO of a computer program for copyright purposes is well established in law and can neatly fit into a static literary thing or object with deterministic properties. The research suggests otherwise, and the SSO remains generally allusive to copyright. However, new materialism goes further than this and illuminates the fallacy of treating matter as a static thing or object, drawing on quantum theory and philosophy, to substantiate the argument. Instead, matter emerges as more of a continual process that can be (re) examined through materials and the material context. The material process allows for new matter to be uncovered, primarily because of the way matter is understood. Matter does not *interact* with other matter. *Interactions* assume that matter is already defined, which leads to static interpretations like the law on the SSO. Conversely, if matter is understood to *intra-act*, no assumptions are made about matter, allowing the ontology of matter to be (re) discovered just as Guattari and Deleuze illuminate through the analogy of the wasp and orchid.

Through a new materialist lens, some insights are offered on the SSO of a computer program, and by extension CGWs, under s9(3). Firstly, the combination of employing formalism to understand the idea/expression dichotomy in the context of the SSO leads the judiciary to focus too much on the law itself. This is insofar as the law is treated separately from the inorganic matter e.g. the SSO of the program. Secondly, by focusing too much on

the law results in the judiciary being involved in semantic exercises over the language in the legal texts. These exercises can range from whether the design is a computer program or separate to the program, whether the in-time movement is a singular graphic work or a series of works, and whether the literary work depends on the degree, and nature of functional material. Such exercises appear to be due to the similarities in nature of both the formalist model and the idea/expression dichotomy. Put differently, how both are techniques that treat the law separately from the law's materials and materiality. If this is the case, it seems likely that using the formalist model to interpret the provision on CGWs i.e., s9(3) will produce a reductionist approach akin to computer programs.

When using formalism, judges appear to be engrossed in the language of a legal provision which takes the judicial focus away from the materiality of the law. From a new materialist perspective, it is important to note that the materiality is significant for the future direction of the law. Becoming too focused on the legal provision, not only keeps the law stagnant but allows for differences in the language to incorrectly direct and shape the law. To borrow Bradoitte's words, 'difference [is] both central and non-essentialistic.'¹⁹⁹ Differences in the language within legal texts should not be fatal to copyright matter. Adopting formalism as a model to complement the idea/expression dichotomy wrongly engages the judiciary in linguistic exercises. What this means for CGWs is that the judiciary are very likely to be embroiled further in division within the legal language of s9(3) of the CDPA, whilst not having a meaningful understanding of CGWs.

The thesis suggests that new materialism can be used as a conceptual model instead of formalism. Employing a new materialist model will equip the judiciary to focus more on the legal discourse around the SSO of a computer program to (re) examine the existing legal

¹⁹⁹Rosi Braidotti, *The Posthuman* (Polity 2013) 100.

knowledge on algorithms. With the rise in CGWs, the spotlight in literature is on the arrangements and contributions in creating algorithms in the context of a CGW. It is argued that (re) examining algorithms can be done by employing the purposive approach instead of a literal approach, which manifests from formalism. In the next chapter, a case is made using a new materialist lens for the purposive approach to be used to facilitate understanding on the legal ontology of algorithms. Once new matter is uncovered, the matter can be perceived for copyright purposes under s9(3) of the CDPA. The next chapter commences with a new materialist approach to s9(3) of the CDPA.

CHAPTER FOUR

A NEW MATERIALIST APPROACH TO STATUTORY INTERPRETATION OF THE SSO OF A COMPUTER PROGRAM FOR CGWS

4.0 Introduction

Matter is substance in its intra-active becoming- not a thing, but a doing, a congealing of agency. Matter is a stabilizing and destabilizing process of iterative intra-activity.¹

Using a new materialist lens, copyright matter should be understood by the phenomena's materials and the materiality of the provision emphasising the importance of the process of how phenomena comes into being. More specifically, legal materiality refers to the process of how algorithms may come into being for copyright purposes, while the materials comprise of legal materials such as legal texts and statutory interpretative techniques.² The chapter has two purposes. Firstly, to demonstrate the link between the law and new materialism. Secondly, to (re) examine the legal materials which may help to provide a more meaningful understanding of copyright matter for CGWs. Matter is conceptual rather than physical³ so retracing the material (legal) process of algorithms may help to understand the meaning of some of the arrangements necessary in a CGW. By exploring the material (legal) process of algorithms, the process allows for more material to be considered, providing for the possibility of a more expansive conceptualisation of authorship of CGWs. This is sharp contrast to the existing formalist model, which appears to limit the focus to the phenomena itself, treating the phenomena as a static thing or an object.⁴ When providing a new materialist perspective on

¹ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

² Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 7.

³ Kang and Kendall explain what matter is, in the context of law. The authors do not discuss copyright or computer programs /CGWs. Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 7.

⁴ Cross refer to chapter 2 'n 168'.

copyright matter, matter is referred to as phenomena rather than a copyright work; the latter indicating predetermined fixed boundaries that do not allow for a (re) configuring of the law.⁵

The chapter focuses on the materials that may give meaning to the *arrangements necessary* for authorship to be assigned to a CGW under s9(3). An examination of algorithms may help to address the question whether a creator of an algorithm can be assigned authorship of a CGW under s9(3). The meaning of algorithms is sought through the legal texts, namely, the CDPA and Directive 1991 (as amended in 2009) on the protection of computer programs.⁶ The directive is by no means the only legal material that is relevant, as the travaux préparatoires are significant. More specifically, the opinion from the Economic and Social Committee on the proposal of Directive 1991, coupled also with the European Commission proposal for the directive are of notable interest.⁷ It is hoped that more meaning on the *arrangements necessary* for s9(3) can be traced to the material (legal) process of dealing with algorithms in a computer program.

Using new materialism not only allows the judiciary to focus on the legal materials, but also invites the judiciary to (re) examine the materiality of s9(3). Calls are made to abandon the formalist conceptual model, which limits the law to semantic exercises over the legal provision.⁸ Instead, it is contended that formalism should be replaced by adopting a new materialist model.⁹ The new materialist model would encompass a purposive approach to be

⁵ Treating matter as phenomena is taken from Karen Barad's reasoning. See Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 813, 820.

⁶ Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 as amended by Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. The latest directive is almost a mirror copy of Directive 1991 with a few minor amendments.

⁷ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4; Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (88) 816 final 6.

⁸ Cross refer to chapter 2, s2.3.2, 77.

⁹ Cross refer to chapter 3 'n 18'.

taken by the judiciary. The purposive approach allows the judiciary to look beyond the words of the legal text to discover the true meaning of the Act. In doing so, the judiciary can use both internal and external materials associated to the directive to aid with judicial interpretations.¹⁰ It is argued that the purposive approach is a much more suitable interpretative technique, rather than giving the plain, ordinary meaning to legal provisions which is often symptomatic of formalism.¹¹ The argument is advanced due to the new materialist undertones that correspond with the purposive approach.¹² Using new materialism reveals the suitability of the purposive approach in understanding the materiality of s9(3).

Similarities are drawn between the purposive approach and new materialism. There is a striking resemblance between the two in how they *intra-act* with material, de-stabilizing phenomena through the material process. Through (re) materialising phenomena, more meaning can be given to s9(3). Both new materialism and the purposive approach allow for phenomena to (re) emerge through the unlimited connections and associations with materials in the material process of the phenomena.¹³

The connections with the philosophy of computer science will be drawn upon by using the purposive approach, although will feature more heavily in chapter five. The aim is to utilise all associations on algorithms to consider whether a creator of an algorithm can be perceived to be an author under s9(3). It is argued that there is space in the legal materials to accommodate new developments from the philosophy of computer science to (re) cast algorithms in a different light legally. If this is the case, algorithms can be (re) examined both as copyright

¹⁰ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693[8] (Lord Bingham).

¹¹ Cross refer to chapter 2 'n 217'.

¹² Cross refer to chapter 4 'n 86'.

¹³ Cross refer to chapter 5 224.

matter but also in the context of assigning the creator authorship of a CGW based on the arrangements necessary that were made in designing the algorithm.

The chapter consists of five sections. The first section uses a new materialist lens to examine the ontological nature of s9(3). The second section draws on the earlier doctrinal legal research to (re) examine the findings to argue that legal positivism, couched in formalism, is not as distant from the material world that legal positivism suggests. The third section explores the purposive approach and draws on case law to illustrate the similarities with new materialism. Reasoning by analogy is used to advance an argument that the purposive approach corresponds with new materialism. A new materialist approach is used in the fourth section to examine the legal materials on algorithms to assess whether the law is flexible enough to accommodate any new developments on algorithmic materials. The final section will conclude with a lead-in to chapter five. The chapter commences by taking a closer look at s9(3) of the CDPA.

4.1 The ontology of s9(3): the SSO and algorithmic material

S9(3) remains largely unexplored by the judiciary except for Mr Justice Kitchen's opportunity in the High Court in *Nova*.¹⁴ In examining the legal reasoning by Mr Justice Kitchen in *Nova*, the rules and logic of a computer program emerge as inorganic material that is important to understanding the legal materiality of s9(3). Having a meaningful understanding of the rules and logic, likely to be associated to the SSO of a computer program, influences whether algorithms are fully understood. A new materialist lens is used to (re) examine the relationship

¹⁴ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

between the legal materials and inorganic materials in the material process of creating a CGW.¹⁵

The judgment by Mr Justice Kitchin in *Nova* illuminates the material process of s9(3). Part of the case concerns the authorship of computer-generated works in a computer pool game. Mr Justice Kitchin's reasoning for assigning authorship to Mr Jones (the designer) was:

because he devised the appearance of the various elements of the game and the rules and logic by which each frame is generated and he wrote the relevant computer program. In these circumstances I am satisfied that Mr Jones is the person by whom the arrangements necessary for the creation of the works were undertaken and therefore is deemed to be the author by virtue of s.9(3).¹⁶

Not only were the arrangements in writing the program considered as relevant contributions to attributing authorship to the CGW, but the contributions, arguably, in the SSO of the computer program, were also viewed as important. Mr Justice Kitchin's reasoning illustrating the importance of the material process in understanding s9(3).

Parallels can be made to Mr Justice Kitchin's reasoning on assigning authorship of a CGW based on the connections that Mr Jones had with the computer program to that of Guattari and Deleuze in explaining how matter is formed.¹⁷ Like Guattari and Deleuze's exposition, a CGW is made up of assemblages which entail the contribution to the SSO of a computer program. The assemblages of materials or the materiality of the SSO of a computer program

¹⁵ Cross refer to chapter 1 'n 170' for an explanation of legal materials and 'n 2' in chapter 4 for an explanation on legal materiality. Further, when Kang and Kendall explain law's matters, not only do they refer to the legal materials, but the authors also refer to inorganic materials.

¹⁶ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹⁷ Giles Deleuze, Felix Guattari, *A thousand plateaus: Capitalism and Schizophrenia* (Massumi tr, University of Minnesota Press London 1987) 4, 10, 21.

exposes that meaning is given to the legal texts, namely, the CDPA and Directive 1991 (as amended in 2009), by using the formalist model.¹⁸ Formalism limits understanding of the SSO for copyright purposes to the sensory and physical features of a copyright work.¹⁹ Formalism which appears to have Newtonian and Cartesian underpinnings offers too much of a distraction to the judiciary producing semantic exercises without meaningfully understanding the materiality of copyright matter.²⁰ Unsurprisingly, the research uncovers the legal ontological instability on computer programs.²¹ This finding strongly suggests that the ontological instability will have a material effect on the legal ontology of s9(3).²²

The provision of s9(3) is (re) examined by using a new materialist approach to bring more meaning to understanding the arrangements necessary in a CGW. More specifically, focus is on whether the creator of an algorithm can be said to be involved in the arrangements that are deemed necessary for the creation of a CGW. The focus is informed by recent questions that have emerged in the literature and case law.²³ Algorithms will be examined by retracing the material process of a computer program in the context of copyright law.

Retracing the meaning of algorithms through the materials and material context raises concerns with existing knowledge on algorithms. Employing the legal text of Directive 1991/250 (amended in 2009), recital eleven, *produces* knowledge that algorithms comprise of

¹⁸ Cross refer to chapter 2, s2.3.2, 77.

¹⁹ Cross refer to chapter 2 'n 131'.

²⁰ Cross refer to chapter 2, 77.

²¹ Cross refer to chapter2, s2.3.2, 77.

²² Cross refer to chapter 2 106.

²³ Jessica Fjeld, Robert Mahari, Ziv Epstein, 'Generative AI is a Minefield for Copyright Law' (The Conversation 15 June 2023); Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2021; Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 16 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225.

ideas which underlie the interfaces of a computer program.²⁴ Although the recitals are only of persuasive value, Mr Justice Arnold in *SAS Institute* observes:

These steps, the algorithms, from the program is built up, should not be protected as such against unauthorized reproduction. They are the equivalent of the words by which the poet or the novelist creates a work of literature, or the brushstrokes of the artist or the musical scales of the composer.²⁵

Mr Justice Arnold's *obiter* remark aligns with the recital in the legal text of the directive insofar as algorithms are ideas. However, the remark also makes visible the use of analogical reasoning, comparing an algorithm to words of a poet or the brushstrokes of an artist. Mr Justice Arnold's Cartesian belief that algorithms are akin to brushstrokes or words of a poet assumes that words or brushstrokes are separate from the painting or the book and are only part of the materiality but not the matter. Namely, creating a dualism within matter resulting from understanding matter as a thing or an object.

New materialism confronts the type of reasoning by Mr Justice Arnold as although differences in algorithms from copyright matter should be considered,²⁶ these differences should not be fatal to copyright. Consequently, algorithms should be (re) explored not only as part of the materiality but also as part of the material world. Put differently, algorithms should be understood as an iterative process akin to Barad's understanding of how matter is formed.²⁷ For example, drawing on Guattari, Deleuze and Latour,²⁸ copyright law on algorithms should

²⁴ Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 as amended by Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. The latest directive is almost a mirror copy of Directive 1991 with a few minor amendments.

²⁵ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229].

²⁶ This statement is inspired by Rosi Braidotti, *The Posthuman* (Polity 2013) 100.

²⁷ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

²⁸ Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987); Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005)

be understood by the law's connections with other materials. These materials will help to *describe* algorithms rather than *produce* knowledge on algorithms.²⁹ It is argued that once a description on algorithms is given, material that is revealed can then be perceived for copyright consideration under s9(3).

When considering copyright law's connections with other materials, it is interesting to note the law on the SSO of a computer program is not as remote from the material world as formalism dictates.

4.2 The legal materiality of the SSO

Formalism is not as distant to the material world as some of the decisions on the SSO of a computer program suggest. The SSO of a computer program may be important to s9(3) as only authorship can be assigned if one is found responsible for the *arrangements necessary* for the creation of a CGW. Mr Justice Kitchen appears to confirm the connection with the SSO of a computer program and a CGW in *Nova*.³⁰ Moreover, the finding that formalism is not divorced from the material world when employed by the judiciary to understand the SSO, aligns with other areas of law, including music copyright.³¹ It is contended that this research can be used to justify employing a new materialist interpretation for s9(3) of the CDPA.

²⁹ This statement was inspired by the work of Barad. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

³⁰ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

³¹ For example, Bellido's research discovered how experts and their techniques influenced and shaped copyright law. Jose Bellido, 'Forensic Technologies in Music Copyright' (2016) 25 *Social and Legal Studies* 456. Moreover, Scheffer demonstrates how materialities such as the court, the files and the narrative of the parties can prevent the full truth from being uncovered. See Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 *International Journal of the Semiotics of Law* 388. For more examples discussing how the law is immersed into the material world, cross refer to chapter 3, s 3.2, 128.

There is no doubt that formalism limits how the SSO of a computer program is made visible to the courts as illustrated by the research in this thesis. Formalism does not permit the judiciary to engage with other materials, apart from focusing on the sensory and physical properties of a computer program.³² Recalling Lord Justice Jacob's comments about the judiciary not needing to know how the computer pool games are played or what they are in *Nova* is a reminder of the distance between the materiality of the law and the materials it attempts to deal with.³³

Despite the reminder from Lord Justice Jacob in *Nova*, it is argued that the judiciary engage more with the material world than the use of formalism indicates. In examining the SSO of a computer program, Mr Justice Pumfrey in *Navitaire* uses policy reasons as part of the *ratio* for deciding that business logic is not deserving of copyright protection.³⁴ Mr Justice Pumfrey held:

As a matter of policy also, it seems to me that to permit the 'business logic' of a program to attract protection through the literary copyright afforded to the program itself is an unjustifiable extension of copyright protection into a field where I am far from satisfied that it is appropriate.³⁵

Mr Justice Pumfrey referring to the policy of Directive 1991 (as amended) before concluding that policy reasons dictate that business logic could not be protected.³⁶ It is the policy of the directive not to protect ideas; a utilitarian value that goes to the heart of copyright law. Such values can be traced all the way back to *Donaldson v Beckett*,³⁷ about promoting learning and

³² Cross refer to chapter 2, s 2.3.2, 77 for a more detailed explanation on formalism.

³³ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1036 [6].

³⁴ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

³⁵ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

³⁶ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

³⁷ *Donaldson v. Becket* [1774] 1 ER 837.

educating the masses.³⁸ In similar vein, article six and some of the recitals of the directive suggest a need for material to be available as ideas for interoperable purposes.³⁹

By Justice Pumfrey referring to policy reasons as part of the decision-making process in *Navitaire*, the decision may suggest that the formalist model was not equipped to deal with material arguably of an (in) tangible nature. Nonetheless, the decision-making process also illuminates the engagement with the material world. Policy reasons consider the impact of decisions on the welfare of society. This cements the reasoning of the likes of MacCormick and Barak.⁴⁰ For example, MacCormick argues that the law is made up of a complex web of legal, political and factual circumstances.⁴¹ This means judicial decisions are enmeshed in materialisations.

Abandoning the formalist model to engage with policy reasons as part of the materiality on the SSO of a computer program is not an isolated event. Mr Justice Ferris in *John Richardson* rejected the formalist model in favour of a US test from *Computer Associates v Altai*.⁴² Copyright matter became visible from applying a three-stage test, which is heavily influenced by policy considerations.⁴³ Mr Justice Walker's reasoning was informed by Justice Stewart's explanations on policy considerations in copyright law.⁴⁴ Mr Justice Walker noted that a careful balance needs to be made during the interpretative process to ensure that decisions

³⁸ *Donaldson v. Becket* [1774] 1 ER 840 [135].

³⁹ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42. Both are almost identical. The argument refers to recitals nineteen and twenty-one.

⁴⁰ Neil MacCormick, *Rhetoric and the Rule of Law: A Theory of Legal Reasoning* (OUP 2005) 139; Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 221.

⁴¹ Neil MacCormick, *Rhetoric and the Rule of Law: A Theory of Legal Reasoning* (OUP 2005) 139.

⁴² *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 refers to a test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992)

⁴³ *Computer Associates v Altai* 982 F 2d 702, 707-712 (CA 2d Cir 1992). There is also an explicit section within the judgement titled 'policy considerations.' See 711 of judgment. For a more detailed explanation and analysis of the three-stage test, cross refer to chapter 2, 94-95.

⁴⁴ Walker CJ quotes from Justice Stewart in *Twentieth Century Music Corp v Aiken* 422 US 151 (1975) in *Computer Associates v Altai* 982 F 2d 702, 711 (CA 2d Cir 1992).

not only encourage and reward creative works but ensure public availability of materials.⁴⁵ In other words, the material effects on society and the availability of materials for the public will be considered as part of the legal discourse on copyright law. Policy reasons emerge again in Lord Justice Lewison's judgment from the CA in *SAS Institute*. Lord Justice Lewison adopted a US style merger test into the judgment when he argued that if there were limited number of ways to express a work, then the work will not be visible as an original expression of an idea.⁴⁶ Protecting the impact on society of granting a copyright over the SSO within a computer program is made a prominent feature of the decision-making process.

What is revealing is how the formalist model sometimes appears to be abandoned, leaving the materiality of the law to become part of copyright matter. This is evident when Mr Justice Arnold in *SAS Institute* refers questions on the SSO to the CJEU, only to have them reformulated by the CJEU. For example, one of the questions was originally phrased around whether copyright protects interfaces from being copied without decompiling the object code.⁴⁷ Mr Justice Arnold posed this question for the CJEU in connection with interpreting article 1(2) of Directive 1991 (as amended in 2009).⁴⁸ The question was reformulated by Advocate General Bot in the CJEU.⁴⁹ The question was recast as whether art 1(2) is to be interpreted as understanding the functionalities of a computer program as an expression of an idea, which attracts copyright protection.⁵⁰ The reformulation demonstrates how the materiality of copyright law shapes copyright matter.

⁴⁵ *Computer Associates v Altai* 982 F 2d 702, 711 (CA 2d Cir 1992).

⁴⁶ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

⁴⁷ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 14 [332].

⁴⁸ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 14 [332].

⁴⁹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [37].

⁵⁰ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [37].

Similarly, Bot did not answer the direct questions from the domestic court in *BSA*.⁵¹ The original question posed by the Czech court was whether a graphical user interface (GUI) is an expression of a computer program or part of a computer program for the purposes of interpreting art 1(2) of Directive 1991.⁵² Bot held that a GUI could not be deemed an expression of a computer program, although omitted to address whether it could be part of the expression of a computer program.⁵³ The decision-making in *BSA*, which remains binding on the English judiciary,⁵⁴ reveals that the legal discourse is copyright matter as the way the question was narrowly interpreted by the CJEU contributed to the SSO components not being protected.

Making visible the entanglements with the material world closely resembles Scheffer's research.⁵⁵ Scheffer examines legal discourse through the court, the files and the narrative of the parties. Although Scheffer finds that the three materialities add a sense of stability to the proceedings, Scheffer also contends that the materialities act as a constraint on discovering the truth.⁵⁶ A similar argument can be advanced for some of the decision-making processes on copyright matter for the SSO as not answering the direct questions from the domestic court also acts as a constraint to understanding the SSO for copyright purposes.

Using the formalist approach and then abandoning it whereby policy reasons are resorted to, coupled with domestic questions being reformulated by the CJEU, does very little to bring understanding to the SSO of a computer program for copyright purposes. The findings in this thesis suggests a legal ontological instability in copyright law on the SSO. The legal

⁵¹ *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [29], [49].

⁵² *Case C-393/09 BSA v Ministerstvo Kultury* [2010], [2011] FSR 18 [29].

⁵³ Stephen Vousden, 'Protecting GUIs in EU law: Bezpečnostní Softwarová Asociace' (2011) 6 *Journal of Intellectual Property Law & Practice* 728.

⁵⁴ The European Union (Withdrawal) Act 2018, s2. See also *Wright v BTC Core* [2023] EWCA Civ 868, [2023] FSR 21 [34].

⁵⁵ Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 *International Journal of the Semiotics of Law* 365.

⁵⁶ Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 *International Journal of the Semiotics of Law* 365, 388.

instability is examined in the thesis, but a summary follows.⁵⁷ Firstly, the lack of connection between the material facts presented in court on the SSO like in *Navitaire* and the nebulous policy grounds for conceptualising the SSO as an idea. It is difficult to be convinced that a decision based on policy reasons is sound when there were significant material difficulties in conceptualising the SSO for the court. Secondly, the implanting of a US *Altai* test and a US style merger test incorporating policy into English law disturbs the coherence of English judicial decision-making and precedents. And finally, the legal effects from the reformulation of the *original* questions from domestic courts by the CJEU. Such material effects appear to result from failures with formalism, as if formalism was effective, there would be no need to base decisions on abstract notions of policy, decisions from the US or obtain guidance from the CJEU.

The ontological instability suggests a need for copyright in the SSO of a computer program to be grounded in an ontological theory like new materialism. This call for an ontological theory has also been echoed by Pila,⁵⁸ although Pila draws on Kendall Walton's art theory instead to suggest as a basis for reforms.⁵⁹ Nevertheless, Pila's doctrinal research is of interest to this thesis, as it can be used to illustrate further how the law is enmeshed in materialisations. For example, she draws on the judgment from the CA in *LucasFilm Ltd* to illuminate how the intent of the creator is considered by the judiciary when determining an aesthetic work for copyright.⁶⁰ Similarly, in *Hensher v Restawile* the intention of the artist is

⁵⁷ Cross refer to chapter 2, s2.3.2, 77.

⁵⁸ Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 237, 241.

⁵⁹ Pila uses Walton's work to suggest changes to the formalist theory. She refers to Kendall Walton, 'Categories of Art' (1970) 79 The Philosophical Review 334 in Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 248-249.

⁶⁰ Pila refers to *Lucasfilm Ltd v Ainsworth* [2008] EWHC 1878 [2009] FSR 2 in Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 239-240.

also used to determine whether artistic crafts can be perceived as a copyright work.⁶¹ Further examples are used by Pila, but the point of using her research is to demonstrate how the findings in this thesis around formalism align with research conducted on other areas of copyright law.⁶² Judges are resorting to finding subjective intent to determine a work for copyright, demonstrating how the law is enmeshed in the material world.

Having (re) explored some of the case-law through a new materialist lens exposes how the law on the SSO of a computer program is more closely aligned to a new materialism account of how the SSO is formed for copyright than first envisaged. These findings can be used to further advance a case for using a new materialist approach to CGWs for the purposes of s9(3). It is hoped that a new materialist approach will allow more focus on the legal discourse rather than vacuous exercises which only create artificial divisions within copyright matter. With that in mind, the purposive approach is discussed and analysed through a new materialist lens.

The thesis contends that the judiciary should use a purposive approach to interpret the legal text of Directive 1991 to understand algorithms. In recent literature on CGWs, understanding the functions of a computer program, including algorithms, appears to be at the forefront of discussions.⁶³ The purposive interpretative technique will enable rather than

⁶¹ Artistic craftsmanship is the term used in the CDPA. See s4(1)(C). *Hensher v Restawile* [1976] AC 64 (HL) in Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 234.

⁶² Pila also claims that formalism is not working. See Justine Pila, 'Copyright and Its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 231-242.

⁶³ Jessica Fjeld, Robert Mahari, Ziv Epstein, 'Generative AI is a minefield for copyright law' (The Conversation 15 June 2023); Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 2 May 2024; Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225.

restrict legal discourse on algorithms and copyright law. The purposive approach allows the judiciary to look beyond the words to give effect to Parliament's purpose for the Act.

4.3 A new materialist account of the purposive approach

This section draws on the similarities between how the purposive approach operates and new materialism. It is contended that the purposive approach is material which describes copyright matter in a way that is more reflective of new materialism than giving the plain, ordinary meaning to words; an interpretation that is generally undergirded by formalism.⁶⁴ The section draws on case-law beyond copyright to illustrate the benefits of employing a purposive material discourse on CGWs for copyright consideration.⁶⁵

A purposive approach gives effect to the true meaning of what Parliament said in a statute.⁶⁶ To retrace the true meaning of the words of Parliament, it is important to understand the different contexts of the legal clause. For example, the context of the words within the legal provision, similar texts, the history of the legal provision, coupled with the legal system's fundamental values.⁶⁷ The judge's role is to give effect to Parliament's purpose within permissible boundaries of interpretation. Controversial provisions should be read in the context of the whole of the statute and historical context of the situation which led to the enactment of the statute.⁶⁸

⁶⁴ Cross refer to chapter 2, s2.3.2, 77.

⁶⁵ For an explanation on the relationship of the SSO of a computer program and CGWs, cross refer to s 4.2, 155 in this chapter.

⁶⁶ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8] (Lord Bingham).

⁶⁷ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 111.

⁶⁸ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8] (Lord Bingham).

Employing a purposive construction of a legal text corresponds with how a new materialist understands matter to emerge. In *R (Quintavalle) v Secretary of State for Health*, a purposive interpretation was applied to s1(1) of the Human Fertilisation and Embryology (HEA) Act 1990.⁶⁹ The case concerned an appeal to the former House of Lords regarding whether embryos created by cell nuclear replacement were covered by the 1990 Act. S1(1) provided that a live human embryo where fertilisation was complete would be regulated by license.⁷⁰ At the time of creating the Act, scientific development had not stretched to cell nuclear replacement.⁷¹ The resemblance of the purposive approach and new materialism is striking in the judicial reasoning from the judgment. I make the following link with the use of the purposive approach in the above judgment and new materialism. Lord Steyn draws on a quote from Lord Thring that is identical to Karen Barad's theory of how matter is formed.⁷² The quote is 'that statutes ought generally to be constructed as "always speaking statutes."'”⁷³ Lord Steyn uses this quote in the context of interpreting the statute in the light of new scientific knowledge.⁷⁴ The quote of how the law emerges bears a striking resemblance to the quote by Barad at the beginning of the chapter.⁷⁵ Both Lord Thring and Barad referring to the iterative process of matter. Both quotes suggesting that law is not a finished article and the materiality, namely the legal process, comprises of matter.

⁶⁹ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687

⁷⁰ Human Fertilisation and Embryology Act 1990, s1(1) as referred to in *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1 WLR 693; ; [2003] 2 AC 687 [1] (Lord Bingham).

⁷¹ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [23] (Lord Steyn).

⁷² Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801.

⁷³ Lord Steyn was quoting Lord Thring, a great Victorian draftsman. See *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693 [22] (Lord Steyn).

⁷⁴ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [22] (Lord Steyn).

⁷⁵ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

Legal matter emerges generally from two contrasting interpretative techniques: the literal and the purposive approach.⁷⁶ Lord Steyn refers to the above approaches as a ‘hunt in pairs: that for every rule there is a rule to the contrary effect (...)’.⁷⁷ Lord Steyn referring to the contrast between the purposive technique and the literal technique. The former providing for a more expansive interpretation as Lord Steyn suggests. The findings in this thesis corroborate Lord Steyn’s point, as do the cases below.⁷⁸ Interesting, when Lord Steyn refers to the literal approach, his observations that the statute is interpreted as if it was construed on the day, correspond with the findings in this thesis.⁷⁹ Literal interpretations frozen to a time-period, unlike the purposive approach, but symptomatic of the underlying theoretical foundations of formalism.⁸⁰ Lord Steyn’s comments also align with Barak’s criticism of giving the plain, ordinary meaning to words.⁸¹ The two techniques offering the judiciary a different interpretation of legal matter.

New materialist undertones can also be found in Lord Bingham’s reasoning and justification in *R (Quintavalle)*⁸² for using the purposive approach. Like Lord Steyn, Lord Bingham rejects the literal construction of the HEA Act believing that when a case reaches the appellate courts, the words will be of an ambiguous nature.⁸³ In other words, the plain ordinary meaning of the provision will not be applicable; a point also mentioned by Barak.⁸⁴ Lord

⁷⁶ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [22] (Lord Steyn).

⁷⁷ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [22] (Lord Steyn).

⁷⁸ Cross refer to chapter 5 234.

⁷⁹ In virtually all cases, the SSO has been perceived in the same way, namely, as an idea for copyright purposes.

⁸⁰ Cross refer to chapter 3, s3.3, 131.

⁸¹ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 276.

⁸² *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2AC 687 [8] (Lord Bingham).

⁸³ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [7] (Lord Bingham).

⁸⁴ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press 2020) 273-74.

Bingham preferring the purposive approach, but in doing so, arguably illuminates the new materialist ontological nature of the approach. Lord Bingham states:

Controversial provisions should be read in the context of the statute as a whole, and the statute as a whole should be read in the historical context of the situation which led it its enactment.⁸⁵

The above explanation of the purposive interpretative method resembles Guattari, Deleuze and Latour's approach in relation to understanding matter through the phenomena's connections or assemblages.⁸⁶ The meaning of the provision should be sought by tracing the origins of the statute which can be revealed through connections with historical legal materials. Further, Braidotti's *not one-principle*⁸⁷ can also be employed as rather than the focus be on words as units of matter in isolation from the material contexts, the statute should be considered as a whole. This means an embryo which is in the process of fertilisation or is undergoing fertilisation, according to the HFE Act 1990,⁸⁸ should be understood by the legal material process of the statute. Braidotti's reasoning can be applied to Lord Bingham's explanation of the purposive approach as the differences in the meaning of an embryo from the material context are central to the discourse but should not be fatal to deciding whether the material should attract protection.⁸⁹ Unsurprisingly, both Lord Steyn and Lord Bingham, amongst other

⁸⁵ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8] (Lord Bingham).

⁸⁶ Giles Deleuze, Felix Guattari, *A thousand plateaus: Capitalism and Schizophrenia* (Massumi tr, University of Minnesota Press London 1987); Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005).

⁸⁷ Rosi Braidotti, *The Posthuman* (Polity 2013) 95.

⁸⁸ Human Fertilisation and Embryology Act 1990, s1(1).

⁸⁹ Braidotti coins the phrase that 'difference [is] both central and non-essentialist. See Rosi Braidotti, *The Posthuman* (Polity 2013) 100.

judges, decided that embryos created by cell nuclear replacement were also within the remit of the provision.⁹⁰

The majority of the judges in the case above were heavily influenced by Lord Wilberforce's decision in *Royal College of Nursing of the United Kingdom*.⁹¹ Lord Bingham, Lord Steyn and Lord Hoffmann all referred to the same passage of Lord Wilberforce's judgment.⁹² Lord Wilberforce's reasoning within the passage at p 822 provides clarity on applying a purposive construction of a statute to new material. Lord Wilberforce purports that in deciding whether new material should fall within the Parliamentary intention of the Act, the material must fit within the same genus of facts as those which the expressed policy has been formulated.⁹³ New material can be held to be within Parliament's intention if a clear purpose is detected in the legislation which can only be fulfilled if the extension is made.⁹⁴ Lord Wilberforce does proceed to make some valuable comments around how to apply these principles, noting that the application will depend on the strictness or otherwise of the words in which the provision has been expressed. Lord Wilberforce reiterates this by explaining that the judiciary should be less inclined to extend meanings if the Act was designed to be restrictive or circumscribed in nature.⁹⁵ Therefore, the judiciary need to find meaning of the provision within permissible boundaries.⁹⁶

⁹⁰*R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693 [19] (Lord Bingham); [27] (Lord Steyn). Lord Hoffmann, Lord Millett and Lord Scott also reached this decision.

⁹¹*Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800.

⁹²*R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [10] (Lord Bingham); [24] (Lord Steyn); [32] (Lord Hoffmann).

⁹³*Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800, 822 (Lord Wilberforce).

⁹⁴*Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800, 822 (Lord Wilberforce).

⁹⁵*Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800, 822 (Lord Wilberforce).

⁹⁶*R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8] (Lord Bingham).

Locating meaning within the boundaries above is crucial especially as the purposive approach can face criticism if it is too liberally applied. Laing draws attention to Bingham's point in *R (Quintavalle)*⁹⁷ regarding how the purposive approach must respect the doctrine of the separation of powers.⁹⁸ In other words, the judge's role is one of interpretation rather than making the law. It follows that the purposive approach must be interpreted carefully so as not to conflict with the separation of powers.

If the purposive approach faces criticism for giving too much power to the unelected judiciary, logically, objections can also be made to the common law.⁹⁹ The judiciary are involved in updating the law by distinguishing between precedents and in the case of Supreme Court judges, judges can use the Practice Statement to evolve the law when it appears right to do so.¹⁰⁰ Yet as Burrows quite rightly argues the common law is revered.¹⁰¹ The judiciary apply their legal knowledge and expertise to develop and shape the law in many areas that have grave effects on the public.¹⁰² For example, arguably, one of the most heinous crimes of murder is a common law rather than a statutory offence. However, the judiciary do have to operate within permissible boundaries as Lord Wilberforce's principles illustrate. In other words, the judiciary are not free to interpret the law in any way they deem fit.¹⁰³ Moreover, aligned with parliamentary sovereignty, Parliament has the power to enact an Act of Parliament that

⁹⁷ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8] (Lord Bingham).

⁹⁸ Judith M Laing, 'R (On the application of Quintavalle) v Secretary of State for Health [2003] UKHL 13 (2003) 25 Journal of Social Welfare and Family Law 243; *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [15] (Lord Bingham).

⁹⁹ Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 31.

¹⁰⁰ Michael Zander, *The Law-Making Process* (8th edn, Hart 2020) 283.

¹⁰¹ Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 31.

¹⁰² Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 31.

¹⁰³ Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 31.

overrides any decisions made by the judiciary.¹⁰⁴ Burrows even advocates in areas of controversial social policy the judiciary should apply the best interpretation rather than leaving the law for Parliament to amend.¹⁰⁵ This makes sense if the judiciary operate within the permissible boundaries of the statute. It means judges can respond to circumstances when facts are brought to their attention as Parliamentary law-making can be plagued with delay and political manoeuvres. It is contended that these arguments should go some way to appease any critics of the purposive approach.

Barak interprets the law-making process to be a relationship between the legislature and the judiciary, the legislature as the senior partner, whilst the judge as a junior.¹⁰⁶ Barak's comments can be viewed through a new materialist lens. Akin to a new materialist, Barak is not of the opinion that law making is done in so much isolation from the two institutions: the legislature and the judiciary. Instead, Barak argues that when a judges adjudicate disputes, creating law and protecting democracy are inevitable side-effects.¹⁰⁷ A new materialist would concur with this reasoning as the interpretive process is not just materiality but also consists of matter, meaning phenomena cannot be distinguished by one or the other. Nevertheless, following Lord Wilberforce's principles keeps interpretations within permissible boundaries.

I now turn to how a purposive material discourse can be helpful to understanding CGWs for copyright purposes. More specifically, this is done so one can address whether a creator of an algorithm can be assigned authorship of a CGW under s9(3). The purposive material discourse will extend beyond this chapter, but a few initial observations are made as a way to

¹⁰⁴ Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 31.

¹⁰⁵ Andrew Burrows, *Thinking About Statutes, Interpretation, interaction, Improvement* (Cambridge University Press, Cambridge, 2018) 32.

¹⁰⁶ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 250

¹⁰⁷ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2020) 220.

justify using the method. The observations are made in the light of Lord Wilberforce's comments and judgment from *R (Quintavalle)*.¹⁰⁸

Firstly, the wording used around algorithms within Directive 1991 (as amended in 2009) is not so restrictive or circumscribed to borrow Lord Wilberforce's wording, as even that of *R v (Quintavalle)*. The wording within the Human Fertilisation and Embryology Act 1990; the focus of judicial interpretation in the above case, referred to an embryo as an egg in the process of fertilisation.¹⁰⁹ Yet, the judiciary reached a unanimous decision that an embryo created by cell nuclear replacement could be included within the meaning of the Act.¹¹⁰ Conversely, algorithms are not mentioned in the articles of the directive but are mentioned in the recitals as being an idea.¹¹¹ Nonetheless, although recital eleven refers to algorithms as being an idea, it is not clear what they are as no description is provided.¹¹²

As the directive does not prescribe what algorithms are, this means a purposive construction of the provision may extend to algorithms abstracted from a computer program in ways which may be perceived to be different from being simply an idea.¹¹³ Parliament's purpose for protecting a computer program is laid bare in recital two of the directive. The directive is there to protect the technical and financial resources that are invested into making computer programs especially as the copying of computer programs can occur at a fraction of

¹⁰⁸ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687.

¹⁰⁹ Human Fertilisation and Embryology Act 1990, s1(1).

¹¹⁰ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [19], [29], [54], [55].

¹¹¹ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42. Both Directives are almost identical. Algorithms are ideas according to the recitals. See recital eleven of Directive 2009 and recital fourteen in Directive 1991.

¹¹² This omission is likely to have given rise to Mr Justice Arnold's analogical reasoning comparing algorithms to words of a poet or the brushstrokes of an artist. See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [229].

¹¹³ Cross refer to chapter 5, s5.2.3.1, 224 for an explanation on how this may be done.

the cost.¹¹⁴ A full exploration of the material facts of the cases mentioned in this research demonstrates the human and financial investment devoted to the SSO of a computer program.¹¹⁵ It is contended that algorithms can be abstracted at multiple layers which is reflective of new materialist philosophy on how matter should be understood.¹¹⁶ If this is the case, one may discuss how the different layers may be perceived legally for copyright purposes.¹¹⁷

A purposive construction of algorithms according to Directive 2009 can be conducted in the following way. Lord Bingham's judgment in *R v Quantaville* notes that a purposive approach is applicable when words are capable of more than one meaning.¹¹⁸ Drawing on Angius and Primiero's reasoning on algorithmic materials, this appears to be the case.¹¹⁹ Lord Bingham argues that words should not be understood in isolation but should be read in the context of the instrument as a whole, including the historical context of the situation, which led to the legal instrument.¹²⁰ Using Lord Bingham's reasoning, an argument can be advanced that algorithms which comprise of ideas, according to recital eleven, should not be construed in

¹¹⁴ Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. This is an exact copy of recital two from Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs [1991] OJ L122/42.

¹¹⁵ Cross refer to chapter 2, s2.3.2, 75.

¹¹⁶ This will be explained in-depth in chapter 5. See also Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283-308 <<https://doi.org/10.1007/s13347-019-00358-7>> accessed 19 April 2024.

¹¹⁷ Cross refer to chapter 5, 224.

¹¹⁸ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [7] (Lord Bingham).

¹¹⁹ This is discussed more fully in the next section.

¹²⁰ This is the explanation provided by Lord Bingham in *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 [8].

isolation to the history of the directive.¹²¹ The history of the directive can be traced back to the predecessor which is the text of Directive 1991.¹²²

It is suggested that a purposive construction would allow for *travaux préparatoires* connected to Directive 2009 to be considered. This suggestion is credible and has been given support by Lord Brown-Wilkinson in *Pepper v Hart*.¹²³ Lord Brown-Wilkinson in *Pepper v Hart* reminded the court that White papers and official reports were already being used to assist the court with determining the meaning of statutory words.¹²⁴ The reminder was made to assist with Lord Brown-Wilkinson's reasoning to also allow the use of Hansard reports.¹²⁵ I use Lord Brown-Wilkinson's reminder to allow for *travaux préparatoires* to be used to discover the meaning of algorithms.

The *travaux préparatoires* allows for the materiality of the law on algorithms to be visible. Employing *travaux préparatoires* to bring meaning to Directive 2009 permits one to trace the material context of the directive. More specifically, by examining the Commission proposal for the directive, coupled with the opinion on the proposal from the Economic and Social Committee, the historical context of drafting the directive can be illuminated. One will be able to gain an understanding as to why algorithms only feature as an idea for copyright purposes in one of the recitals rather than the main text of the directive. It is significant to understand the mismatch between the recital and the omission in the text, as the text is binding, but the recitals are only of a persuasive value. The mismatch suggests an uncertainty around

¹²¹ Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs [1991] OJ L122/42, recital eleven.

¹²² Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42. Both Directives are almost identical. Algorithms are ideas according to the recitals. See recital eleven of Directive 2009 and recital fourteen in Directive 1991.

¹²³ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032; [1993] AC 593, 637-639.

¹²⁴ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032; [1993] AC 593, 640 (Lord Brown-Wilkinson).

¹²⁵ The reports reflect the official debate by Parliament of a law coming into force, namely, a bill of Parliament.

conceptualising algorithms that needs to be more closely understood. Further, the *travaux préparatoires* will provide an understanding of how algorithms were understood at the time of creating the directive, which will lead to a more meaningful understanding as to why algorithms appear in the recital as an idea rather than as an expression of an idea. The latter only attracting copyright protection. Once a more meaningful understanding is gained on these two issues, one can assess whether there is space in the directive for alternative interpretations of algorithms. Examining the materiality of the directive reflects legal materialism and the works of the likes of Davies, Bellido, Scheffer and Burk; authors who also traced the meaning of law from legal materials.¹²⁶

However, caution needs to be taken when examining external legal materials. The dissenting judgment by Lord MacKay in *Pepper v Hart* raises some concerns.¹²⁷ However, the concerns are about the use of Hansard reports which are not *travaux préparatoires*. Hansard reports on the proceedings of Parliament when proposed legislation is debated whereas the *travaux préparatoires* is the drafting history of a directive. Nevertheless, the practical considerations that Lord MacKay raises will be similar for the *travaux préparatoires*. The crux of the issue is, as Lord MacKay sees it, tracing the material process of a legal instrument will involve practical considerations such as the time and the increased cost of litigation to the public.¹²⁸ This practical concern can be applied also to *travaux préparatoires* as it takes time to trace the historical context of the directive in comparison with just examining the text of the directive. Examining the historical context will require the lawyers to study the *travaux*

¹²⁶ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017); Jose Bellido, 'Forensic Technologies in Music Copyright' (2016) 25 *Social and Legal Studies* 441; Thomas Scheffer, 'Materialities of Legal Proceedings' (2004) 17 *International Journal of the Semiotics of Law* 365; Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44-62.

¹²⁷ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032; [1993] AC 593.

¹²⁸ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032; [1993] AC 593, 615 (Lord Mackay).

préparatoires before a case is presented in court.¹²⁹ Lord MacKay does state that he does not find objection in using such resources apart from these practical considerations.¹³⁰ The practical considerations need to be considered but could be overestimated when applying to copyright cases on CGWs. The latter is one area of law, whereas *Pepper v Hart* involved the relaxation of using Hansard reports potentially in all cases that involves ambiguity.¹³¹

Overall, new materialism shines a light on the vibrancy of the interpretative process. What has also become visible as part of the legal discourse on CGWs is how similar the purposive approach is to new materialism. It is hoped that this section lays the foundations for future research by other academics on how new materialism can be a theoretical basis for the purposive approach. The next section employs a purposive material construction to Directive 2009 to understand the ontology of algorithmic material.

4.4 Tracing the meaning of algorithms for computer-generated works

By examining the *travaux préparatoires* of Directive 2009, the meaning of algorithms can be traced back to the historical roots of the directive. The historical roots leads to Directive 1991.¹³² What the external legal materials indicate is that algorithms were recognised as being ambiguous in nature at the time of creating the directive.¹³³ Further, a definition on algorithms was provided in one of the legal materials,¹³⁴ although this was not without criticism, visible

¹²⁹ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032, [1993] AC 593, 614 (Lord Mackay).

¹³⁰ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032, [1993] AC 593, 615 (Lord Mackay).

¹³¹ *Pepper (Inspector of Taxes) v Hart* [1992] 3 WLR 1032, [1993] AC 593, 614-615 (Lord Mackay).

¹³² Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 as amended by Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. The latest Directive is almost a mirror copy of Directive 1991 with a few minor amendments.

¹³³ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹³⁴ Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (1989) 816 final 6 [2.4].

in other legal material.¹³⁵ These findings may go some way to explaining why the articles in the final directive are silent regarding algorithms, yet algorithms feature in one of the recitals. Nonetheless, recital eleven appears to assume that algorithms have a pre-determined and static meaning as they should be conceptualised as ideas not deserving of copyright protection.¹³⁶ In other words, assuming all algorithms have the same meaning and therefore can be conceptualised in the same way. New materialism challenges this understanding of the ontological nature of algorithms by drawing on the reasoning from Angius and Primiero.¹³⁷

The legal ontological instability around the meaning of the SSO of a computer program for copyright purposes is evident from the research. Knowledge on the SSO is limited and incomplete.¹³⁸ The formalist model appears to be contributing to the reductionist approach taken by the judiciary to the interpretation of the SSO in a computer program.¹³⁹ By revealing the ontological uncertainty around the SSO of a computer program, questions emerge over the reliability of existing knowledge on algorithms. Algorithms are *identified* in recital eleven of the directive as ideas, although they are not defined.¹⁴⁰ It should be noted that there is no explicit reference to them in the articles of the directive.¹⁴¹ However, Mr Justice Arnold in *SAS Institute* attempts to address this gap, by drawing on an analogy of algorithms being equivalent to brushstrokes of an artist or the words of a poet.¹⁴² Relying on analogical reasoning only

¹³⁵ Economic and Social Committee, ‘Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs (1989) C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹³⁶ Council Directive 91/250/EEC of 14 May 1991 [1991] OJ L122/42 as amended by Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16. The latest directive is almost a mirror copy of Directive 1991 with a few minor amendments. See recital 11.

¹³⁷ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) 33 *Philosophy & Technology* 283-308. 1

¹³⁸ Cross refer to chapter 2, s2.3.2, 76.

¹³⁹ Cross refer to chapter 2, s2.3.2, 76

¹⁴⁰ Council Directive 2009/24/EC of 23 April 2009 on the legal Protection of Computer Programs [2009] OJ L111/16.

¹⁴¹ The articles are binding whereas the recitals are of persuasive value.

¹⁴² See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [229].

exacerbates the uncertainty around the meaning of algorithms for copyright. On this basis, focus will be given to the material process of the directive to trace a more reliable meaning.

4.4.1 The legislative trail

Tracing the material context of the Directive 2009 reveals insights into the nature of algorithms. Relying on the Commission of the European Communities on the proposal of Directive 1991 refers to algorithms as steps that represent solutions for a computational problem. The way the steps are expressed gives the program speed, efficiency and even style.¹⁴³ ‘These steps, the algorithms, from which the program is built up, should not be protected as such against unauthorized reproduction’.¹⁴⁴ The Commission described algorithms in a way that the Commission understood them as ideas. Prior to the remarks on algorithms as steps that represent solutions, the Commission also refer to how tasks need to be defined for the steps to be selected to bring about the desired outcomes to solve a computational problem.¹⁴⁵ Drawing on Angius and Primiero’s reasoning from the philosophy of computer science suggests that the Commission refers to algorithms at a level of abstraction known as specifications and procedures.¹⁴⁶ Angius and Primiero explain that abstractions at specification level are when a set of requirements are needed to solve a computational problem akin to the European Commission explaining how the task need to be defined in order to solve the problem.¹⁴⁷ Abstraction by procedure involves a procedural description that implements the

¹⁴³ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (1989) 816 final 6 [2.3].

¹⁴⁴ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (1989) 816 final 6 [2.4].

¹⁴⁵ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (1989) 816 final 6 [2.3].

¹⁴⁶ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) *Philosophy & Technology* 283, 290-295.

¹⁴⁷ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) *Philosophy & Technology* 283, 294.

specification.¹⁴⁸ It follows that algorithms at specification and procedural level is how the Commission have understood algorithms.

However, the Economic and Social Committee provided an opinion on the proposal that strongly suggests that any reference to the term algorithm within the directive could cause confusion.¹⁴⁹ The Committee drew attention to the ambiguous nature of algorithms and how often logic and algorithms are used interchangeably.¹⁵⁰ Nonetheless, the Committee seemed to be of the opinion that algorithms were ideas.¹⁵¹ However, the Committee substantiates the comment by explaining that their opinion is made in the context of the current state of technology.¹⁵² It should be noted that the opinion by the Committee was provided in 1989. It can be inferred that the Committee may not be of the same view at the time of writing this thesis, if knowledge on algorithms has changed. The concern that the Committee had around algorithms being ambiguous and prone to change with technological advances led the Committee to recommend removing algorithms from the directive.¹⁵³ This is likely to be why the Council moved algorithms from the text (articles) of the directive, as proposed by the Commission, to recital fourteen.¹⁵⁴ In other words, placing algorithms in one of the recitals

¹⁴⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 286.

¹⁴⁹ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' (1989) C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁵⁰ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁵¹ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁵² Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁵³ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁵⁴ Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 as amended by Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16. The latest directive is almost a mirror copy of Directive 1991 with a few minor amendments. See recital eleven in Directive 2009 and recital fourteen in Directive 1991. Both explain that algorithms are ideas.

was a compromise between the proposal from the Commission and the opinion from the Economic and Social Committee.

There is potential space within the directive for algorithms to be conceptualised as being more than an idea, but this is based on a few caveats. Algorithms as an expression of an idea is only likely to be legally credible if algorithms can be made visible to the judiciary beyond mere specifications or procedures. Further, the creator of the algorithm would have to demonstrate in devising the algorithms that the expression would have to be the creator's own intellectual creation.¹⁵⁵ The latter being correctly noted by Advocate General Bot in *SAS Institute* when discussing Mr Justice Arnold's questions for the CJEU on the SSO of a computer program.¹⁵⁶ If algorithms exist beyond specifications and procedures, it may be possible to consider algorithms for copyright purposes.

Understanding algorithms as being more than an idea is likely to make an argument stronger for authorship of a CGW under s9(3). The latter is insofar as the contributions may be used as evidence to support that the creator is involved in not only the arrangements of creating a CGW, but also the *arrangements* that are *necessary* for the CGW to be created. Prove of being responsible for the arrangements necessary is crucial for authorship of the CGW according to s9(3) of the CDPA. Moreover, research indicates the lack of clarity over whether original input is required for authorship under s9(3).¹⁵⁷ This largely stems from the provision being silent on the matter,¹⁵⁸ coupled with the only case which deals with s9(3) being a decision from the Court of First Instance, which is over seventeen years of age.¹⁵⁹ Having further research, like the research in this thesis, which re-examines algorithms, which may point to

¹⁵⁵ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50].

¹⁵⁶ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50].

¹⁵⁷ Cross refer chapter 1 (n) 77.

¹⁵⁸ CDPA, s9(3).

¹⁵⁹ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14.

being understood as an original expression of an idea, may help to provide clarity for the creator of the algorithm.

Despite the opinion by the Economic and Social Committee on the proposal of the directive that algorithms are ambiguous and can change depending on the technological advances, decisions on algorithms remain stagnant. For example, the analogy that Mr Justice Arnold uses in *SAS Institute* that algorithms are ‘the equivalent of the words by which the poet or the novelist creates a work of literature, or the brushstrokes of the artist or the musical scales of the composer’¹⁶⁰ can be traced all the way back to 1989. Brushstrokes of an artist and words of a poet are ideas used to produce the artistic or literary expression apparently akin to algorithms for the creation of a computer program. The Commission’s proposal on the directive uses the exact analogy to describe algorithms.¹⁶¹ Mr Justice Arnold’s reasoning illustrates how algorithms are being treated as static pre-determined units of knowledge twenty-two years on from the Commission’s proposal on the directive. Furthermore, this is despite the warnings given by the Economic and Social Committee that algorithms were conceptualised as ideas based on the state of technology around in 1989. Although one may argue that *SAS Institute* is an isolated case, the research in this thesis indicates otherwise, as is evidenced by the way the SSO of a computer program has been interpreted.¹⁶²

It is argued that the interpretation on algorithms will remain stagnant and resistance to change based on the research from this thesis. The research exposes how the formalist model is used by the judiciary to produce the SSO in a computer program. Generally, the SSO does not attract copyright protection.¹⁶³ However, new materialism seems to reveal the ontological

¹⁶⁰ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229].

¹⁶¹ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (1989) 816 final 6 [2.4].

¹⁶² Cross refer to chapter 2, 2.3.2, 75. See also chapter 3, s3.3, 132 for an explanation as to why interpretations tend to be stagnant.

¹⁶³ Cross refer to chapter 2, s2.3.2, 75.

Newtonian and Cartesian nature of formalism, which is likely to be contributing to the limited and incomplete understanding of the SSO.¹⁶⁴ If this is the case, it is not likely that algorithms will be visible in any other way apart from as an idea. This is due to how Newtonian and Cartesian properties relate with other matter.¹⁶⁵ For example, copyright material insofar as the text of the directive, the external legal materials to the directive, and the interpretive tools by the judiciary interact with the inorganic material in a predetermined way. The legal materials predetermine the inorganic material, i.e. the SSO of a computer program, as an idea in their relations with the computer program.

For the judiciary to avoid understanding matter in the same predictable way, a new materialist interpretative approach should be taken.¹⁶⁶ New materialism avoids understanding algorithms from the outside of a computer program. Instead, algorithms will be understood as phenomena interwoven in a computer program as well as emerging out of the (re) articulation of the boundaries of an idea and an expression of an idea.¹⁶⁷

To better understand the nature of algorithms, the reasoning from Angius and Primiero will be employed. It is contended that the authors' reasoning is suitable as they are philosophers in computer science, computation and information. From a new materialist lens, it is important that legal discourse on algorithms is not divorced from computer science materials. Like physicist Niels Bohr's work, which Barad draws on, philosophy and computer

¹⁶⁴ Cross refer to chapter 3, 132.

¹⁶⁵ Cross refer to chapter 3 'n 160'.

¹⁶⁶ Matter is not physical but is conceptual. Kang and Kendall explain what matter is, in the context of law. The authors do not discuss copyright or computer programs /CGWs. Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 Law Text Culture 1, 7.

¹⁶⁷ This statement has been taken from the reasoning from Karen Barad. Although Karen Barad does not discuss CGWs/computer programs, Barad describes how matter is formed. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 812.

science are understood as being inseparable in this thesis.¹⁶⁸ Angius and Primiero's reasoning on algorithms is used as part of a new materialist interpretation of Directive 2009, and by extension, s9(3) of the CDPA.¹⁶⁹ What is interesting about Angius and Primiero's reasoning is that the authors' apply their knowledge from computer science to the SSO, more specifically, algorithms. Further, although the authors are not lawyers, Angius and Primiero do attempt to draw on some of the copyright debates over the SSO of a computer program, but from a US perspective.¹⁷⁰ This thesis aims to bridge the gap between the authors' knowledge from computer science to copyright knowledge on the SSO. It is hoped that the perspective will help shed light for authorship under s9(3) of the CDPA for creators of algorithms. I turn now to (re) examine algorithms by using a purposive materialist approach.

4.4.2 A new materialist perspective from the philosophy of computer science

Unlike Cartesian and Newtonian properties of legal positivism, couched in formalism, philosophy from computer science avoids a dualist understanding of copyright matter. This is akin to how a new materialist would understand the ontology of copyright law. The reasoning from Angius and Primiero reflects the very nature of new materialism insofar as how the authors both come to understand algorithms from the phenomena's materials.

The legal uncertainty around the SSO of a computer program appears to be due to the judiciary not knowing what level of abstraction is required from a computer program. Mr Justice Ferris correctly explains how consideration should not be restricted to the structure and

¹⁶⁸ Barad draws on Niels Bohr (1885-1962), a contemporary of Albert Einstein and one of the founders of quantum physics. Barad refers to Bohr and how his philosophy-physics challenges Newtonian physics. She mentions that he did not see a difference between philosophy and physics. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813. This would make sense as his work challenges Newtonian physics.

¹⁶⁹ This extends over to chapter five.

¹⁷⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 285-290.

organisation of a computer program as ‘it imports an unacceptable degree of uncertainty because it is unclear as to what level of abstraction the structure and organisation is discerned with’.¹⁷¹ The research in this thesis exposes a reductionist approach to understanding the SSO of a computer program.¹⁷² The difficulty the judiciary face with deciding on the level of abstraction is understandable since a legal positivist model, expressed as formalism, is only concerned with Cartesian epistemological debates on a literary work.¹⁷³

New materialism, as an ontological theory, bridges the gap exposed above in the research, as the theory allows for unlimited connections between the materials and materiality of copyright and algorithms. Angius and Primiero’s reasoning from the philosophy of computer science comes to the forefront as their reasoning provides an ontological analysis of levels of abstraction of the SSO of a computer program.¹⁷⁴ The authors’ reasoning is used, coupled with the external legal materials of Directive 2009, to examine the intra-actions of the materials so matter can (re) emerge for copyright consideration.

Interestingly, Angius and Primiero reflect on Moon’s research, as this thesis does. Moon, Angius and Primiero differ in their approach on how to meaningfully understand the SSO in a computer program. For example, Moon explains that the SSO can be understood at the design level by tracing the software engineering development models.¹⁷⁵ Moon’s suggestion would be welcomed by a new materialist as the law would emerge from the design of the SSO. However, Angius and Primiero’s argument that Moon’s proposals would depend on contextual

¹⁷¹ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527.

¹⁷² Cross refer to chapter 2, s2.3.2, 76.

¹⁷³ Cross refer to chapter 3 ‘n 154’. This statement is inspired by the work of Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 813

¹⁷⁴ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) *Philosophy & Technology* 283, 285-290.

¹⁷⁵ Ken Moon, ‘Another Nail in the Coffin for Non-Literal Software Copyright Infringement?’ (2015) 10 *Journal of Intellectual Property Law & Practice* 921, 924.

and accidental development processes would mean there would be limited generalisation.¹⁷⁶ Abstracting the SSO at a level that provides a generality which can complement the existing idea/expression dichotomy is likely to help the judiciary apply the dichotomy to the SSO.

Angius and Primiero's approach to understanding the SSO of a computer program is of interest to this thesis, especially from a new materialist perspective. The authors explain that one cannot understand a computer program through one level of abstraction;¹⁷⁷ a problem faced by the English courts.¹⁷⁸ Angius and Primiero outline five different levels of abstraction of a software system, making visible the material within the program.¹⁷⁹ Firstly, specification level, which involves a set of requirements to solve a computational problem. Secondly, at the level of algorithm, a procedure is formulated to fulfil the above requirements at specification level. Thirdly, at the level of programming language instructions, the procedure at the algorithm level is implemented by the chosen language. Fourthly, the implementation of the programming language instructions is translated into machine code required by the hardware. Fifth, operations are executed by electrical charges and the information flows on the hardware.¹⁸⁰ Angius and Primiero suggest that each level of abstraction expresses a control structure for the level below, whilst constituting an implementation of the level above. What this means is that an algorithm is understood not in isolation of its level of abstraction but within the whole hierarchy of the levels of abstractions.¹⁸¹

¹⁷⁶ Angius and Primiero discuss Agile software developmental models whilst making this comment. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 288.

¹⁷⁷ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 286.

¹⁷⁸ Formalism abstracts material in a predetermined static unit which reduces the SSO to an idea. Cross refer to chapter 2, s 2.3.2, 76.

¹⁷⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 286.

¹⁸⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 286.

¹⁸¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 286.

Understanding algorithms within the whole hierarchy makes visible the prescribed behaviours rather than the observed behaviours. For example, two algorithms are the same if they prescribe the same behaviours. Whether they prescribe the same behaviours can be assessed by referring to the hierarchy mentioned above. Provided that the level of abstraction is a correct implementation of its upper level of abstraction, the same set of prescribed behaviours will be associated to all the levels of abstractions below it.¹⁸² Angius and Primiero emphasise the importance of this by providing an example of two high-level language programs *P* and *Q*, programs which may prescribe the same set of behaviours regardless of the high level language chosen when the programs both use the same algorithm.¹⁸³ Focus is shifted from the language used to the behaviours within the program.

Making visible the prescribed behaviours rather than the observed behaviours allows for the detection of more material *within* a computer program rather than the formalist approach which only focuses on the sensory and physical properties.¹⁸⁴ Algorithms are understood by Angius and Primiero through their connections with the levels of abstraction above and below the phenomena in the hierarchy which is considered a wider remit compared to using the formalist approach. Formalism reduces the judicial eye to the sensory and physical properties of the computer program, making it almost impossible for the SSO of a computer program to gain copyright protection.¹⁸⁵ Angius and Primiero's understanding mirrors that of new materialism as algorithms are not visible as static units but emerge from the levels of abstractions in the hierarchy.¹⁸⁶

¹⁸² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 289.

¹⁸³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 289.

¹⁸⁴ Cross refer to chapter 5 223.

¹⁸⁵ Cross refer to chapter 2 s2.3.2 77.

¹⁸⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 289.

Algorithms should be understood both linguistically and through their implementation.¹⁸⁷ A linguistic construction would make the phenomena visible as a procedural description expressed in an informal language. Through an algorithm's implementation, the phenomena would be perceptible as descriptions of the execution of a program on an abstract machine corresponding to both the input/output.¹⁸⁸ An abstract machine can be converted into a state transition system, defined by a set of rules, state transitions and original and final states.¹⁸⁹ An algorithm at this level of abstraction specifies all the prescribed behaviours or computational paths of any program implementing that algorithm.¹⁹⁰ Algorithms can be understood differently through their implementation as an abstract machine rather than merely as a linguistic construction.

Interestingly, and of noteworthy importance, computer science, refers to an abstract machine as a theoretical model to explore a computer program, evidenced by Angius and Primiero's reasoning. An abstract machine avoids being hamstrung by dichotomies such as hardware/software, especially as these concepts do very little to bring meaning to the material. For example, the lack of meaning on the SSO of a computer program is made visible in this research in how the judiciary treat the SSO as a static thing or object.¹⁹¹ Moreover, abstracting the algorithm as an abstract machine can be identified with the SSO.¹⁹² Angius and Primiero's reasoning suggests a departure from treating the SSO as a static thing or object and aligns more with how new materialists understand matter.

¹⁸⁷ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 291.

¹⁸⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 292.

¹⁸⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 292.

¹⁹⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 292.

¹⁹¹ Cross refer to chapter 3, s3.3, 131.

¹⁹² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 304.

Abstracting algorithms in the way described by Angius and Primiero gives more meaning to the SSO of a computer program as understanding is sought from the material processes of a computer program. The latter being understood more as an abstract-physical machine rather than as a abstract *or* physical dichotomy. A new materialist would concur with how the SSO has been made perceptible by Angius and Primiero insofar as new materialism avoids division within material and explores material from its material connections and conditions.¹⁹³ A new materialist is likely to understand an algorithm in almost the same way as Angius and Primiero do, as differences are important but not fatal to the conceptualisation of the material.

Understanding algorithms as abstract machines allows for an analysis of the computational paths within two programs to be assessed. Computational paths can be assessed as either exact, inexact or approximate copies of another program.¹⁹⁴ Angius and Primiero explain that if the abstract machine for S is given by a set-theoretic structure like a transitional state, then S' will be a superset of the abstract machine for S .¹⁹⁵ For example, focusing on S and S' as programs, an exact copy is where S' prescribes the same set of behaviours as S . When considering the programming language level of abstraction, an implementation of the algorithm as an abstract machine, makes visible the exact set of behaviours, even though the program may be expressed using different programming languages.¹⁹⁶ This is important as the computational paths become visible despite the output in terms of the code being different. Other copies can be assessed for either inexact or approximate copies. An inexact copy is where the paths have been copied but additional paths have been added. The inexact copy

¹⁹³ Cross refer to chapter 3 181.

¹⁹⁴ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 295-96.

¹⁹⁵ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 295.

¹⁹⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 295.

relation corresponds with the abstractions lower down in the hierarchy.¹⁹⁷ Using S and S' as a way of illustration, S' will display all the behaviours of S , with a set of executions that are not replicated in S .¹⁹⁸ Conversely, an approximate copy is where only some of the computational paths have been copied. It follows that some executions will be the same for S' and S , while S' and S will also perform different executions as well. Exact, inexact and approximate copies make transparent the number of computational paths potentially copied.

Determining whether S' is a copy of S can be constrained by some limitations associated to software testing, so Angius and Primiero suggest using process algebra instead.¹⁹⁹ Process algebra considers the logic relations amongst the abstract machines.²⁰⁰ The exact, inexact and approximate copies are given in process algebra notions of bisimulation and simulation between any pairs of transitional states for the involved abstract machines.²⁰¹ What this means is that a bisimulation between transition systems TS' for S and TS for S can be conducted to assess an exact copy between the two systems S' and S . For an inexact copy to be determined, the bisimulation of TS' needs to simulate all the behaviours of TS but is not necessarily confined to those of TS . Finally, an approximate copy will be represented by TS' prescribing at least one of the behaviours prescribed by TS .²⁰² Abstracting algorithms at different levels illuminates how the computational paths can be made visible. However, one needs to determine in the next chapter whether any of these abstractions can amount to copyright matter.

¹⁹⁷ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 295.

¹⁹⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 296.

¹⁹⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 297, 299.

²⁰⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²⁰¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²⁰² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

4.5 Conclusion

Despite judicial use of the formalist model, legal discourse is entangled with the material world and its material effects. Decisions on the SSO of a computer program are intertwined with societal values. Moreover, the legal discourse is enmeshed with the materiality of the body as the CJEU have been found to be re-modelling original questions from domestic courts on the SSO, which limits the SSO of a computer program. Further, some judges abandon formalism in place of policy, when the ontological nature of the SSO is unclear.²⁰³ This paints an entirely different picture to how the SSO of a computer program is being formed as copyright matter. Given the close connection with the law on the SSO and the material world, an argument is made to use a new materialist interpretation to s9(3) of the CDPA.

A new materialist interpretation to s9(3) involves the use of the purposive approach. A purposive method offers the judiciary an opportunity to (re) examine the legal discourse on algorithms, by using the legal materials associated to Directive 2009. A purposive construction of the directive extends over into the next chapter. Nevertheless, a new materialist interpretation of s9(3) has revealed that the ontology of the provision is made up of the materiality of a computer program. Addressing whether a creator of an algorithm can be assigned authorship of a CGW under s9(3) can be traced back to the Directive 1991.²⁰⁴ What the material process reveals is that algorithms are ideas which cannot attract copyright. However, the material process also exposes several other factors that can be used to build up a picture of the legal ontology of algorithms. From the legal materials associated to the directive, it is clear at the time of creating the directive, the Commission were of the view that algorithms abstracted as specifications or procedures would be classed as an idea. However, the final directive did not explicitly mention algorithms as specifications or procedures nor were

²⁰³ For a more detailed explanation, cross refer chapter 4 'n 34', 'n 46', 'n 49'.

²⁰⁴ This is only addressed partially in this chapter as chapter 5 builds on the reasoning from this chapter.

algorithms referred to in the articles of the directive. This is due to the strong opinion provided by the Economic and Social Committee at the time of creating the directive. That said, algorithms appeared instead in recital fourteen of the final directive as an idea.²⁰⁵ The way the directive deals with algorithms is a compromise between the Commission and the Committee. The material effect of the way an algorithm is dealt with creates uncertainty as the recitals are only of persuasive nature. Nonetheless, Mr Justice Arnold in *SAS Institute* explains that algorithms are ideas, using the reasoning from the Commission in 1989 on the proposal of the directive.²⁰⁶

It seems clear that algorithms are treated as static units of knowledge and judicial understanding is frozen in time. This argument is advanced based not only on how Mr Justice Arnold interpreted algorithms but how the SSO of a computer program has been interpreted over the years. Treating knowledge as pre-determined static units is a side-effect of a Cartesian, Newtonian formalist model, adopted in English copyright law. However, new materialism, as a theory, can be used to challenge the Newtonian and Cartesian understanding of matter. What this means for copyright around algorithms is that a new materialist interpretation can be found by using a purposive approach to Directive 2009.

A purposive approach offers an opportunity to incorporate any new knowledge on algorithms to assess whether algorithms can be perceived legally for copyright. New knowledge is drawn from Angius and Primiero, philosophers in computer science.²⁰⁷ The meaning of an algorithm becomes visible through the implementation of different levels of hierarchical abstractions within a program. Dichotomies such as hardware and software are

²⁰⁶ See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 83 [229].

²⁰⁷ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283. The knowledge on algorithms from Angius and Primiero will be explored in chapter 5 as part of a discussion on whether it is likely that the material that they expose can be perceived for copyright purposes.

abandoned, and algorithms emerge as layered artefacts through the process algebra notions of bisimulation and simulation.²⁰⁸ Prescribed behaviours rather than observable behaviours are made visible,²⁰⁹ a sharp contrast to the formalist model. Three types of copies of algorithms materialise from the process, namely, exact, inexact and approximate copies.²¹⁰ What this process does is focus on the number of computational paths that have been copied. For example, programs S and S' can be represented by transitional states. The former being TS and the latter being TS'.²¹¹ An exact copy would be where TS' prescribes all and only behaviours prescribed by TS.²¹² This process allows for computer expert evidence in court to focus on the material within a computer program.

Tracing the material process, as described above, makes visible the materiality. What has emerged during the process is the striking similarity between the purposive method and new materialism. For example, new materialist undertones are visible in both Lord Steyn and Lord Bingham's judgments from *R (Quintavalle)*. Statements include how statutes are always speaking²¹³ and how an Act of Parliament should be read in conjunction with its historical context²¹⁴ offer support for this argument. Further, the purposive approach permits one to view material through the phenomena's connections, and these connections expand over time,

²⁰⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²⁰⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 289.

²¹⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²¹¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²¹² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 299.

²¹³ Lord Steyn was quoting Lord Thring, a great Victorian draftsman. See *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 *1WLR* 693 [22] (Lord Steyn).

²¹⁴ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 *1WLR* 693 [8] (Lord Bingham).

allowing the law to be (re) discovered.²¹⁵ It follows that these observations lay the foundations for new materialism to be a theoretical basis for the purposive approach.

The next chapter continues tracing the material process of Directive 2009 but with the new connections from the reasoning of Angius and Primiero. Angius and Primiero illuminate the ontology of algorithms, whilst also referring to the Supreme Court case that graced the US courts for eleven years.²¹⁶ The Supreme Court case, *Google v Oracle*,²¹⁷ will be discussed in the next chapter. *Google v Oracle* is used because it explores the SSO of a computer program to a greater extent than any English authority does.²¹⁸ The judgments apply the US *Altai* test which has been implanted *albeit* controversially into English copyright law in addition to the implant also of the US style merger test.²¹⁹ Further, there is nothing in English authority which conflicts with the legal test in *Altai*.²²⁰ The *Altai* test attempts to understand the SSO as an original expression of idea.²²¹ Ultimately, the *Altai* test serves the same purpose as in English copyright law insofar as trying to distinguish between the idea and the expression of an idea. As research in this thesis suggests that algorithms may be understood in a limited and incomplete way, drawing on Angius and Primiero's reasoning may help to provide more meaning on algorithms. It is hoped that once the ontology of algorithms become visible in a more meaningful way, the material can be considered for copyright purposes. Once algorithms have been considered legally, one can then turn to finally making some observations on

²¹⁵ This statement is inspired by Giles Deleuze, Felix Guattari, *A Thousand Plateaus* (University of Minnesota Press London 1987) 21.

²¹⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) *Philosophy & Technology* 283, 304-307.

²¹⁷ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021).

²¹⁸ The case graced the courts for eleven years.

²¹⁹ Mr Justice Ferris implanted the *Altai* test from *Computer Associates v Altai* 982 F 2d 693 (CA 2d Cir 1992) in *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497. A US style merger test was adopted by the CA in *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

²²⁰ This argument was also raised by Mr Justice Ferris in *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 527.

²²¹ This is the purpose of using the *Altai* test. Furthermore, the idea/expression dichotomy has been codified and is dealt with by the Copyright Act 1976. See Title 17 of the United States Code, § 102 (b).

whether it is likely a creator of an algorithm can be assigned authorship of a CGW under s9(3).

The next chapter commences with *Google v Oracle*.

CHAPTER FIVE

RE-CONCEPTUALISING THE SSO USING A LEGAL MATERIALIST PERSPECTIVE: ALGORITHMS AS AN EXPRESSION OF AN IDEA

5.0 Introduction

The broader picture indicates that the dislocation of the former system of marking difference makes it all the more urgent to reassert the concept of difference as both central and non-essentialistic.¹

The formalist model, generally adopted by the judiciary, to interpret the structure, sequence and organisation (the SSO) of a computer program for copyright purposes focuses the judicial eye on differences within the phenomena.² The formalist model limits material to *its* physical and sensory properties.³ The material effects of the formalist model manifest in the SSO remaining hidden and not protected by copyright unless the textual nature is revealed, namely, as preparatory design documents.⁴ As such, the research reveals that the formalist model provides limited understanding of the SSO of a computer program.

The limited understanding of the SSO is in sharp contrast to statements made by Mr Justice Ferris and Mr Justice Arnold which suggest that protection should also extend beyond textual materials.⁵ This is so the SSO of a computer program can also get protection.

¹ Rosi Braidotti, *The Posthuman* (Polity 2013) 55, 100.

² I refer to a computer program as phenomena rather than a program which would indicate it is an object. Categorising material into objects or things assumes material has determinate boundaries. This understanding has been inspired by Karen Barad's research. See Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813. Also cross refer to chapter 2, s2.3.3 for a discussion on how the SSO is interpreted by the judiciary using the formalist model.

³ Cross refer to chapter 2, 'n 131'.

⁴ Cross refer to chapter 2, s2.3.2, 77 for a discussion on how the SSO is interpreted by the judiciary using the formalist model.

⁵ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [232].

Interestingly, Mr Justice Ferris looked to US case law for answers on how to abstract the structure and organisation of a program by adopting a variation of the idea/expression dichotomy from *Computer Associates v Altai*.⁶ And although Mr Justice Ferris found some of the materials associated to the SSO of a computer program to be worthy of copyright protection, this was both a controversial and rare occurrence in copyright law.⁷

Moon argues that the *Altai* test only makes visible the structure of a computer program for copyright purposes but not the sequence and organisation.⁸ Moon accredits the flaw within the *Altai* test as to why there have been no successful cases where designers have been able to protect the SSO.⁹ Understanding the sequence and organisation of a computer program is important for assigning authorship of a CGW under s9(3) of the CDPA. The importance is demonstrated in Mr Justice Kitchin's reasoning for assigning authorship to the designer for the CGW in *Nova*.¹⁰ Mr Justice Kitchin refers to devising the rules and logic of a computer program as part of his reasoning for attributing authorship under s9(3).¹¹ Moon's argument is corroborated also by Angius and Primiero.¹² Even using an alternative *Altai* test to the formalist model does not help to understand the sequence and organisation of the computer program.

⁶ 982 F 2d 693 (CA 2d Cir 1992).

⁷ David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders (1993) 2 Law, computers & Artificial Intelligence 269; Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) Journal of Intellectual Property & Policy 921; cross refer to chapter 2, s2.3.1, 72-74.

⁸ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015)) Journal of Intellectual Property & Policy 921, 924.

⁹ Apart from the controversial decision in *John Richardson v Flanders* [1993] (No 2) FSR 497.

¹⁰ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹¹ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 283, 288.

Understanding the sequence and organisation of a program relies on how the material is abstracted which is important to determining authorship of CGWs.¹³

Interestingly, and of noteworthy importance, Mr Justice Ferris had concerns prior to using the *Altai* test, that the English judiciary did not know what level of abstraction the SSO of a computer program is discerned with when applying the idea/expression dichotomy.¹⁴ This is why Mr Justice Ferris looked to the US for answers. The research in this thesis suggests an incomplete and limited understanding of the SSO by the English judiciary.¹⁵ Further, the inappropriateness of the formalism model in helping to shed light on the SSO is likely to be why the judiciary sometimes abandon the formalist model also in place of policy to justify reasons why the SSO is not protected.¹⁶ Overall, the formalist model is not equipping the judiciary to meaningfully understand of the SSO of a computer program.

The chapter examines Angius and Primiero's reasoning on the SSO which the authors apply to the facts of *Google LLC v Oracle* to reveal the incomplete understanding by the judiciary on the ontology of the SSO of a computer program. More specifically, associated to the meaning of algorithmic material. Recent literature on CGWs focus on the functions of a computer program and whether the creator of an algorithm can be assigned authorship for a CGW.¹⁷ The latter, a key research question, of this thesis. Although Angius and Primiero's

¹³ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

¹⁴ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527.

¹⁵ Cross refer to chapter 2, s2.3.2, 77 and chapter 3, s3.3, 132.

¹⁶ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130]; *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 uses a test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992). There is also an explicit section within the *Altai* case titled 'policy considerations' (*Computer Associates v Altai* 982 F 2d 702, 707-712 (CA 2d Cir 1992)). See 711 of judgment. See also *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

¹⁷ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16 <<https://ssrn.com/abstract=3419481>>accessed 29 March 2024; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed),

reasoning is related to a US case, the Federal Circuit of the CA, employed *Altai* as part of the CA's reasoning.¹⁸ *Altai* was transplanted into English law by Mr Justice Ferris in *John Richardson* as a variation on the English idea/expression dichotomy.¹⁹ Further, a US style merger test which was also adopted by the English judiciary in *SAS Institute* is a feature of judicial reasoning by both the district court and CA in *Oracle v Google*.²⁰ Notwithstanding the legal importance of *Google* to the English judiciary, *Google* is one of the most recent cases and arguably, more detailed, than any English case dealing with the SSO of a computer program.²¹ As discussion on the SSO spanned over eleven years in the case, the case acts as a warning to the English judiciary over the potential for protracted legal disputes on the copyright of the SSO, and by extension CGWs, unless algorithms are more meaningfully understood.

Angius and Primiero suggest that algorithms can be better understood through abstracting them as an abstract machine.²² An abstract machine is a theoretical model used in computer science to study a computer program. This results in a computer program being understood through different levels of abstraction²³ rather than as a static literary object. Similarly, algorithms should not be understood in isolation, for example, as one level of abstraction.²⁴ Understanding algorithms in isolation reduces algorithms to their observed

Research Handbook on Intellectual Property and Artificial Intelligence (Edward Elgar, 2022) 225; Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2021; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

¹⁸ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1355, 1361, 1370 (Fed Cir 2014).

¹⁹ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 refers to a test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992).

²⁰ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 997, 1001 (ND Cal 2012); *Oracle America Inc v Google LLC* 750 F 3d 1339, 1360-61, 1370 (Fed Cir 2014); *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31] (Lewison LJ).

²¹ At the time of writing this thesis.

²² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 283, 294-295.

²³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 283, 286.

²⁴ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 Philosophy & Technology 283, 290-93.

behaviours, often referred to as the *look and feel*. In other words, if the alleged copy of the program looks and feels different to the original program despite using the same algorithm, there will be no copyright subsistence in the work and no copyright infringement. Concentrating on the observed behaviours is a manifestation of employing the formalist model which focuses on only the physical and sensory properties of a computer program in English copyright law. Instead, algorithms should be understood through the whole hierarchy of the levels of abstractions.²⁵ The prescribed behaviours inherited down through the different levels of abstraction are made visible.²⁶ This revealing unlocks the sequence and organisation of a computer program for copyright consideration, and any differences in the materials should not be fatal to copyright protection.²⁷

The chapter draws on Angius and Primiero's reasoning from the philosophy of computer science, to legally assess whether the levels of abstraction, particularly algorithms as an abstract machine, can be protected by copyright under English law. The focus is on the EU Directive 2009/24 which deals with the law on computer programs and has been transposed into the CDPA.²⁸ Legal materialism is used to conduct the analysis, which involves taking a purposive construction to the directive.²⁹ A purposive interpretation allows the judiciary to interpret the SSO of a computer program by using the directive's connections with other materials.³⁰ The latter will include the *travaux préparatoires* at the time of creating the directive. A purposive approach enables the judiciary to consider any new knowledge, as part

²⁵ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 290-95.

²⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 289.

²⁷ Cross refer to the quote at the beginning of the chapter. From a new materialist perspective like Rosi Braidotti, decisions should not be solely based on differences within material. See Rosi Braidotti, *The Posthuman* (Polity 2013) 95.

²⁸ The directive was transposed into the CDPA by statutory instrument, SI 1992/3222. Further, directives are retained by English and Welsh law by the European Union (Withdrawal) Act 2018, s 2. This was the position at the time of submitting the thesis.

²⁹ Chapter 5 224.

³⁰ 'n 174' in chapter 5.

of the material discourse on the SSO of a program. Lord Steyn and Lord Bingham in *R (Quintavalle)* used the purposive approach to consider new knowledge on cell nuclear replacement.³¹ The purposive approach was used in the context of understanding the meaning of an embryo for the purposes of the Human Fertilisation and Embryology (HEA) Act 1990.³² In similar vein to Lord Steyn and Lord Bingham, I draw on knowledge from Angius and Primiero regarding the ontology of algorithms as part of a purposive construction of Directive 2009. Further, drawing on the reasoning from computer science should have judicial support if one considers Mr Justice Pumfrey's statement that understanding computers is required for sound reasoning on copyright of technology.³³ It is contended that it is possible for algorithms as an abstract machine to attract copyright protection.

Adopting new materialism is an ontological conceptual theory, likely to be supported by Pila.³⁴ Pila advocates for a departure from formalism to a more coherent theory that better understands the ontology of a copyright work.³⁵ It is argued that new materialism fills this void as the theory allows a copyright work to be visible by the phenomena's material processes rather than as a static literary object or thing. It follows that new materialism allows for a more meaningful understanding of a computer program, including algorithmic material.

A (re) configuring of the law on algorithms can contribute to the academic discussion on CGWs. It is hoped the research can address both Aplin and Pasqualetto's concerns over the limited nature of copyright on the functions of a computer program; a finding that the authors

³¹ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2AC 687 [19], [27].

³² Human Fertilisation and Embryology Act 1990, s1(1) as referred to in *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1 WLR 693, [2003] 2 AC 687 [1] (Lord Bingham); Human Fertilisation and Embryology Act 1990, s1(1).

³³ *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95, 145. *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 is also cited in Brian Bandey, 'Over-categorisation in copyright law: computer and internet programming perspectives' (2007) 29 European Intellectual Property Review 465.

³⁴ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229.

³⁵ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 241.

argue is contributing to the difficulties in attributing authorship of a CGW.³⁶ Moreover, the research seeks to confirm the direction that Ghosh advocates for in exploring computer programs for answers on CGWs.³⁷ Resolutions are provided to Ward and Fjeld et al on conducting research and providing answers to the question whether a creator of an algorithm can be attributed authorship of a CGW.³⁸ Furthermore, this research helps to clarify how the creator of an algorithm can be assigned authorship if an originality component is required under s9(3). The latter is a moot point.³⁹ This is insofar as the research indicates that some abstraction of algorithms can be an expression of an idea as opposed to being an idea. It is not clear whether contributing to an idea alone would be sufficient for s9(3), given the abstract nature of ideas and difficulties pinning down the arrangements involved in them. Conducting this research is likely to contribute to the scholarly literature on authorship of CGWs.

The chapter commences with *Google v Oracle* to understand the legal reasoning of the district court in how the SSO of a computer program was abstracted. The section will examine the appellate judgments to compare the understanding of the SSO from that of the district court. Angius and Primiero's reasoning of how the SSO, more specifically, algorithms have been understood by the courts will also be examined. As *Google v Oracle* has legal implications for

³⁶ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16.

³⁷ Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225.

³⁸ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) < <https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html> > accessed 4 Aug 2023; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 Science 1110, 1111.

³⁹ There is debate as to whether an original component is required. See Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 Intellectual Property Quarterly 169, 176; Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 Melbourne University Law Review 46, 51. McCutcheon's work is also mentioned in Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 Cambridge Law Review 62, 77.

the English judiciary, it is important to understand algorithms in as much detail as the case law provides as the thesis aims to contribute to academic discussion on whether the creator of an algorithm can have authorship of a CGW. The reasoning from Angius and Primiero is used in the second section to conceptualise algorithms through a legal materialist perspective. This section will apply the authors' reasoning to Directive 2009 to assess whether a legal materialist approach could offer a more expansive interpretation of algorithms than the existing formalism model. The penultimate section ties the newly discovered material on algorithms for copyright to s9(3) to offer an account of how creators of algorithms could be deemed to be authors of a CGW. The section will conclude with some broader observations and remarks on the research from this chapter and authorship for CGWs. The chapter commences with the facts of *Google v Oracle*.

5.1 GOOGLE LLC V ORACLE AMERICA, INC⁴⁰

5.1.1 Background to the facts of the case

The predecessor of Oracle America (Sun Microsystems Inc) wrote the Java SE program.⁴¹ As part of creating Google's Android platform software, Google copied approximately 11, 500 lines of code from the Java SE program. The copied lines of code are part of an application programming interface (API).⁴² The API allows programmers to use prewritten code to conduct computational tasks. In Sun's API, each task is known as a method. The API groups similar methods into classes and groups similar classes into packages. This method-class-package organisational structure is referred to as the SSO of a computer program.⁴³ There were two

⁴⁰ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Breyer J).

⁴¹ *Google LLC v Oracle America Inc* 141 SCt 1183, 1190 (2021) (Breyer J).

⁴² *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

⁴³ *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

types of code employed to create the methods; declaring and implementing code. The declaring code defined the name of the task, the data it will process, and the output that would be reached. The implementing code consisted of instructions for the methods to operate.⁴⁴

Oracle's declaring code was essential to its business. To encourage programmers to use Java, Oracle offered three licenses. The first license allowed free access and use of the packages including the declaring and implementing code. In doing so, programmers were required to make the programs compatible with the Java Platform. Moreover, programmers were encouraged to make improvements to the platform, but these improvements had to be disclosed to the public. The second license, known as a specification license, allowed the licensee to use the declaring code and organisation of Oracle's API packages but the implementing code could not be used. Finally, with respect for businesses, a commercial license was offered in return for royalties. Any program created needed to be compatible with the Java platform.⁴⁵

In allowing programmers to use the Java platform in the way described above, Oracle encouraged millions of programmers to learn Java. When Google wanted to attract programmers to Android, Google intended to incorporate the declaring code into Android's software so programmers would be already familiar with it. During 2005, Google tried to obtain a license from Sun to use and adapt the Java platform. After months of negotiations, the parties were unable to reach an agreement.⁴⁶ The dispute arose due to Google's refusal to make the implementation of its programs compatible with Java.⁴⁷ As the negotiations were unsuccessful, Google copied 11,500 lines of Oracle's declaring code and organised the code in

⁴⁴*Google LLC v Oracle America Inc* 141 SCt 1183, 1191-1192 (2021) (Breyer J).

⁴⁵ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1350 (Fed Cir 2014).

⁴⁶ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1350 (Fed Cir 2014).

⁴⁷ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1350 (Fed Cir 2014).

the same way as Oracle had.⁴⁸ This led to Oracle suing Google for copyright infringement both for the code and the SSO.

5.1.2 The District Court trial

Oracle sued Google for copyright infringement. The district court held that the declaring code and the SSO of the API did not warrant copyright protection.⁴⁹ The SSO was not visible for copyright as the material was understood as being merely ‘a system, or method of operation’,⁵⁰ which fell on the ideas side of the boundary between the idea and the expression of the idea.⁵¹ The court used *Baker v Seldon*, a case concerning the copyright of the selection and arrangement of columns and headings in bookkeeping forms as support for its decision.⁵² The court explained how the Baker-like limitation was codified in the Copyright Act 1976 insofar as §102(b) excludes systems, methods and operations from copyright protection.⁵³ Similarly, English law has international obligations to prevent procedures and methods of operations from copyright according to s9(2) of TRIPS.⁵⁴ However, the finding by the district court was nothing but inevitable due to the way the SSO was abstracted. Angius and Primiero argue that the SSO was abstracted at a level of abstraction that accords with algorithms as specifications or

⁴⁸ *Google LLC v Oracle America Inc* 141 SCt 1183, 1204 (2021) (Breyer J).

⁴⁹ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 1002 (ND Cal 2012).

⁵⁰ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 999-1000 (ND Cal 2012).

⁵¹ In the US, the idea/expression dichotomy is made explicit in the 17 USC §102(b), which was referred to in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 999 (ND Cal 2012).

⁵² *Oracle America Inc v Google LLC* 872 F supp 2d 974, 985 (ND Cal 2012).

⁵³ The district court referred to *Baker v Seldon* 101 US 99, 25 LED 841 (1879) in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 984-985 (ND Cal 2012). In the US, made explicit reference to the Copyright Act 1976, s102(b), which was referred to in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 999 (ND Cal 2012). See also the Copyright Act 1976, 102(b).

⁵⁴ And whilst the CDPA or directive 2009/250 does not make explicit provision to systems or methods of operation, the UK do have international obligations to make a similar decision as article 9 (2) of TRIPS states that procedures, methods or mathematical concepts will not be protected by copyright. See Agreement on Trade Related Aspects of Intellectual Property Rights (TRIP) [1994] OJ L336 art 9(2).

procedures.⁵⁵ Therefore, it is easy to understand why the district court conceptualised the SSO as a system or method of operation excluding the SSO from copyright.

Whether the algorithm was abstracted as a specification or procedure was not explicitly mentioned within the case materials, but upon closer analysis of the court's reasoning, it is certain that this is the case. For example, this is evident when Alsup J, the district judge, opines 'anyone is free to write his or her own method to carry out exactly the same function or specification of any and all methods used in Java API.'⁵⁶ Clearly, the methods were written to carry out the specifications required to solve a computational problem. Further, Alsup J, purports that:

no matter how creative or imaginative a Java method specification may be, the entire world is entitled to use the method specification (inputs, outputs, parameters) so long as the line-by-line implementations are different.⁵⁷

Not only does Alsup J merge methods with specifications, Alsup J postulates no matter how creative the methods are, they will not attract copyright protection. Alsup J referred to other Ninth Circuit decisions such as *Sega* and *Sony* as close analogies to substantiate his reasoning⁵⁸ as both concerned interface procedures which arguably may be deemed akin to method specifications.

Alsup J's reasoning found favour with seventy-two intellectual property scholars who submitted an *amicus* brief to the United States of Appeals for the Federal Circuit.⁵⁹ The

⁵⁵ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 304.

⁵⁶ *Oracle America Inc v Google LLC* 872 F sup 2d 974, 997 (ND Cal 2012).

⁵⁷ *Oracle America Inc v Google LLC* 872 F sup 2d 974, 998 (ND Cal 2012).

⁵⁸ William Alsup refers to *Sega Enterprises Ltd v Accolade Inc* 977 F2d 1510 (9th Cir 1992) and *Sony Computer entertainment, Inc v Connectix Corporation* 203 F 3d 596 (9th Cir 2000) in *Oracle America Inc v Google LLC* 872 F sup 2d 974, 994-997, 1000 (ND Cal 2012).

⁵⁹ This is a brief presented to the court on behalf of scholars in intellectual property law.

Samuelson Clinic represented the intellectual property scholars who filed the brief.⁶⁰ The scholars argued that excluding the SSO on the grounds of a system or a method of operation was consistent with existing precedents.⁶¹ The precedents referred to include *Sega* and *Baker v Selden*.⁶² The way these precedents were used by the seventy-two scholars aligns very much with how Alsup J used these precedents insofar as abstracting the SSO at a level of abstraction that accords with algorithms as specifications or procedures. When the SSO is understood in this way, it is straightforward to use the precedents as supportive authority to exclude the SSO from copyright. Put another way, algorithms abstracted as specifications or procedures can be visible as a system or method. What the brief overlooks is that algorithms can be abstracted in more than one way.⁶³ Although the brief offers support for Alsup J's decision, the support is based on having a similar narrow understanding of the SSO.

The inevitability of the district court's decision in finding the SSO did not attract copyright protection is illuminated when Alsup J refers to the merger doctrine.⁶⁴ The merger doctrine is where there is only one or limited ways of expressing the material so the expression merges with the idea and cannot attract copyright. Alsup J reminds the court that the merger doctrine was employed in *Altai*.⁶⁵ The district court was of the view that there were limited ways of expressing the methods (the SSO), so the SSO could not be given copyright

⁶⁰ The Samuelson Clinic is called after Pamela Samuelson; a legal scholar from University of California, Berkeley, School of Law. See [Google v. Oracle Amicus Briefs - Berkeley Law](#).

⁶¹ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, Brief of 72 Intellectual Property Scholars as Amici Curiae In Support Of Petitioner' (Jan 13, 2020) 5-6.

⁶² *Sega Enterprises Ltd v Accolade Inc* 977 F2d 1510 (9th Cir 1992) and *Baker v Selden* 101 US 99, 25 LED 841 (1879) were discussed in *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, Brief of 72 Intellectual Property Scholars as Amici Curiae In Support Of Petitioner' (Jan 13, 2020) 4-6.

⁶³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 293.

⁶⁴ The merger doctrine is explained in chapter two, s2.3.2, 99, but for convenience purposes, it is where there is only one or limited ways of expressing the material that the idea/expression are merged and cannot attract copyright. This is also explained in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 997, 1001 (ND Cal 2012).

⁶⁵ *Computer Associates v Altai* 982 F 2d 693, 709 (CA 2d Cir 1992) was referred to in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 988, 989 (ND Cal 2012).

protection.⁶⁶ Alsup J's narrow visibility is contrary to the evidence that was accepted by the Federal Court which demonstrated that 'Oracle had unlimited options as to the selection and arrangements of the 7000 lines Google copied'.⁶⁷ Oracle's unlimited options may not have been considered credible by Alsup J due to only the functional nature of the algorithms being visible. For example, when an algorithm is given a static meaning such as that of a specification or procedure, the narrow interpretation leads to the specification or procedure either being only expressed in one or very few ways, i.e., as a method or system. The inevitability of the district court's decision appears to be made apparent.

The analysis from *Oracle* so far indicates that if algorithms are abstracted as specifications or procedures then it is a foregone conclusion that algorithms will not get copyright protection. The decision could have implications for English law due to the precedents from *John Richardson* and the CA in *SAS Institute*.⁶⁸ Mr Justice Ferris in *John Richardson* implanted the *Altai* test into English law to help determine the SSO of a computer program for copyright purposes. Lord Justice Lewison in *SAS Institute* adopted a US style idea/expression merger test.⁶⁹ What this means is that if algorithms are interpreted in a very narrow and static way, a decision akin to Alsup J could be made by the English judiciary. Furthermore, the UK has international obligations to adhere to s9(2) of TRIPS.⁷⁰ S9(2) states that procedures, methods or mathematical concepts will not be protected by copyright. It is not too large of a leap, given Alsup J's interpretation, that an abstraction as a specification or

⁶⁶ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 998 (ND Cal 2012).

⁶⁷ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1361 (Fed Cir 2014).

⁶⁸ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527 refers to a test in *Computer Associates v Altai* 982 F 2d 706-710 (CA 2d Cir 1992); *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31]. For a more detailed explanation, cross refer to chapter 2, s2.3.3.

⁶⁹ Ken Moon, 'Another Nail in the Coffin for Non-literal Software Copyright Infringement?' (2015) 10 Journal of Intellectual Property Law & Practice 927; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

⁷⁰ Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 9(2).

procedure could be excluded from copyright for being classified as a method or procedure. Despite the seemingly inevitability of the decision, Oracle appealed.

5.1.3 The Federal Circuit judgment

In a rather surprising turn of events, the Federal Circuit reversed the district court's decision.⁷¹ The Federal Circuit found that the API's declaring code and the SSO were protected by copyright.⁷² O'Malley J in the CA considered that the district court's reasoning was at odds with the *Altai* test.⁷³ The *Altai* test recognises that the SSO can attract copyright.⁷⁴ O'Malley J purports how Alsup J's reasoning was problematic as following his reasoning the SSO would never attract copyright. O'Malley J explains that a computer program is a set of instructions or statements and is of a functional nature so it follows that the SSO will be of a similar nature.⁷⁵ Therefore, O'Malley J argues that if the reasoning of Alsup J is adhered to, the SSO, or even a computer program, will never get protection, putting the district court's decision in direct conflict with the precedent in *Altai*, and even the Copyright Act 1976.⁷⁶

There is no denying that there is a danger that all parts of a computer program, not just the SSO, could be deemed to be a system or method of operation especially as the Copyright Act 1976 defines a computer program as a set of instructions or statements.⁷⁷ Interestingly, neither the CDPA nor the Directive 2009/24 define what is a computer program. However, a definition akin to the Copyright Act 1976 can be found in the proposal for the directive, but it

⁷¹ *Oracle America Inc v Google LLC* 750 F 3d 1339 (Fed Cir 2014).

⁷² *Oracle America Inc v Google LLC* 750 F 3d 1339, 1381 (Fed Cir 2014).

⁷³ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1366 (Fed Cir 2014).

⁷⁴ *Computer Associates v Altai* 982 F 2d 692 (CA 2d Cir 1992).

⁷⁵ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1367 (Fed Cir 2014). 17 USC s 101 defines a computer program unlike the CDPA or Directive 2009/24.

⁷⁶ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1367 (Fed Cir 2014); 17 USC, s 101.

⁷⁷ Title 17 USC § 101.

was omitted from the final version due to concerns that the definition may become outdated.⁷⁸ Considering the Federal Court's criticisms of how the SSO was interpreted by the district court in *Oracle*, the European Commission's omission in 1989 was not only prudent but very forward thinking for that time. It follows that the criticism by the CA levelled at the district court is a much larger problem with conceptualising a computer program as a literary work for copyright purposes⁷⁹ than solely Alsup J's interpretation in *Oracle*. Walker J in *Altai* very aptly sums up the concerns when 'compared to aesthetic works, computer programs hover even more closely to the elusive boundary described in 102(b)'.⁸⁰ This illuminates how easy it is to criticise the district court's reasoning as demarcating the boundaries of when the SSO, or even a computer program, is classed as a system or a method of operation, excluding the phenomena from copyright, is both arbitrary and ontologically unstable.

An *amici* brief from the Copyright Office also appears to suggest a cautious approach should be taken when applying traditional copyright caselaw to computer programs which are different from the traditional means of a literary work. The brief needs to be given significant weight as the Copyright Office are responsible for deciding in the US on whether one can register a copyright work, and, importantly, have a role in advising Congress and the courts on copyright matter.⁸¹ The Copyright Office argues that cases such as *Baker v Selden*, a case used as supportive authority by both the district court, and in the seventy two intellectual property lawyers' *amici* brief, cannot be so easily applied to computer programs.⁸² The Copyright Office corroborates O'Malley J's concerns regarding Alsup J's use of case-law. The concerns

⁷⁸ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, 'Brief for the United States'(Feb, 2020) 17.

⁷⁹ Akin to English law, the Copyright Act 1976 defines a computer program as a literary work. See 17 USC §101.

⁸⁰ *Computer Associates v Altai* 982 F 2d 693, 704 (CA 2d Cir 1992). §102 (b) states that systems, methods and operations are excluded from copyright protection.

⁸¹ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, 'Brief for the United States'(Feb, 2020) 1.

⁸² *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, 'Brief for the United States'(Feb, 2020) 17.

are with how case law is used to conceptualise the SSO as a system or method for operation, which can logically be extended to excluding the computer code from copyright protection, when the code is clearly protected by statute.⁸³

O'Malley J's reasoning from the CA relied on an array of supportive authority as part of his decision to offer the SSO copyright protection. Various precedents such as the appellate decisions of *Johnson Controls*, *Apple Computer Inc*, *Toro Co* and *Am Dental Ass'n*, were used to advance an argument that copyright exists in the original expression of the functional material.⁸⁴ Further, a National Commission on New Technologies Uses of Copyrighted Works (CONTU) report was also used as supportive evidence for the protection of the SSO.⁸⁵ O'Malley draws on an interesting quote from *Am Dental Ass'n* which refers to the dictionary and how one cannot view a dictionary as a system solely on the basis that others may use words from it to create new works. These precedents and authority were used by O'Malley J to suggest a way out of the impasse on how to find copyright in the SSO which is inherently functional material.

O'Malley J's interpretation of the SSO as an original expression of functional material has the support of Professor Miller, a former CONTU member who provided an *amici* brief of great interest which also warrants substantial weight. CONTU was set up in 1974 by Congress to advise them on copyright over computer matters. Moreover, Professor Miller participated in debates and hearings regarding the passing of the Computer Software Copyright Act of

⁸³ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the United States Court of Appeals For The Federal Circuit, 'Brief for the United States'(Feb, 2020) 17

⁸⁴ *Johnson Controls* 886 F 2d , 1175-76; *Apple Computer Inc v Franklin Computer Corp* 714 F 2d 1240, 1250-52 (3d Cir 1983); *Toro Co v R & R Prods co* 787 F2d 1208, 1212 (8th Cir 1986); *Am Dental Ass'n v Delta Dental Plans Ass'n* 126 F3d 977, 980 (7th Cir 1997) were all mentioned in *Oracle America Inc v Google LLC* 750 F 3d 1339, 1381 (Fed Cir 2014).

⁸⁵ CONTU was set up in 1974 by Congress to advise them on copyright over computer matters.

1980.⁸⁶ Ultimately, ‘functionality alone does not remove software - even interfaces - from Congress’s command that software is copyrightable’.⁸⁷ This means the sole reason for denying copyright protection cannot be attributed to the material being functional. Miller supports this with examples that have attracted copyright, such as maps, charts, tables of contents and indices, in addition to architectural drawings.⁸⁸ Miller’s argument reflects O’Malley J’s reasoning from the CA, emphasising that the focus should be on *how* the functional material is expressed rather than the nature of the material.

On one hand, this clarification is welcomed in the US, given the way the SSO was interpreted by the district court, but on the other hand, does not teach one anything new for English law on copyright of the SSO. Recalling Mr Justice Arnold’s nine questions in the English High Court in *SAS Institute* to the CJEU, Bot’s response mirrors that of O’Malley’s in *Oracle*.⁸⁹ And although both O’Malley J and Advocate General Bot are of the view that copyright exists in the way the functional material, such as the SSO is expressed, the lack of success in protecting the SSO in English law raises questions on how helpful O’Malley’s reasoning *practically* will be to the judiciary in the US.⁹⁰

Moreover, O’Malley J took issue with other aspects of Alsup’s reasoning in the district court. For example, the close analogies between *Sega* and *Sony* and the facts of *Oracle* and *Google* are disputed by O’Malley J. O’Malley J pointed out that Google had not reverse

⁸⁶ *Google LLC v Oracle America Inc*, ‘On Writ Of Certiorari To the Unites States Court of Appeals For The Federal Circuit, ‘Brief of Amicus Curiae Professor And Former CONTU Member Arthur R Miller’ (19 Feb, 2020) 1, 3.

⁸⁷ *Google LLC v Oracle America Inc*, ‘On Writ Of Certiorari To the Unites States Court of Appeals For The Federal Circuit, ‘Brief of Amicus Curiae Professor And Former CONTU Member Arthur R Miller’ (19 Feb, 2020) 14.

⁸⁸ *Google LLC v Oracle America Inc*, ‘On Writ Of Certiorari To the Unites States Court of Appeals For The Federal Circuit, ‘Brief of Amicus Curiae Professor And Former CONTU Member Arthur R Miller’ (19 Feb, 2020) 8-9.

⁸⁹ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [55]

⁹⁰ Cross refer to chapter 2 s2.3.2, 77.

engineered Oracle's program unlike the facts in both *Sega* and *Sony*.⁹¹ Further, O'Malley J objected to how the *Altai* test was employed.⁹² With respect to the latter, elements that are dictated by efficiency within a computer program will not be protected as the expression is said to merge with the idea. This is the merger doctrine. Contrary to the district court's findings, O'Malley J explained that the analysis around efficiency needed to be conducted at the time Oracle were creating Java's API package and its SSO, not when Google were copying the API and the SSO.⁹³ An *ex-ante* assessment allows evidence to be visible that Oracle had unlimited options when arranging and selecting the methods, suggesting the merger doctrine did not apply.⁹⁴ O'Malley J's *Altai* analysis around efficiency is corroborated by the Copyright Office who confirm that the assessment needs to be considered at the time of creating the SSO.⁹⁵ Furthermore, O'Malley J's analysis is also supported by Professor Miller.⁹⁶ Applying *Altai* erroneously is not a first for the judiciary as Mr Justice Ferris was criticised in how he did this in the English case of *John Richardson* as it was alleged that he had not used the *Altai* test robustly.⁹⁷ O'Malley J's claim that there were unlimited options to express the SSO can go some way to support the argument that the SSO involves more than the mundane selection of names, columns and headings that were associated to some of the precedents referred to in the judgment by the district court.⁹⁸ If this is the case, this indicates that the SSO should be abstracted differently to a specification/procedure, a system or method of operation.

⁹¹ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1370 (Fed Cir 2014) and *Oracle America Inc v Google LLC* 872 F supp 2d 974, 977-79 (ND Cal 2012).

⁹² *Oracle America Inc v Google LLC* 750 F 3d 1339, 1370-71 (Fed Cir 2014).

⁹³ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1370-71 (Fed Cir 2014).

⁹⁴ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1360 (Fed Cir 2014).

⁹⁵ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the Unites States Court of Appeals For The Federal Circuit, 'Brief for the United States'(Feb, 2020) 22.

⁹⁶ *Google LLC v Oracle America Inc*, 'On Writ Of Certiorari To the Unites States Court of Appeals For The Federal Circuit, 'Brief of Amicus Curiae Professor And Former CONTU Member Arthur R Miller' (19 Feb, 2020) 10-11, 14.

⁹⁷ For a critical review of *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, see David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders (1993) 2 Law, Computers & Artificial Intelligence 276 who argued that Ferris J incorrectly employed the *Altai* test.

⁹⁸ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1361 (Fed Cir 2014).

Overall, *Oracle v Google* fails to provide a meaningful understanding to the English judiciary on how to perceive the SSO for copyright purposes. The divergent views between Alsup J and O'Malley J highlight the difficulties the judiciary have with applying the *Altai* and the merger test.⁹⁹ This is cemented further in the contrasting *amicus* briefs between 72 eminent IP scholars and that of both the Copyright Office and a brief from a former member of CONTU. From a new materialist perspective, the *Altai* test and the merger test acts as distractions from understanding the ontology of the SSO. They are legal tests but can only be applied consistently when the judiciary understand the ontology of the SSO. The SSO is only visible as a static object or thing with predetermined boundaries which results in the courts involved in vacuous exercises which range from whether the material is a system or a method of operation, whether the expression merges with the idea, whether the material is efficient; all in search for the originality of expression in material that is ambiguous in nature. It is clear from the discourse between Alsup J and O'Malley J that there is agreement the material is of a functional nature, but a dispute between the two judges arise as to whether it is expressed in a creative way. It follows that the decision of the Supreme Court was much anticipated in legal circles.

5.1.4 The Supreme Court judgment

Google appealed to the Supreme Court.¹⁰⁰ The Supreme Court held by a majority of 6-2 in favour of Google, although this split did not consider Barratt J, who omitted to take part in the decision.¹⁰¹ Rather surprisingly, the Supreme Court did not review the Federal Court's finding on the API's declaring code and the SSO. Breyer J, delivering the opinion of the court, stated

⁹⁹ Both tests used in English law.

¹⁰⁰ *Google LLC v Oracle America Inc* 141 SCt 1183, 1194-1195 (2021).

¹⁰¹ *Google LLC v Oracle America Inc* 18-956 141 SCt 1183, 1189 (2021).

‘we assume, for argument’s sake, that the material was copyrightable.’¹⁰² Breyer J’s decision to *assume* copyright in the SSO for argument’s sake is disappointing is an understatement, considering the divergent views from the district court, CA and the amicus briefs that were provided to the federal court. The brief quote above represents the substance on the SSO within the case materials, as no reasons were provided by Breyer J in what can only then be classed as an assertion on the copyright of the SSO.

In the dissenting opinion of Thomas J, in which Alito J joined, there was no justification for the Supreme Court to decline to address the main question on copyright.¹⁰³ Thomas J states:

The Court wrongly sidesteps the principal question that we were asked to answer: Is the declaring code protected by copyright? I would hold that it is.¹⁰⁴

Thomas J claims that a critical part of the conclusion on copyright was missing as the declaring code was not examined for copyright purposes.¹⁰⁵ A new materialist would concur with Justice Thomas’s argument insofar as it is important to consider not only all the materials but the material effects that a phenomena can have on producing copyright matter.¹⁰⁶

A missed opportunity arises from the Supreme Court judgment to clarify whether the materials within a computer program can attract copyright protection. Breyer J decided to *assume* copyright in both the API’s code and the SSO.¹⁰⁷ As the Supreme Court missed the opportunity to examine these materials, the thesis will attempt to focus on the computer

¹⁰² *Google LLC v Oracle America Inc* 141 SCt 1183, 1190 (2021) (Breyer J)

¹⁰³ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Thomas J) 7.

¹⁰⁴ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Thomas J) 4.

¹⁰⁵ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Thomas J).

¹⁰⁶ What this means in the context of Justice Thomas’s argument is that it is wrong to decide whether material can be copied on the basis of fair use for interoperable purposes when one has not discussed and understood the material legally in the first instance. The fair use analysis is not part of the remit of this thesis as it is a defence recognised in the US but is also not helpful in answering the research questions on CGWs.

¹⁰⁷ *Google LLC v Oracle America Inc* 141 SCt 1183, 1190 (2021) (Breyer J).

program.¹⁰⁸ I will employ legal materialism to (re) examine the ontology of the SSO by tracing the material process and material context of the SSO. What this involves is drawing on Angius and Primiero's reasoning from the philosophy of computer science on *Google v Oracle* to ascertain legally how the SSO can be classed as an expression of an idea. Although it was important to understand the legal implications on English law from *Google v Oracle*, the thesis will focus on English law. This is insofar as ensuring the research on the SSO can feed into a discussion on CGWs under s9(3). Legal materialism provides the opportunity to examine the legal materials associated to Directive 2009/24 on algorithmic materials in a computer program. It is hoped that legal materialism will bring more clarity to the SSO in English law. Further, the research may provide insight into the direction that future US copyright law can take.

5.2 *Google v Oracle* reimaged through a legal materialist perspective for English law.

Google v Oracle provides an opportunity to explore the meaning of the SSO, more specifically, algorithmic material, through a legal materialist lens.

5.2.1 The rationale

One of the contributing factors associated to the divergent views on the SSO is linked to understanding both the SSO and copyright as a Cartesian/Newtonian static thing or object.¹⁰⁹ The SSO is reduced to the predetermined boundaries of a literary work to attract US copyright, also a familiar state of affairs with English copyright but the latter a manifestation of formalism.

¹⁰⁸ One of the main research questions in this thesis is around whether the creator of the SSO can be assigned authorship of a CGW under s9(3) of the CDPA 1988.

¹⁰⁹ Cross refer to chapter 3, s3.3, 132 for a critique on the Cartesian/Newtonian resemblance of the formalist conceptual model; a model used by the judiciary in conceptualising the SSO for copyright purposes.

The conflict between the district court and CA in *Oracle v Google* has not been helped by the Supreme Court whose own decision on the copyright matter of the SSO is lacking. New materialism, a springboard for legal materialism, provides an opportunity to (re)explore the SSO and copyright law as phenomena not limited by boundaries that are immersed in historical materialisations.¹¹⁰ The latter being especially significant as the meaning of a computer program, and in turn the SSO, will change as technology advances.¹¹¹ Mr Justice Pumfrey explains the importance of understanding computers before making decisions on how the inorganic material can be conceptualised as copyright matter.¹¹² It follows that legal discursive practices are material insofar as they are ongoing material (re) configurings where law emerges from the material world which includes material from computer science.¹¹³

Before embarking on a legal materialist analysis, it is prudent to point out that the dissenting judgment by Thomas J, in which Alito J joins, is not helpful. The crux of the issue is that although Thomas J is correct in his rebuke of the Supreme Court in not addressing the copyright of the materials, his judgment is limited to the copyright of the declaring code.¹¹⁴ The case materials from the Federal Circuit make it clear that the method-class-package is the SSO, while the declaring code, along with the implementing code, created the methods.¹¹⁵ At least the distinction between the code and the SSO was made by the district and the Federal

¹¹⁰ For a full explanation of new materialism and the different strands to new materialism, cross reference to chapter 3, s 3.2, 126 which deals with legal materialism.

¹¹¹ See *R (Quintavalle) v Secretary of State for Health* 2013] UKHL 13; [2003] 2 1WLR 693; [2003] 2 AC 687 where both Lord Bingham and Lord Steyn use a purposive approach to align a decision with scientific developments.

¹¹² *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95, 145. *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 is also cited in Brian Bandey, 'Over-categorisation in copyright law: computer and internet programming perspectives' (2007) 29 European Intellectual Property Review 465. To remind the reader matter in this context is not physical but conceptual.

¹¹³ Karen Barad does not deal with issues associated to computer programs or computer science but explains how discursive practices materials are based on the (re) configurings of the world. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Culture and Society 801, 822. Cross refer to chapter 4, s4.2, 155 that discusses how the law is entangled in the material world.

¹¹⁴ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Thomas J) 4-9.

¹¹⁵ *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

Circuit Court. Therefore, Thomas J's dissenting judgment is of very little value to English law on the copyright of the SSO, as the judgment does not refer to *Altai* or the merger doctrine; both of which may have implications for English copyright law.¹¹⁶

Nonetheless, I take full advantage of the legal analysis from both the district and the CA to re-imagine the facts associated to the SSO of the Oracle program under English law. I do this having in mind the overarching question which is whether the creator of an algorithm can be assigned authorship under s9(3) of the CDPA. A legal materialist interpretation of the API SSO rejects viewing a computer program as a static literary object or thing, undergirded by Cartesian/Newtonian formalism.¹¹⁷ The interpretation is crafted in a way that avoids a literal construction of a literary work which focuses only on the sensory and physical properties.¹¹⁸ The interpretation draws on Angius and Primiero's reasoning, whom suggest that the SSO of an API can be abstracted at three different levels of abstraction. Rather than interpreting the SSO by observed behaviours, aligned with the formalist conceptual model, the API SSO can be abstracted to make visible the prescribed behaviours or computational paths of the phenomena.¹¹⁹ Much of the construction hinges around a decision on the threshold of paths that would be deemed necessary to achieve interoperability. Paths beyond this acceptable threshold may attract copyright protection.

One notable aspect to the understanding of the SSO is how the API SSO emerges out of, and includes, as part of its being the ongoing re-configurings of Directive 2009/24.¹²⁰ The material context of Directive 2009 uncovers parliament's intent or purpose for not protecting the SSO as an algorithm. The space that emerges within the directive to accommodate the SSO

¹¹⁶ *Google LLC v Oracle America Inc* 141 SCt 1183 (2021) (Thomas J) 4-9.

¹¹⁷ Cross refer to chapter 3, s3.3, 132.

¹¹⁸ Cross refer to chapter 2, s2.3.2, 77 for a more detailed explanation on this.

¹¹⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283-308.

¹²⁰ Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16.

is achieved by using a purposive construction of the directive.¹²¹ A purposive interpretation allows one to (re) examine the legal materials, namely, the travaux préparatoires, to trace the roots of how algorithms have been understood for copyright purposes. Parliament's intention can be traced back to only abstracting algorithms as specifications or procedures.¹²² As a purposive approach allows interpretations to evolve and reflect new developments, one draws on Angius and Primiero's reasoning from the philosophy of computer science on algorithms.¹²³ New interpretations of algorithms must be within the permissible boundaries of the directive. Lord Wilberforce's principles on applying the purposive approach are a useful guide on how to remain within the boundaries of the provision.¹²⁴ A large part depends on the strictness or the express wording within the directive on algorithms.¹²⁵ As the directive is neither restrictive nor prescriptive on algorithms, there is more scope for new knowledge on algorithms to be considered.

The use of the purposive approach allows a literary work to be unveiled through intra-actions¹²⁶ with the material context of Directive 2009/24 and the reasoning from Angius and Primiero. The dynamic force of this intra-active process is illuminated as it provides meaning to copyright of the SSO. A literary work is reconfigured closing the legal gap between the code and the SSO for copyright purposes. Interesting questions will be addressed later in the chapter such as whether this legal materialist re-reading of the SSO as an algorithm can help bring

¹²¹ For explanations on using the purposive approach, cross refer to chapter 5, s5.2.3.1 224.

¹²² Commission, 'Proposal for a Council Directive on the Legal Protection of computer Programs' COM (88) 816 final 6.

¹²³ Lord Bingham and Lord Steyn used the purposive approach so a decision could reflect newer knowledge on embryos in *R v Quantaville v Secretary of State for Health* [2013] UKHL 13, [2003] 2 WLR 693, [2003] 2 AC 687. See also *Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279, [1981] AC 800, 822 (Lord Wilberforce).

¹²⁴ *Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800, 822 (Lord Wilberforce).

¹²⁵ *Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279, [1981] AC 800, 822 (Lord Wilberforce).

¹²⁶ A word borrowed from Karen Barad's work. Intra-actions as opposed to interactions involves material engagement without materials being viewed as separate units. See Karen Barad, 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of women in Culture and Society* 801, 820-824.

more meaning to CGWs for copyright under s9(3) of the CDPA. Furthermore, concluding observations will be noted insofar as whether the formalist model is likely to be fit for purpose as a conceptual tool for the judiciary. This is especially the case when the Cartesian/Newtonian approach to matter is challenged by new materialism.

5.2.2 The legal context

The materialist re-reading of the SSO takes place in a context where the judiciary have experienced difficulty in applying copyright to the SSO, and a computer program more generally.¹²⁷ The ontological nature of a computer program is highly functional and of a utilitarian value,¹²⁸ fitting uneasily into a literary work for copyright purposes.¹²⁹ Unless our view of a computer program, including the SSO of the program, is expanded to encompass knowledge associated to computer science, the law on copyright of SSO will remain problematic for the judiciary to apply.

Judicial decision-making on understanding the SSO of a computer program for copyright purposes has been anything but straightforward. The SSO can take many different forms, which may be interpreted as functional material and appropriately outside the parameters of copyright, or, as material which warrants copyright protection.¹³⁰ However, attracting copyright protection for the SSO of a computer program remains largely non-

¹²⁷Cross refer to chapter 2 76.

¹²⁸ *Computers Associates International Inc v Altai Inc* 982 F2d 693, 712 [3] (2nd cir 1992); Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 921, 924-930; Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 285-290.

¹²⁹ There have been no successful cases so far where the SSO has been interpreted as a literary work, unless there are design documents supplied separately. This is except for *John Richardson Computers Ltd v Flanders* [1993] FSR 497 (Ch), although this decision faced criticism. See David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v. Flanders (1993) 2 *Law, Computers & Artificial Intelligence* 269, 276.

¹³⁰ *John Richardson Computers Ltd v Flanders* [1993] FSR 497, 520 (Ch); *C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50].

existent. The judicial difficulty is captured very aptly in Mr Justice Arnold's questions in *SAS Institute* for a preliminary reference to the CJEU.¹³¹ These questions ranged from whether a programming language, an interface, and the functions of a computer program, all being associated to the SSO, could attract copyright protection.¹³² Advocate General Bot was clear in his response to Mr Justice Arnold that functional material cannot attract copyright, nor will the SSO be protected when it is replicated during the copying of the object code.¹³³ Nevertheless, Bot's response as to when the SSO can be assigned copyright relies on the ability to neatly separate the original expression from functional materials. Bot argues the way the functional material is arranged like the style in which the program is written could attract copyright.¹³⁴ However, Bot's response does very little to help differentiate between the SSO and the code, leaving the judiciary to continue to search for how to implement Mr John Ferris, Mr Justice Arnold and Mr Justice Jacob's statements that the SSO extends beyond the text of the code.¹³⁵ Furthermore, Bot omits to comment on whether the interface can be protected without the copying of the object code;¹³⁶ one of Mr Justice Arnold's original questions.¹³⁷ *SAS Institute* provides a good insight into the difficulties that lay ahead for the English judiciary.

Parallels can be drawn with Bot's omission on the interface which creates uncertainty and the way the courts in *Oracle v Google* either deal or omit to deal with interfaces. The district court and the CA had divergent views over how to conceptualise the method-class-

¹³¹ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [332].

¹³² *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [332].

¹³³ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [57], [94-97].

¹³⁴ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50].

¹³⁵ *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 500 [7]; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [232]; *IBCO Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 302. There have been virtually no cases where the SSO has been protected by copyright. For more information on this, cross refer to chapter 2, s2.3.2, 77.

¹³⁶ A comparison can be made at looking at the following sections of the judgments: *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [332]; *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [36-40]. See also Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 *International Review of Intellectual Property and Competition Law* 428, 443.

¹³⁷ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [332].

package (the SSO) of the application programming interface (API) for copyright purposes.¹³⁸ The district court turning to analogical reasoning stating that the method-class-package was akin to interface procedures in both *Sega* and *Sony*.¹³⁹ Conversely, originality was found by the CA in the way the method-class-package was expressed.¹⁴⁰ However, akin to *Bot*, the Supreme Court did not address the question of copyright,¹⁴¹ leaving a large degree of uncertainty around the SSO for copyright purposes. The uncertainty seems to result in not understanding how to abstract the SSO, leaving it hard to differentiate the SSO as an idea from an expression of an idea.

The uncertainty around how to conceptualise the SSO of a computer program is evident in *Navitaire*. The SSO within *Navitaire*'s OpenRes program was referred to as a dynamic user interface after abandoning the term business logic when it became too difficult to shoehorn business logic into a literary work.¹⁴² Unlike the Supreme Court in *Oracle v Google* or *Bot* in *SAS Institute*, Mr Justice Pumfrey did address the business logic/dynamic user interface when discussing copyright.¹⁴³ However, Mr Justice Pumfrey's reasoning relied on policy reasons associated to Directive 1991 (amended in 2009) to reject the SSO of a computer program from the remit of copyright protection rather than explicit reference to the properties of a literary work.¹⁴⁴ The case highlights the lack in understanding on how to abstract the SSO for copyright purposes.¹⁴⁵

¹³⁸ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 999-1000 (ND Cal 2012); *Oracle America Inc v Google LLC* 750 F 3d 1339, 1381 (Fed Cir 2014).

¹³⁹ William Alsup refers to *Sega Enterprises Ltd v Accolade Inc* 977 F2d 1510 (9th Cir 1992) and *Sony Computer entertainment, Inc v Connectix Corporation* 203 F 3d 596 (9th Cir 2000) in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 994-997, 1000 (ND Cal 2012).

¹⁴⁰ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1381 (Fed Cir 2014).

¹⁴¹ *Google LLC v Oracle America Inc* 141 SCt 1183, 1190 (2021) (Breyer J)

¹⁴² *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [125]. [131].

¹⁴³ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130], [131].

¹⁴⁴ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

¹⁴⁵ For a more detailed discussion on policy reasoning in English copyright law, cross refer to chapter 4, s4.2, 158.

Viewing a potential copyright work, such as a computer program, and the SSO, in identifiable units, (original/functional material) as suggested by Bot in *SAS Institute* is not conducive to fully understanding the SSO of a computer program.¹⁴⁶ The approach suggested by Bot resembles the old materialist Cartesian/Newtonian understanding of how matter is formed.¹⁴⁷ Matter interacts with matter as identifiable units.¹⁴⁸ However, phenomena such as a computer program or a literary work do not have inherently deterministic boundaries.¹⁴⁹ Yet, the judiciary generally use what is known as the formalist conceptual model, a model which allows the judiciary to focus on the non-aesthetic properties of a work (the sensory and physical properties)¹⁵⁰ which produces a plain, ordinary meaning of a literary work.¹⁵¹ Put differently, the boundaries of a literary work are already pre-determined by the judiciary. For example, in *Nova*, Lord Justice Jacob provides an *obiter* statement, whilst discussing the design (the SSO)¹⁵² of a video pool game. Lord Justice Jacob states:

¹⁴⁶ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [50]. See Diana Coole, Samantha Frost, *Introducing the New Materialism* in Diana Coole, Samantha Frost (eds), *New Materialism ontology, agency and Politics* (Duke University Press 2010) 1-15; Rosi Braidotti, *The Posthuman* (Polity 2013) 95-101; Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813-818.

¹⁴⁷ Newtonian and Cartesian understanding of matter is challenged by new materialism. See Diana Coole, Samantha Frost, *Introducing the New Materialism* in D Coole, S Frost (eds), *New Materialism ontology, agency and Politics* (Duke University Press 2010) 8; Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 812-813. Cross refer to chapter 3, s3.3, 132.

¹⁴⁸ See Diana Coole, Samantha Frost, *Introducing the New Materialism* in D Coole, S Frost (eds), *New Materialism ontology, agency and Politics* (Duke University Press 2010) 8; Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 812-813.

¹⁴⁹ Karen Barad explains how a new materialist does not understand that material has deterministic boundaries. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

¹⁵⁰ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal Legal Studies* 229, 231-236. Cross refer to chapter 2 59.

¹⁵¹ Cross refer to chapter 2, 77.

¹⁵² Arnold J refers to the design of the computer program as the SSO. See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 104 [232].

‘if Mr Jones [the designer] had actually written a description of the pulsing, rotating cue, and synchronised power meter his description would (if not too trivial at least) be protected as a literary work. People could not copy that.’¹⁵³

What Lord Justice Jacob means by this statement is that the design *within* the video pool game was only visible to Lord Justice Jacob for copyright protection if the design was separate from the computer program and in a textual form. I argue that in understanding the design process of a computer program in the form of a literary work e.g. as a static object or a thing, creates a risk of the design not being fully understood.¹⁵⁴

Judicial decisions have been unnecessarily complex as the US *Altai* test and a US merger-style test have been adopted into English law,¹⁵⁵ which is why the *Google v Oracle* case; a case that refers to both legal tests may be of significance to English copyright law. However, adopting US tests only further complicates an already problematic area as naturally the legal culture and systems are different.¹⁵⁶ Applying these tests have led to judicial reasoning that is almost metaphysical in nature¹⁵⁷ as the judiciary are left to grapple with abstract concepts such as whether the SSO is on the wrong side of the elusive boundary between the idea and the expression of an idea. The judiciary are further distracted by having to somehow decide whether the idea has merged with the expression or even whether the SSO is dictated to by efficiency, both of which puts the SSO of a computer program beyond the reach of copyright

¹⁵³ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032 [51].

¹⁵⁴ See the following about the risks involved when dividing up materials and not considering the whole material process: Diana Coole, Samantha Frost, ‘*Introducing the New Materialism*’ in Diana Coole, Samantha Frost (eds), ‘*New Materialism ontology, agency and Politics*’ (Duke University Press 2010) 1-15; Rosi Braidotti, ‘*The Posthuman*’ (Polity 2013) 95-101; Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 813-818.

¹⁵⁵ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526, 27; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

¹⁵⁶ *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 524-528; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

¹⁵⁷ Ken Moon, ‘Another nail in the coffin for non-literal software copyright infringement?’ (2015) 10 *Journal of Intellectual Property Law & Practice* 929.

protection.¹⁵⁸ Perhaps, unsurprisingly, there has been very little legal success in protecting the SSO for copyright purposes.¹⁵⁹ Although legal positivists such as Hart would argue that the judiciary are applying the law,¹⁶⁰ new materialism reveals that the formalist conception of a copyright work reflects old materialist understanding of how matter is formed.¹⁶¹ The old materialist understanding of matter is challenged by new materialism, with underpinnings from quantum physics.¹⁶² Through a new materialist lens, I would argue that the SSO of a computer program is produced by these legal tests rather than meaningfully explained through examining the phenomena's materials.

5.2.3 Through a legal materialist lens

It is my respectful view that treating phenomena as having inherently determinate boundaries or properties as the formalist model does, results in seeing material in isolation and therefore not as a whole. Legal materials, which include statutory interpretative tools interact with inorganic materials¹⁶³ such as a computer program as discrete predetermined units. The research in this thesis provides evidence of how the legal materials interact with inorganic materials in a pre-determined way.¹⁶⁴ Nevertheless, Lord Justice Jacob comments are very apt

¹⁵⁸ *Computer Associates v Altai* 982 F 2d 706-711 (CA 2d Cir 1992); *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

¹⁵⁹ Except for *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, although this decision faced criticism. See a critical review of the decision in David I Bainbridge, 'The Look and Feel of Computer Programs after Richardson v Flanders (1993) 2 Law Computers & Artificial Intelligence 269, 275, 276.

¹⁶⁰ H L A Hart, *The Concept of Law* (3rd ed, OUP 2012) 57. See also Davies who refers to Hart as well. Margaret Davies, 'Law Unlimited Materialism, Pluralism, and Legal Theory' (Routledge 2017) 115.

¹⁶¹ Cross refer to chapter 3 'n 150'.

¹⁶² Cross refer to chapter 3 'n 74'.

¹⁶³ Kang explains that legal materials can include legal texts and statutory interpretive techniques. See Hyo Kang, Law's Materiality in A Philippoppulps-Mihahalopoulos, *Routledge Handbook of Law and Theory* (Routledge 2018) 464-65. Kang also refer to how the law relates to the physical matters of the world such as inorganic matters.

¹⁶⁴ Cross refer to chapter 3 'n 154'.

to substantiate this argument. Lord Justice Jacob comments on the materiality¹⁶⁵ of copyright law when he notes that:

It is a remarkable feature...that it is unnecessary actually to know how any of the games concerned are played or even what they are other than computer games based on pool.¹⁶⁶

Lord Justice Jacob illustrating the separation between the legal materials and the computer materials when attempting to understand the SSO of a computer program as copyright matter. Separating materials in the material process leaves the risk that material is hidden to the judicial eye. Moreover, viewing phenomena in this way *produces* inherently determinate meanings rather than explaining the meaning of the phenomena.¹⁶⁷ An approach like this results in knowledge and understanding being frozen to a time period. In other words, interpretations are rigid and do not have the elasticity to align, for example, with developments in computer science. This is likely to be contributing to why the SSO or the “golden nugget”¹⁶⁸ remains allusive to the courts for copyright protection.¹⁶⁹ What this leads me to believe is that the claim made by the judiciary that the ‘SSO’ can be offered copyright protection is misleading on the

¹⁶⁵ The materiality is the process of understanding of how copyright law becomes law. Margaret Davies explains the meaning of legal materiality. Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 5.

¹⁶⁶ *Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus Law Rev 1032, 1036 [6].

¹⁶⁷ Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 819.

¹⁶⁸ This is how Walker CJ referred to the protectable components associated to the SSO in *Computers Associates International Inc v Altai Inc* 982 F 2d 693, 710 (2nd Cir June 1992).

¹⁶⁹ There have been no successful cases on copyright protection of the SSO. This is except for *John Richardson Computers Ltd v Flanders* [1993] FSR 497 (Ch), although this decision faced criticism. See David I Bainbridge, ‘The Look and Feel of Computer Programs after Richardson v. Flanders (1993) 2 *Law, computers & Artificial Intelligence* 269, 276.

existing knowledge of the SSO, as it implies that the SSO can attract copyright which broadly speaking is not the case.¹⁷⁰

5.2.3.1 A purposive construction: algorithmic material as an expression of an idea.

The allusive nature of the SSO of a computer program for copyright purposes may be revealed if the judiciary conceptually shifts from viewing the SSO as a static determinate literary object. Through a new materialist lens, the judiciary can understand a literary work as a material discursive ongoing reconfiguring.¹⁷¹ Adopting a purposive approach to the construction of Directive 2009/24 on the legal protection of computer programs,¹⁷² allows the judiciary the creative freedom to interpret phenomena rather than being hamstrung to a fixed meaning.¹⁷³ The purposive approach allows the judiciary to depart from using the restrictive properties of formalism, i.e. the physical and sensory properties to understand a work as copyright matter. Rather, the purposive approach allows the judiciary to (re) examine Parliament's intent or purpose for the provision through exploring the wider material process of the enactment.

Using a purposive approach corresponds with new materialism as the purposive approach allows the judiciary to explore the materials and the material process, whilst illuminating that the law is enmeshed in the material world.¹⁷⁴ By adopting the purposive approach, European Parliament's subjective purpose (intent or will) for the directive can be

¹⁷⁰This has also been argued by Moon. See Ken Moon, 'Another Nail in the Coffin for Non-literal Software Copyright Infringement?' (2015) 10 Journal of Intellectual Property Law & Practice 921, 930. Ferris J and Arnold J both explained that the SSO could obtain copyright protection. See *John Richardson v Flanders* [1993] (No 2) FSR 497, 527; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [232].

¹⁷¹ This statement has been inspired by Karen Barad's work. Karen Barad does not discuss how the law is made. I use her work on matter and apply it to the copyright of the SSO, and by extension, CGWs. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 Journal of Women in Culture and Society 801, 822.

¹⁷²Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16.

¹⁷³ Neil MacCormick, *Rhetoric and The rule of Law: A theory of Legal Reasoning* (OUP 2005) 136-137.

¹⁷⁴ For a new materialist account of the purposive approach, cross refer to chapter 4 'n 64'.

discovered from two sources; the text itself, and certain sources external to the directive.¹⁷⁵ The external sources include circumstances up to the creation of the text and the totality of the circumstances.¹⁷⁶ For this thesis, the travaux préparatoires will be examined. These sources may reveal more about Parliament's intentions for copyright of the SSO of a computer program.

Firstly, the textual source (Directive 2009/24) illuminates European Parliament's purpose in enacting the directive. The purpose is to prevent the ubiquitous copying of software programs.¹⁷⁷ The directive states that this is especially the case since computer programs are copied at a fraction of the cost compared to the resources that have been invested into the programs.¹⁷⁸ In offering protection to computer programs, ideas that underlie the computer program's interface are naturally not protected.¹⁷⁹ Ideas appear to include algorithms, if recital eleven is considered.¹⁸⁰ Angius and Primiero suggest that algorithms can be abstracted as the SSO of a computer program.¹⁸¹ Newell's reasoning also corroborates this.¹⁸² Further, Mr Justice Arnold in *SAS Institute* refers to the SSO as the *design* within the program,¹⁸³ which aligns with Newell's reasoning that algorithms are a continuum of design tasks.¹⁸⁴ There is no

¹⁷⁵ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2005) 135.

¹⁷⁶ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2005) 135.

¹⁷⁷ Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16, recital 2.

¹⁷⁸ Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16, recital 2.

¹⁷⁹ This reflects the idea/expression dichotomy and how ideas should be kept in the public domain for the public to use rather than creating monopolies over materials that are functional and required for interoperable purposes.

¹⁸⁰ Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16, recital 11.

¹⁸¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 304.

¹⁸² Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 *University of Pittsburgh Law Review* 1023, 1028.

¹⁸³ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 85 [232].

¹⁸⁴ Allen Newell, 'Response: The Models are Broken, the Models are Broken' (1986) 47 *University of Pittsburgh Law Review* 1023, 1030.

definition given to algorithms in the directive, so Parliament's purpose cannot be said to be restrictive or prescriptive on algorithms.¹⁸⁵

Drawing on the external sources to the directive, more specifically, the revised version of the Commission of the European Communities on the proposal for the directive, the intention for the directive was that algorithms, as a procedure or specification would be classed as an idea.¹⁸⁶ Algorithms were described in the proposal as a set of steps needed to provide a solution to a problem.¹⁸⁷ This definition mirrors how Angius and Primiero describe algorithms as procedures.¹⁸⁸ Moreover, the Commission also refer to how tasks needs to be defined so the program can provide computational solutions.¹⁸⁹ This also corresponds with the definition given by Angius and Primiero on algorithms as specifications.¹⁹⁰ The Commission proposal for the directive suggests that algorithms were ideas based on the understanding they were specifications or procedures.

However, tracing back to another external source by the Economic and Social Committee at the time of the creation of the directive raises doubt about judges giving such a determinate meaning, as the one by the Commission, which describes an algorithm as a specification or procedure. The Economic and Social Committee, who were asked to consult on the directive by the European Council at the time of creating the directive were explicit that

¹⁸⁵ This leaves space within the directive for meaning to be given to algorithms and for the meaning to be within the permissible boundaries of Parliament's purpose. Cross refer to chapter 4 'n 122' for a more detailed account of how to discover Parliament's purpose.

¹⁸⁶ Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (1989) 816 final 6 [2.3], [2.4]. It is worth noting that the external sources used to interpret Parliament's purpose/intent relates to Directive 91/250/EEC of 14 May 1991 on the legal protection of Computer Programs [1991] OJ L122/42, although Directive 2009/24 is almost a mirror image of the directive with some minor amendments.

¹⁸⁷ Commission, 'Proposal for a Council Directive on the Legal Protection of computer Programs' COM (1989) 816 final 6 [2.3], [2.4].

¹⁸⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 294.

¹⁸⁹ Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (1989) 816 final 6 [2.3].

¹⁹⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 294.

algorithms were not clear terms and were frequently interchangeably referred to as logic.¹⁹¹ Consequently, the Committee recommended that any referral to algorithms in the directive should be removed as it could cause confusion, if a definition was provided. Furthermore, the Committee mentioned that the meaning of an algorithm can vary depending on the state of technology,¹⁹² which would only add another layer of confusion. Nonetheless, algorithms remained in the final directive, *albeit* in the recitals, and classed as an idea, not deserving of copyright.¹⁹³ Therefore, it is reasonable to advance an argument that it is in the permissible boundaries of Parliament's purpose for the directive to recognise other meanings of an algorithm, which could attract copyright. This would involve departing from viewing an algorithm in a fixed, deterministic state, expressed as steps to achieve a computational result.

It is argued that one of the reasons contributing to the problems that the judiciary face over the copyright of the SSO, which includes algorithms, is linked to the uncertainty as to how the SSO should be abstracted. This argument was first raised by Mr Ferris in *John Richardson*.¹⁹⁴ The research within this thesis offers support to this argument as the formalist model does not help to understand the sequence and organisation of a computer program as it only focuses on the physical and sensory properties of the program. This is almost certain to be why Mr Justice Ferris looked to the US *Altai* test for answers. However, even using the *Altai* test has not produced much success for providing the SSO of a computer program with protection. The *Altai* test faces similar criticisms to those above regarding the lack of visibility in the sequence and organisation of the computer program.¹⁹⁵

¹⁹¹ Economic and Social Committee, 'Opinion on the proposal for a Council Directive on the legal protection of computer programs' (1989) C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁹² Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' (1989) C329/02 OJ No C 91, 12 4 (3.3.2.2).

¹⁹³ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16, recital 11.

¹⁹⁴ *John Richardson Computers Ltd v Flanders* [1993] FSR 497, 527.

¹⁹⁵ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) *Journal of Intellectual Property Law & Practice* 921, 924.

It is contended that the reasoning from Angius and Primiero needs to be drawn upon to assess whether the authors' reasoning on the SSO, which they identify as algorithms, can be used for copyright consideration from a legal materialist perspective.¹⁹⁶ Angius and Primiero employ the facts of *Google v Oracle*. *Google v Oracle* focus on Oracle's interface and the materials that underlie the interface.¹⁹⁷ An ontological analysis will be welcomed by the English courts. I make this argument on the basis that *Navitaire's* dynamic user interface-business logic did not attract copyright based on policy grounds, while Bot and Mr Justice Arnold in *SAS Institute* did not address whether an interface could be protected without decompiling the object code.¹⁹⁸ Understanding the ontological nature of the SSO of a computer program may help the English judiciary, in the future, to apply the law using a purposive construction of directive 2009, undergirded by new materialism.

There is scope within Directive 2009/24 for algorithms to be recognised as an expression of an idea if abstracted differently to that of a specification or procedure.¹⁹⁹ O'Malley J in the CA of *Oracle v Google* appears to have done just that, but it is interesting to note that Bot, which Mr Justice Arnold appears to concur with in *SAS Institute* suggests this also.²⁰⁰ As O'Malley J found originality in the expression of the functional material, this indicates that the SSO was abstracted at another level of abstraction to Alsup J, although this was not made clear in the judgment. Angius and Primiero suggest that the algorithm could be abstracted as an abstract machine.²⁰¹ Algorithms as abstract machines will

¹⁹⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 304.

¹⁹⁷ *Google LLC v Oracle America Inc* 141 SCt 1183, 1191 (2021) (Breyer J).

¹⁹⁸ Compare the original question to the one that Bot attempted to answer. See *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 104 [332]; *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [37].

¹⁹⁹ Cross refer to the previous section.

²⁰⁰ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1381 (Fed Cir 2014); *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [55]; *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch); [2013] RPC 17 [42].

²⁰¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 304.

be discussed in more detail later in this chapter, but briefly, this is where procedures are implemented as prescriptions of the executions of the program on an abstract machine which corresponds with the input and the output.²⁰² This is a useful observation for the English judiciary as Bot also makes the same suggestion as O'Malley J insofar as originality can be found in how the functional material is expressed. Although there was very little clarification by Bot on how this could be done, and an impasse appears to be reached by the English judiciary on this issue, Bot's suggestion could be implemented practically by abstracting an algorithm as an abstract machine.

Algorithms abstracted at the levels suggested by Angius and Primiero need to be examined in the context of copyright law to assess whether any could attract protection. Firstly, I shall explain how an algorithm can be abstracted at either one of three levels. Algorithms can be abstracted as specifications, as procedures or algorithms as abstract machines.²⁰³ Whilst examining the material context of Directive 2009/24, algorithms abstracted as a specification or procedure cannot attract copyright protection.²⁰⁴ However, the material process is silent regarding any other ways of abstraction which leaves room for others to be within Parliament's purpose of providing legal protection under the directive.

Examining the district court's decision in *Oracle v Google* reveals some useful insights into the way the English judiciary may be abstracting the SSO of a computer program. The district judge held in *Oracle v Google* that the SSO of the application programming interface, which was referred to as the method-class-package organisation was not protected by copyright. This was insofar as it was only visible to Alsup J, the district judge, as 'a system,

²⁰² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 294.

²⁰³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 293.

²⁰⁴ Commission, 'Proposal for a Council Directive on the Legal Protection of computer Programs' COM (1989) 816 final 6 [2.3], [2.4].

or method of operation’.²⁰⁵ What this research exposes is that the method-class-package organisation was abstracted by way of algorithms as specifications or procedures.²⁰⁶ The implications of such, were that the originality by Oracle/Sun in developing the procedures was obscured by the way the algorithm was abstracted.²⁰⁷ This is akin to when the judiciary apply the formalist model, as the model reduces a computer program and the SSO to a static literary thing or object.²⁰⁸ The original expression remains hidden, which indirectly leaves material that is only functional in nature.²⁰⁹ It follows that formalism acts more as a distraction from this observation as the judicial eye is focused on whether the SSO fits neatly into a form.²¹⁰ Formalism obscures the visibility that the SSO of a computer program is being consistently abstracted as functional material, which appears to be at the level of abstraction of algorithms as specifications or procedures. This reflects the content in the travaux préparatoires of the directive, which point to algorithms as specifications or procedures but also how Mr Justice Arnold used the travaux préparatoires when describing algorithms even in 2011.²¹¹ There is nothing in the doctrinal legal research from other cases on the SSO that conflicts with this interpretation.²¹²

Algorithms should not be merely understood as specifications or procedures which appears to be how algorithms are recognised legally in English law. Abstracting an algorithm

²⁰⁵ *Oracle America Inc v Google LLC* 872 F supp 2d 974, 999-1000 (ND Cal 2012).

²⁰⁶ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) 33 *Philosophy & Technology* 283, 304. An examination of the legal reasoning by the district judge also corroborates this finding. Cross refer to s5.1.2, 201 within this chapter.

²⁰⁷ Nicola Angius, Giuseppe Primiero, ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) 33 *Philosophy & Technology* 283, 304.

²⁰⁸ Cross refer to chapter 2; s 2.3.2, 77.

²⁰⁹ There have generally been no cases where the SSO has taken the form of a literary work, attracting copyright, without the accompaniment of preparatory design documents.

²¹⁰ CDPA, s3-8, although a computer program needs to fit the form of a literary work.

²¹¹ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229].

²¹² Cross refer to chapter 2, s 2.3.2, 77. To the author’s knowledge there have been no significant cases on the SSO in England and Wales since *SAS Institute v World Programming Ltd* [2013] EWHC 69 (Ch), [2013] RPC 17.

by specification consists of an informal description of the input/output relation.²¹³ Abstracting an algorithm as a specification does not describe all the procedural steps.²¹⁴ Instead an algorithm's properties should be considered insofar as the linguistic and implementation properties.²¹⁵ Linguistically, an algorithm can be abstracted as a procedural description in a specific informal language. However, an implementation level makes the algorithm visible as a description of the executions of the program on an abstract machine for the process corresponding with the input/output within the specification.²¹⁶ The latter shifts judicial focus from the *observed* behaviours of an algorithm that are only visible by formalism to the *prescribed* behaviours.²¹⁷

It is worth noting that an abstract machine is often used in computer science as a way of studying a computer system. From a new materialist perspective, this is useful as it allows meaning to be given without being constrained by an object or thing that has pre-determined boundaries. More specifically, a taxonomy of identity and copy relations between two software systems referred to as S and S' is provided by Angius and Primiero to demonstrate how this could be done. S and S' can be examined for similarities based on exact, inexact, and approximate copies.²¹⁸ An exact copy of S would mean that S' prescribes the same set of

²¹³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 291. This reflects how algorithms are abstracted in the Directive. See Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (1989) 816 final 6 [2.3], [2.4].

²¹⁴ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 291.

²¹⁵ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 291.

Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 289.

²¹⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 291, 292.

²¹⁷ The different levels of abstraction were discussed previously in a new materialist perspective from the philosophy of computer science. Cross refer to in chapter 4 s.4.4.3, 164. Anguis and Primiero discuss how abstracting algorithms as machines allows for prescribed behaviours to be examined rather than being restricted to only exploring the observed behaviours. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 289.

²¹⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 294.

behaviours as S .²¹⁹ This would mean that S' is an exact copy of S , despite the code being expressed in a different computer language or having a different structure.²²⁰ This is in sharp contrast to the material that is visible using the formalist model as the formalist model would only concentrate on either the structure or the code, which could be different due to the various programming languages used, yet the sequence and organisation of the program could be the same. An inexact copy is where S' copies all the functionalities of S but includes additional functionalities as well.²²¹ And finally, an approximate copy of S , would involve S' copying some of the functionalities of S .²²² Focusing on the prescribed behaviours provides an opportunity to focus on the sequence and organisation of a computer program.

To determine whether S' is an exact, inexact, or approximate copy of S , one can use process algebra to provide an automatable check.²²³ The distinction between the three levels of abstraction is done through process algebra notions of bisimulation and simulation between any pairs of transitional states (TS) for the abstract machines.²²⁴ To determine if S' is an exact copy of S , this will depend upon whether the TS' simulates all the behaviours of TS and TS simulates all the behaviours of TS' . In terms of an inexact copy, this would be represented if TS' simulates all the behaviours of TS , but is not necessarily constrained to only those behaviours prescribed by TS . And finally, approximate copies can be represented by a partial simulation relation requiring at least *one* path of TS .²²⁵ This demonstrates an approach that

²¹⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 295.

²²⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 295.

²²¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 295.

²²² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 296.

²²³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 299.

²²⁴ ²²⁴ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 299.

²²⁵ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 299.

computer experts (used in copyright cases in the UK) could use to guide the judiciary in ascertaining whether a computer program was an exact, inexact, or approximate copy of the original computer program. Making visible the computational paths unlocks the SSO of a computer program for copyright consideration.

For the judiciary to use exact, inexact, or approximate copies would depend on whether this level of abstraction aligns with the fundamental values of the copyright legal system. This is referred to as satisfying Parliament's objective purpose.²²⁶ Directive 2009/24 is clear that a balance needs to be struck in protecting the 'considerable human, technical and financial resources';²²⁷ whilst simultaneously ensuring there is no monopoly over the underlying ideas of a program.²²⁸ These values are also visible in article 7 of TRIPS.²²⁹ The directive states that international obligations should be adhered to as part of interpreting the provisions within the directive.²³⁰ The promotion of technological innovation and the transfer and dissemination of technology are the objective values embedded in the international IP agreement.²³¹ These values, utilitarian in nature, can be traced all the way back in copyright law to *Donaldson v Beckett*.²³² The court explained that:

the common law has ever regarded public utility, as the mother of justice and equity.

Public utility requires, that the productions of the mind should be diffused as wide as

²²⁶ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press 2005) 152.

²²⁷ Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 recital 2. Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 recital 2 mirrors this provision.

²²⁸ Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42 art 1(2).

²²⁹ The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 7.

²³⁰ Council Directive 91/250/EEC of 14 May 1991 on The Legal Protection of Computer Programs [1991] OJ L122/42 recital 15. Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16 recital 11 mirrors this provision.

²³¹ The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) [1994] OJ L336 art 7.

²³² *Donaldson v. Becket* [1774] 1 ER 837.

possible; and therefore the common law could not, upon any principle consistent with itself, abridge the right of multiplying copies.²³³

The court making it clear that public utility in the form of disseminating material is critical to a just and equitable copyright legal system. Although this quote by the court is expressed in 1774, these values still underpin the copyright legal system as both the directive and the TRIPS agreement reveal. This means that the courts will have to be sure that protecting algorithms as abstract machines will uphold these values insofar as not creating a monopoly over the SSO of a computer program. This is important since some abstractions of algorithms will be required for interoperable purposes by other programmers.

Protecting algorithms as an abstract machine should strike a balance between protecting the resources invested in creating algorithms, whilst allowing material that is deemed necessary to achieve interoperability with other programs.²³⁴ More specifically, if a threshold of paths in an approximate copy is allowed, this permits programmers to reuse simulated computational paths.²³⁵ This ensures monopolies over behaviours cannot be formed that can only be modelled in a limited number of ways. For example, the behaviours involved in setting the volume on a machine.²³⁶ Furthermore, if exact and inexact copies are also permitted, this ensures there are no monopolies over newly discovered solutions to a critical computational problem. Instead, what is being suggested is that computer experts in court will focus on a *threshold of paths* that an approximate copy is allowed to contain for interoperable purposes.²³⁷ This approach could have been taken by the court in *Google v Oracle* which would have provided the court with

²³³ *Donaldson v. Becket* [1774] 1 ER 840 [135].

²³⁴ It is necessary that materials associated to interoperability are not copyright protected. Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs [1991] OJ L122/42 recital 15.

²³⁵ Angius and Primerio make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 303.

²³⁶ Angius and Primerio make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 303.

²³⁷ Angius and Primerio make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 303.

more clarity over the decision-making process.²³⁸ Beyond this threshold is material that can be examined for copyright consideration suggesting a balance is struck between permitting programmers to use vital material for interoperable purposes while also recognising the designer's creative expression when producing original algorithmic material.

Exceeding a threshold of paths required for interoperable purposes with another program potentially illuminates the originality in the remaining design of the computational paths as the material is neither common, general, or required for interoperability purposes. Recalling the exposition by Laddie et al on how to differentiate between an idea and an expression using the example of a painting, Laddie et al explains that others are free to copy the idea of painting a dog listening to his master's voice on a gramophone.²³⁹ However, copying the combination of ideas, such as the breed of the dog and type of gramophone would infringe upon the original expression of the painting.²⁴⁰ Using this as an analogy, one could copy the threshold of paths that are deemed to be for interoperable purposes but could not copy the combination of the remaining paths as the paths are original to that program. It is argued that this would satisfy the legal threshold on originality in terms of being the author's own intellectual creation.²⁴¹ The selection of computational paths exceeding the threshold for interoperable purposes, could be used to illustrate the author's free and creative choices.²⁴² By demonstrating the creative choices, it is posited that the intellectual creation reflects the

²³⁸ Angius and Primerio make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 305.

²³⁹ Laddie, Prescott & Vitoria, *The Modern Law of Copyright* (5th edn, LexisNexis Butterworths 2018) 4.52. Works from this author have been used in the past by the judiciary.

²⁴⁰ Laddie, Prescott & Vitoria, *The Modern Law of Copyright* (5th edn, LexisNexis Butterworths 2018) 4.52.

²⁴¹ Case C-5/08 *Infopaq International A/S v Danske Dagblades Forening* [2009] ECR I-6569 [51].

²⁴² Case C-145/10 *Painer v Standard Verlags GmbH* [2012] ECDR 6 [89].

author's personality.²⁴³ Mr Justice Arnold confirms that this is the threshold to be adhered to by the English judiciary.²⁴⁴

If an original expression can be made visible, this overcomes two legal hurdles. Firstly, algorithms can be expressed as more than a specification or procedure, which provides the judiciary with the creative freedom to distinguish between any past precedents on the SSO and the Directive 2009/24, recital eleven, once the material context has been considered.²⁴⁵ Secondly, illuminating the creative choices in the remaining selection of the computational paths allows the original expression in the functional material to be revealed. To leave no stone uncovered, the textual description of the prescriptions of the executions of the program on the machine for the process corresponding with input and output relation could be written in a document adhering to the plain reading of art 1(1) of Directive 2009/24 and s 1(b)(c) of the CDPA.²⁴⁶ By making the originality visible in the preparatory documents, akin to the analogy of the dog and the gramophone in the painting, the visibility of the original literary work emerges to reflect the originality in the design of the computational paths. It may be argued that the way the algorithm is expressed, without a preparatory design document, would be sufficient for copyright protection, although this would have to be tested in court.²⁴⁷

²⁴³Case C-145/10 *Painer v Standard Verlags Gmbh* [2012] ECDR 6 [88].

²⁴⁴ At the time of submitting the thesis. See *TJH Systems Ltd, Optionnet LLP and Sheridan, Sheridan Options Corp* {2023} EWCA Civ 1354 [15],[16].

²⁴⁵ The material context refers to the external sources that explain an algorithm can be abstracted as a specification or procedure. Commission, 'Proposal for a Council Directive on the Legal Protection of computer Programs' COM (1989) 816 final 6 [2.3], [2.4].

²⁴⁶ The legal provisions, namely art 1(1) of the Directive and 1(b) of the CDPA 1988 identifies a computer program as a literary work. S1 (c) identify preparatory computer design document as a literary work. Angius and Primiero make the suggestion of giving the abstraction a textual form so it aligns with a literary work. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 307.

²⁴⁷ Lord Justice Jacob provided an *obiter* statement that the Directive may have contemplated only one literary work for the program and the SSO. *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] *Bus Law Review* 1032, 1041.

A counter argument that I would like to address is whether recognising copyright in the SSO of a computer program could potentially mean that the law collides with art 6 of Directive 2009/24. Article 6 allows for the code to be decompiled so one can replicate the functions of the program. A similar argument was made by Angius and Primiero when they discuss reverse engineering in their paper.²⁴⁸ However, abstracting the SSO as an abstract machine reveals more precisely the number of computational paths that have been copied, providing the opportunity to guide the judiciary on a threshold of paths that would be acceptable to have in common with another program for interoperable purposes.²⁴⁹ In other words, the interpretation of the SSO of a computer program would not conflict with art 6 of the Directive.

Another potential counter argument could be advanced on the basis that drawing on Angius and Primiero's interpretation is a way to merely circumvent the law, for example, when one refers to the provision in TRIPS. Art 9(2) states that copyright will not extend to procedures, methods of operation or mathematical concepts as such. To help refute this point, the legal argument between Alsup J and O'Malley J in *Oracle v Google* could be used to shed light on this. O'Malley J draws attention to the ease in which any material can be conceptualised in a computer program as a procedure or method of operation, since a computer program is largely utilitarian and functional in nature.²⁵⁰ The provision in the Copyright Act 1976 refers to a computer program as a set of instructions.²⁵¹ O'Malley J's argument could also extend to the ease in which any of the material could be classed as computer behaviours. This is the crux of the problem and why Walker J in *Altai* referred to the almost impossible role that the judiciary had in attempting 'to fit the proverbial square peg into a round hole'.²⁵²

²⁴⁸ Reverse engineering is a term used in the US which mirrors art 6 of the Directive.

²⁴⁹ Angius and Primiero make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 305.

²⁵⁰ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1367 (Fed Cir 2014).

²⁵¹ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1376 (Fed Cir 2014). See 17 USC 101 which defines a computer program.

²⁵² *Computer Associates v Altai* 982 F 2d 692 (CA 2d Cir 1992) 721.

In other words, pointing to the difficulty of fitting a computer program into a traditional literary work. What this means for academics and the judiciary is that these words within art 9(2) should not be interpreted in the traditional, literal sense, when dealing with a computer program.

Avoiding traditional, stagnant, interpretations is the reason why new materialism is employed in this thesis. The objective of the theory is to strip the boundaries of a word away and for the word to re-emerge during an examination of the material process. Legal materialism involves (re) exploring the EU Directive, and its external materials exposes the space for creative freedom on the meaning of algorithms. Regardless of the potential criticism that the law is being circumvented, algorithms are not being abstracted at one level of abstraction i.e., as a procedure. Algorithms are made visible as prescriptions of the executions of a program on an abstract machine for the process corresponding with the input and output.²⁵³ What this means is that algorithms are being abstracted to reflect the hierarchical levels of abstractions of a computer program.²⁵⁴ This is important to a new materialist as material should be understood within the material process. Angius and Primiero do not view a computer program using abstract terms such as hardware or software but at different levels of abstraction. Such dichotomies and division within material do not have the support of a new materialist researcher. Neither do these two authors understand a computer program as a set of instructions as this is meaningless considering O'Malley J's salient point. Therefore, from a new materialist perspective, understanding the SSO of a computer program in the context of the layers of

²⁵³ Angius and Primiero make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 292.

²⁵⁴ Angius and Primiero make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 305.

abstraction makes it clear that the abstraction is not solely based on the material being procedural.

The unreliability of static definitions has come to the forefront in this research on the SSO of a computer program. O'Malley J's criticism of Alsup J's reasoning demonstrates how an interpretation can either become out of date or too far removed from the original material process. The latter referring to the difference between a traditional literary work and a computer program yet both being treated in a very similar, rigid, way for copyright law. Continuing with this line of thought, the meaning of functional material in a computer program for copyright purposes cannot also be reliably understood if the judicial reasoning on the SSO is considered from this thesis. An impasse has been reached where judges find themselves being unable to reliably distinguish between original and functional material-expression in a computer program. This is almost certain to be contributing to the lack of protection for the SSO. Therefore, the legal material analysis illustrating how algorithms can be visible as an expression of an idea is a way out of the impasse for the SSO in a computer program.

If the judiciary can distinguish between functional and original material-expression in a computer program, in the way described in this chapter, the law will become more ontologically stable. For example, it would mean Mr Justice Ferris and Mr Justice Arnold's comments on offering copyright protection to the SSO may be achievable rather than generally being a paper right.²⁵⁵ The analysis should provide a direction on how to distinguish between interfaces and the SSO of an interface,²⁵⁶ as the SSO can be abstracted by way of algorithms as specifications or procedures.

²⁵⁵ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [232].

²⁵⁶ This should be useful for cases similar to *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1,104 [332] and *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [125], [130].

A warning must be provided. This thesis is not suggesting that the SSO of a computer program will always be given protection, this will depend on two aspects. Firstly, whether the threshold of computational paths have been exceeded. Secondly, whether the abstraction can be perceived legally for copyright purposes. The implication is to ensure that an acceptable number of computational paths are available for interoperable purposes. Further, any abstraction perceived to be for copyright purposes must adhere to the permissible boundaries of the directive. A significant question for this thesis is the relevance of this legal material analysis for s9(3) of the CDPA.

5.3 Creators of algorithms as authors of computer-generated works under s9(3) CDPA

For authorship of a CGW to be assigned under s9(3) of the CDPA, judicial understanding of the rules and logic of a computer program are important.²⁵⁷ As a recap, Mr Justice Kitchen in *Nova* had to decide whether the designer of the composite frames, which were computer-generated, could be said to be the author of the CGW under the said provision. In deciding to award authorship to the designer, Mr Justice Kitchen considered the contribution to the computer program as being important in deciding on the authorship of a CGW under s9(3).²⁵⁸

In assigning authorship under s9(3), Mr Justice Kitchen referred to the designer's contribution to the appearance of the game and devising the rules and logic for each frame that was generated.²⁵⁹ These materials can be associated to the functions in a computer program. However, attributing authorship to the designer in *Nova* was a little easier as the designer had

²⁵⁷*Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

²⁵⁸*Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

²⁵⁹*Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

also written the computer program.²⁶⁰ Consequently, it is not clear if authorship of a CGW can be assigned if the arrangements were solely connected to devising the functions of the program, including algorithms.

Attempting to address these questions is important in determining authorship of a CGW. This is illuminated in the reasoning by Aplin and Pasqualetto when discussing how copyright could deal with authorship of AI generative works.²⁶¹ Moreover, Guadamuz's attempts in providing clarity on the issue do not go far enough in dealing with the creator of the algorithm for the purposes of s9(3).²⁶² Further, the specific question over whether the creator of an algorithm can be assigned authorship emerges in the reasoning by Ward and Fjeld et al in the context of generative AI works.²⁶³

In order to address the above question, a legal material analysis of Directive 2009/24, makes it possible that an algorithm visible as prescriptions of the executions of a program on an abstract machine for the process corresponding with the input and output can be legally held to be an expression of an idea. Although the latter will hinge on whether a certain threshold of computational paths are exceeded when copying the SSO into another computer program. If this is the case, creators of an algorithm can demonstrate more reliably their involvement in the creation of a CGW. Reliably, insofar, as if the algorithm is deemed to be an expression of an

²⁶⁰ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

²⁶¹ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16 <<https://ssrn.com/abstract=3419481>>accessed 29 March 2024.

²⁶² Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 176.

²⁶³ Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) <<https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>>accessed 4 Aug 2021; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 *Science* 1110, 1111.

idea, the contribution can be pinned down in the form and style of the computational paths created rather than existing knowledge that it is an idea. Arguably, there is some distance between contributing to an idea that is difficult to discern, to being able to illuminate the design of the computational paths for authorship under s9(3). Overall, using the research in this thesis, not only contributes to the discussion on CGWs, but it is hoped that it contributes as a way out of the impasse on the copyright of the SSO that the judiciary are faced with.

5.4 Conclusion

New materialism is an ontological theory that sheds light on the ontological nature of a copyright work by allowing one to (re) explore the legal materials and legal processes. This is done in the context of the SSO in a computer program for the purposes of this thesis in determining whether a creator of an algorithm can be assigned authorship under s9(3). Understanding the legal discourse, as material, allows a (re) examination of the existing boundaries of terms such as the SSO in a computer program. At the time of writing, the SSO in a computer program appears to be understood in a narrow and limited way. The research suggests the formalist conceptual model, undergirding judicial interpretations, *produces* rather than *describes* the SSO, and as result, contributes to the difficulty the judiciary face when conceptualising the SSO. Interpretations are static, rigid, and not aligned with the material process of a computer program. The latter is given the same literal meaning as a traditional literary work. Copyright matter emerges from this rigid interpretative process on shaky ontological legal grounds. Questions emerge over the reliability of the meaning given by the judiciary to the SSO in a computer program.

The chapter analyses *Oracle v Google* which is a case that graced the US courts for a decade on the copyright of the SSO for comparative insights. Mr Justice Ferris in *John*

Richardson expressed concern that the judiciary were unclear as to how to abstract the SSO of a computer program for copyright purposes so looked to the US *Altai* test for answers. Although Mr Justice Ferris employs the *Altai* test, the research indicates that the *Altai* test fails to make visible the sequence and organisation within a computer program. *Google v Oracle* is of significant interest to this thesis because of the material facts of the case. Moreover, the case may have legal implications for English law as the judgments employs the *Altai* test,²⁶⁴ but also the US style merger test, which was adopted by Lord Justice Lewison in the CA in *SAS Institute*.²⁶⁵ *Google v Oracle* provides an opportunity to (re) examine an interface and material underpinning the interface for copyright purposes. This is useful for the English judiciary as it may help them deal with difficult cases such as *Navitaire*, *Nova*, and *SAS Institute* which all involve material associated to interfaces.

In this regard, *Google v Oracle* is used as a close analogy to offer some observations to the English judiciary about the legal ontology of the SSO. O'Malley J levelled criticism at the district court for using traditional case law on a literary work to understand the SSO for copyright which resulted in the SSO being reduced to a system or method of operation. Following the district court's reasoning a computer program can be made visible as a system or method of operation, putting the law on a collision course with the US Copyright Act 1976. However, a similar interpretation to the US district court by the English judiciary is more than possible if the issue around the copyright of the SSO arose in the future. Although different legal systems, the way the materials interact to produce copyright matter appears to be similar. A copyright work needs to take the form of an original literary work under copyright laws from

²⁶⁴ This was controversially implanted into English law by Mr Justice Ferris in *John Richardson Computers Ltd v Flanders* (No 2) [1993] FSR 497, 526-527.

²⁶⁵ *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31] (Lewison LJ). See *Oracle America Inc v Google LLC* 872 F sup 2d 974, 997, 1001 (ND Cal 2012); *Oracle America Inc v Google LLC* 750 F 3d 1339, 1360-61, 1370 (Fed Cir 2014).

both countries. Further, the utilitarian and functional nature of the inorganic material, i.e., the SSO of a computer program, also remains the same for both countries. The material legal analysis reveals that the SSO was visible as functional material abstracted at a level that corresponds with an algorithm as a specification or procedure. It may also be suggested that the SSO is being abstracted in a similar way by the English judiciary. This is especially the case as the material roots of Directive 2009 correspond with algorithms as specifications and procedures. This goes some way to help understand why the original expression of functional material was hidden to the district court, but also may provide a reason for the SSO remaining hidden to the English judiciary.

Interestingly, and of noteworthy importance, is the decision by the CA in *Oracle v Google*. It is interesting as the court found that the method-class-package organisation of Oracle's API to be an original expression of an idea. The divergent views of both the district court and the CA demonstrate the difficulties in demarcating the boundaries between an idea and expression of an idea for the SSO. The difficulties with treating inorganic materials such as the SSO as either an idea or an expression of an idea has proved problematic for the English judiciary. It has been so problematic that variations from the US on the idea and the expression of the idea, namely the *Altai* test and a US style merger test, have been implanted into English law. However, what is striking is that the CA abstracted the SSO in a way that reveals the original expression of functional material. This means that the SSO was abstracted in an alternative way to algorithms as specifications or procedures.

Abstracting the SSO beyond algorithms as specifications or procedures is noteworthy, as it suggests that algorithms have a layered ontology.²⁶⁶ Advocate General Bot's response to

²⁶⁶ Angius and Primiero argue that algorithms can be visible as layered artefacts. Angius and Primiero make this suggestion. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 290.

Mr Justice Arnold in *SAS Institute* suggests that algorithms have a layered ontology beyond specifications or procedures. Bot's *obiter* remark suggests that the way algorithms are expressed can attract copyright. Although Bot mentions about the style in which the algorithm is transposed into the code can attract copyright, this does very little to give meaning to the SSO from the code itself. Mr Justice Arnold concurs with Bot's reasoning and did not give copyright protection to the SSO in SAS's analytical software. Almost virtually no English cases have given copyright protection to the SSO. Similarly, the decision by the CA in *Oracle v Google* is not helpful to the judiciary on *how* the SSO is being abstracted for copyright protection. What can be deduced from both Bot and the CA in *Oracle v Google* is that algorithms can be visible beyond specifications and procedures. Angius and Primiero suggest that the way the CA abstracted the SSO corresponds with algorithms as an abstract machine. Algorithms as an abstract machine are described as prescriptions of the executions of a program on an abstract machine for the process corresponding with the input and the output. The abstraction allows the computational paths of the computer program to become visible. Copyright hinges on exceeding a threshold of paths that have been agreed, for example, by a computer expert, for interoperable purposes. The research suggests algorithms can be understood beyond an algorithm at a specification or procedural level.

Applying Angius and Primiero's reasoning to English copyright law on the SSO could shed light on how the original expression of functional material in the SSO can be abstracted. Computational paths that exceed the threshold for interoperable purposes should demonstrate the requisite threshold on originality as the design in the paths will not be common or general but more specifically designed for that program. This allows the originality, or the author's intellectual creation to be visible, offering a stronger case for interpreting algorithms as an expression of an idea rather than as an idea.

The material legal analysis involves a purposive construction of Directive 2009/24 which examines how the legal materials, more specifically, the *travaux préparatoires* for the directive, and the inorganic materials, such as the SSO, interact in the materiality of a copyright work. The material legal analysis demonstrates that the ontology of a copyright work is not the deterministic literary object that is visible in the categorisation system within the CDPA. The analysis exposes a literary work as a material discursive ongoing reconfiguring.²⁶⁷ However, formalism acts more as a distraction from this observation as the judicial eye is focused on whether the SSO fits neatly into a form.²⁶⁸ By focusing too much on the form of a copyright work, the level of abstraction by which the SSO is being conducted is obscured.

If the SSO can be abstracted in a way which corresponds with an algorithm as an abstract machine, it is contended that this may provide greater clarity on whether a creator of an algorithm can have authorship of a CGW under s9(3). This is especially the case, when it is not clear whether an originality component is required for s9(3) to be satisfied. Furthermore, it is hoped the research provides a more meaningful understanding of algorithms rather than the existing knowledge which stems from some of the *travaux préparatoires* dating back to 1989. The research in this thesis may go some way to helping to better understand the arrangements involved in creating algorithmic materials. By doing so, the thesis offers an opportunity to contribute to the scholarly literature on authorship of CGWs.

²⁶⁷ This statement has been inspired by Karen Barad's work. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

²⁶⁸ A computer program needs to fit the form of a literary work.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

The aim of this thesis is to explore the theoretical underpinnings of s9(3) of the CDPA 1988 to illuminate any potential issues for the judiciary when interpreting the provision for copyright purposes. One of the main themes discussed within the introduction of this thesis is whether authorship of a CGW under s9(3) can be reliably understood when judicial interpretations are undergirded by property laws. Many academics have criticised intellectual property (IP), which includes copyright, for its perceived dualist nature of tangible and intangible property.¹ IP's dualism is produced by a property paradigm, arguably resulting in IP being outdated and strained for the digital era.² For example, my research reveals how judicial interpretations are limited and incomplete on computer programs for copyright.³ The property paradigm manifests in the judiciary adopting a formalist conceptual model to interpret inorganic matter, such as the SSO of a computer program. Formalism makes visible the sensory and physical properties of the inorganic material.⁴ The formalist conceptual model reduces the SSO to either a static thing or an object for copyright matter.⁵ This reveals that not all properties of a work are considered, casting doubt on the reliability of the formalist model to understand copyright matter.

¹ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 233; Lucy Finchett-Maddock, 'Forming the Legal Avant Garde: A Theory of Art/Law' (2019) Law, Culture and The Humanities 1, 19; Dan Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antionette M Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44; Cristina S Martinez, 'Art and Law in the Age of Digital Production' (1998) 22 History of Photography 14-15.

² Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 233; Lucy Finchett-Maddock, 'Forming the Legal Avant Garde: A Theory of Art/Law' (2019) Law, Culture and The Humanities 1, 19; Dan Burk, Copyright and the New Materialism in Jessica C Lai and Antionette M Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44; Cristina S Martinez, 'Art and Law in the Age of Digital Production' (1998) 22 History of Photography 14, 15.

³ Cross refer to chapter 2, s2.3.2, 77.

⁴ Cross reference to chapter 2, 'n 131'.

⁵ Cross refer to chapter 2, 77.

The lack of a meaningful understanding of the sequence and organisation of a computer program is due to the formalist model focusing the judicial eye on the form that the SSO takes, i.e. a literary work, rather than the material *within* the program. Similarly, the lack of focus on the materiality of the law is made visible as judges are distracted by vacuous legal exercises produced by understanding material, including the legal discourse, as a static thing or object. Exercises involve whether the SSO of a computer program falls on the correct side of an allusive boundary between an idea and an expression of an idea. An exercise that is arguably meaningless in nature if the formalist model continues to be used.⁶ This argument is advanced as in virtually all cases the original expression in the functional material of the SSO remains hidden to the judiciary.⁷ As formalism treats a copyright work as a static thing or object, it is almost certain that it will continue to replicate this cycle in legal reasoning whereby the SSO remains visible as an idea due to the SSO's apparent functional ontology. Having the SSO of a computer program only partially visible is likely to have implications on understanding the contributions that designers make in creating the SSO for authorship of a CGW.

Doubt over the reliability of the formalist model has specific relevance for s9(3). As formalism is not equipping the judiciary to fully understand the SSO of a computer program, this affects the meaning of the functions within a computer program, including algorithmic materials. Understanding the latter is the focus of this thesis in order to address whether the creator of an algorithm can be assigned authorship of a CGW. Moreover, one of the only cases, dealing with authorship of a CGW, focuses on the functions of a computer program. Part of the (then) Mr Justice Kitchen's reasoning in *Nova* for assigning authorship to the designer of the CGW was based on the designer devising the appearance of the games and the rules and

⁶ Cross refer to chapter 3, s3.3, 132.

⁷ Cross refer to chapter 2, s2.3.2, 77.

logic of each computer-generated frame.⁸ Understanding the limitations of the formalist model helps to inform the research that an alternative conceptual model may be required to meaningfully understand whether the creator of an algorithm can be attributed authorship under s9(3).

This thesis calls for new materialism to be used by the judiciary, which is a conceptual theory. New materialism provides an opportunity to (re) examine existing knowledge on the copyright of the SSO of a computer program. Rather than focusing on the static literary object which formalism invites the judiciary to do, I argue that this focus needs to be shifted to the materiality of copyright law. More specifically, new materialism reveals the suitability of a purposive construction of legal instruments. Directive 2009/24 which deals with the copyright on the protection of computer programs is a central feature of the thesis. A legal material analysis of Directive 2009/24 unlocks material related to the sequence and organisation of a computer program for copyright purposes. Revealing more material associated to the SSO of a computer program for copyright strongly suggests that the current conceptual model is not equipped to reliably deal with the material of a computer program.

Understanding a computer program for copyright purposes goes some way to addressing the main research question on whether a creator of an algorithm can be assigned authorship of a CGW. The material legal analysis reveals that algorithms can be expressions of an idea. However, this depends on how an algorithm is understood and abstracted for copyright purposes. If this is accepted, a stronger case can be advanced that a creator of an algorithm can be an author of a CGW under s9(3). This is especially the case if an originality component is required for s9(3). To briefly recap, there were divergent views in the scholarly

⁸ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC 24 (Ch), [2006] EMLR 14 [105].

literature on the originality issue, coupled with *Nova* being over seventeen years of age and only a decision from the Court of First Instance,⁹ leaving a lot of uncertainty around originality. The lack of uncertainty is exacerbated by the lack of case law and a statutory provision, namely, s9(3), that is silent on the issue. It is hoped the understanding of algorithms, in the way abstracted in this thesis, provides more clarity to designers of algorithms who are faced with the lack of uncertainty around the originality component of s9(3). Furthermore, the material legal analysis hopefully extends the discourse around the functions of a computer program for the purposes of authorship of CGWs, most notably from Guadamuz, Ward, Fjeld et al, Aplin, Pasqualetto and Ghosh.¹⁰

6.1 Computer-generated works are reduced to static objects

The judiciary are hindered by legal positivism, couched in formalism, which underpins judicial interpretations of a computer program.¹¹ Formalism only makes visible the sensory and physical properties of a program for copyright consideration.¹² Adopting a formalist model poses challenges for the authorship of a CGW when the arrangements necessary in creating a

⁹ This applies to the decision on CGWs in *Nova*.

¹⁰ Aplin and Pasqualetto argue that the limited way copyright deals with the functions of a computer program is contributing to the difficulties in determining authorship of an AI generative work. The latter being used to denote some human input in creating the work. See Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16. Moreover, Ghosh purports that focusing on the copyright of computer software may be a useful direction in seeking answers on the authorship of AI generative works. See Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225. Further, the research in this thesis may build on some of the reasoning by Guadamuz on a computer program for the purposes of s9(3) Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 176. Lastly, and by no means less important, the research may go some way to address the specific question on whether the creator of an algorithm can be assigned authorship of a generative AI work, according to Ward, Fjeld et al. See Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) <<https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>>accessed 21 March 2024; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 *Science* 1110, 1111.

¹¹ Cross refer to chapter 2, s2.3.2, 77.

¹² Cross refer to chapter 2, s2.3.2, 77.

CGW involves understanding the inorganic materials of a computer program. The focus is on the algorithmic materials in a computer program. More specifically, one of the research questions invites the thesis to discuss whether a creator of an algorithm can be assigned authorship of a CGW under s9(3) of the CDPA. The challenge that formalism poses for the material discourse on CGWs is that it treats the SSO as a static literary object. Treating the SSO in this way may have a material effect on how a CGW is made visible for authorship under s9(3).

Treating the SSO of a computer program as static objects leads to linguistic exercises where the SSO is made visible in a very limited way. For example, whether the SSO can be protected *within* the computer program as a literary work or whether the SSO needs to be visible *separately* from the computer program as preparatory design documents. Lord Justice Jacob in *Nova* provides an *obiter* statement in connection with the interpretation of Directive 91/250 (as amended by Directive 2009)¹³ on the legal protection of computer programs in a way that appears to give a literary work a plain, ordinary meaning.¹⁴ The CDPA states that a literary work is any work that is written, spoken or sung.¹⁵ The design materials *within* a computer pool game could only attract copyright if the design was transferred onto preparatory design documents.¹⁶ (Mr Justice Arnold states that the SSO is the design of the program.)¹⁷ This is despite Lord Justice Jacob suggesting that the directive may have only contemplated one copyright for both the preparatory design documents and the computer program.¹⁸

¹³ Council Directive 2009/24/EC of 23 April 2009 on the Legal protection of Computer Programs [2009] OJ L111/16 which replaced Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs [1991] OJ L122/42. The Directive was transposed into the CDPA by virtue of SI 1992/3233, reg 3.

¹⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2007] EWCA Civ 219, [2007] Bus Law Riew 1032 [51].

¹⁵ CDPA, s3(1).

¹⁶ *Nova Productions Ltd v Mazooma Games Ltd and Others Nova Productions Ltd Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032 [51].

¹⁷ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 82 [232].

¹⁸ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] Bus LR 1032, 1041.

Angius and Primiero, philosophers of computer science, argue that the design *within* a computer program is also part of the expression of a computer program.¹⁹ Art 1(1) of the EU Directive 1991 (amended in 2009) reads ‘the term computer program shall *include* their preparatory design material’ suggesting a more expansive interpretation can be given. Further, the travaux préparatoires, in the form of the original Commission proposal for the directive states that the preparatory design documents, which have made the creation of the program possible can be called computer software.²⁰ The proposal for the directive appears to be suggesting that the SSO is the computer program, and a literal reading of the directive does not conflict with this reading. A more expansive interpretation of the SSO appears to be possible. Since the design *in* the computer program is not perceivable though the use of the formalist model, the design is likely to be excluded for copyright and categorised as an idea that underlies the computer program.²¹ This is corroborated by the research in this thesis.²²

The linguistic exercises are arguably more visible in Mr Justice Arnold’s questions on how to apply the SSO to Directive 1991 for copyright purposes. Mr Justice Arnold referred no fewer than nine questions to the CJEU in *SAS Institute*.²³ Questions were around *how* the court is to determine whether the SAS components of the SAS analytical computer program are a literary work. Mr Justice Arnold asked whether the answer would depend on the nature, extent of functionality and the level of detail of functionality of the SSO.²⁴ These questions highlight the difficulty that the judiciary have with demarcating the functional material from the original material in a computer program. Although Advocate-General Bot purports that the above

¹⁹ Nicola Angius, Giuseppe Primiero ‘Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions’ (2020) 33 *Philosophy & Technology* 283, 304.

²⁰ Original Commission “Proposal for a Council Directive on the legal protection of computer programs” COM (88) 816 final -SYN 183 (OJ C 91) [1.1]. These documents were also referred to in *Nova*.

²¹ Unless design documents have been supplied separately. See CDPA, s3(1)(c).

²² Cross refer to chapter 2, s2.3.2, 77.

²³ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1, 14 [332].

²⁴ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [35].

questions have no bearing on finding an original expression in functionality material,²⁵ it remains difficult for the judiciary to *find* an original expression.²⁶ It should also be noted that Mr Justice Arnold's long list of questions were reformulated into themes, which led to Bot omitting to answer a key question posed by Mr Justice Arnold. The original question was whether an interface could be protected if one did not decompile the object code.²⁷ The reformulated question was whether art 1(2) is to be interpreted as meaning the functionalities of a computer program are an expression of an idea.²⁸ The reformulated question either appears to *assume* the interface is functional or Bot has not answered the question. Mr Justice Arnold did not correct the omission.²⁹ The reasoning of Mr Justice Arnold and Bot did not provide clarity on the SSO of a computer program. The numbers of questions led to questions being reformulated and a key answer omitted. Having a narrow or incomplete understanding of the SSO is very likely to have implications on understanding algorithms for the purposes of determining authorship of s9(3).

6.1.1 Implications for authorship of computer-generated works

Treating the SSO of a computer program as a static literary object or thing is almost certain to affect the visibility of the contributions made in designing algorithmic material for the purposes of authorship under s9(3) of the CDPA.. The research reveals that the SSO of a computer program is reduced to a static literary object or thing. As the SSO is not fully understood, neither will the functions of a computer program, including algorithms. The nexus between

²⁵ *Case C-406/10 SAS Institute Inc v World Programming Ltd* [2012] RPC 31 [63].

²⁶ There are virtually no cases where the SSO has attracted copyright.

²⁷ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 104 [332]; Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 *International Review of Intellectual Property and Competition law* 428, 443.

²⁸ *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch), [2013] RPC 17 [46].

²⁹ *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch), [2013] RPC 17 [42].

the SSO of a computer program and algorithms is cemented further when Angius and Primiero argue that the SSO can be abstracted as algorithmic material.³⁰ Having a limited understanding of the functions of a computer program contributes to the lack of certainty over authorship of a CGW.³¹ Reducing the visibility of algorithms hides some of the material contributions by creators, which can only affect the evidence of their involvement for authorship under s9(3). A question remains over whether the creator of an algorithm can be assigned authorship. It is argued that a new materialist would allow algorithms to emerge from the materials and material context of a computer program.

A material legal analysis of algorithms involves a purposive construction of the Directive 2009. Examining the legal materials of the directive, namely the travaux préparatoires, reveals there is scope in the directive to recognise algorithms as layered phenomena. This argument is advanced based on comments made in one of the legal materials of the directive. More specifically, the external legal source by the Economic and Social Committee at the time of creating the directive. The Economic and Social Committee, who consulted on the directive, were explicit that algorithms were not clear terms and were frequently interchangeably referred to as logic.³² The Committee also mentioned that the meaning of an algorithm can fluctuate depending on the state of technology.³³ Consequently, the Committee recommended removing any referral to algorithms in the directive.³⁴ Despite

³⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283, 304.

³¹ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16.

³² Economic and Social Committee, 'Opinion on the proposal for a Council Directive on the legal protection of computer programs' [1989] OJ No C 91, 12 4 (3.3.2.2).

³³ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] OJ No C 91, 12 4 (3.3.2.2).

³⁴ Economic and Social Committee, 'Opinion on the proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] OJ No C 91, 12 4 (3.3.2.2).

the warning over the fluidity on the ontology of algorithms by the Committee, algorithms remain in the final directive categorised as an idea, albeit in the recitals.³⁵

Tracing the meaning of algorithms in the recitals from the material process of the directive exposes how algorithms are understood as ideas for copyright purposes. The thesis examines the external legal material to the original Directive 1991: the Commission of the European Communities, who produced the final proposal for the directive. The Commission purports that algorithms are described as a set of steps needed to align with defined tasks to solve a problem.³⁶ The Commission draw on the following analogy: ‘They are equivalent of the words by which the poet or the novelist creates his work of literature, or brush strokes of the artist or the musical scales of the composer’.³⁷ The Commission use the analogy in an attempt to explain what an algorithm involves without resorting to a technical description. The legal material analysis exposes that algorithms were understood by the Commission as an abstraction at specification or procedural level. The understanding led to algorithms being categorised as ideas.³⁸ Nonetheless, the warning from the Economic and Social Committee appears to be why algorithms were moved to the recitals. Although the definition was omitted, algorithms are still categorised as ideas.

Despite the warning given by the Economic and Social Committee, it appears that algorithms are understood as static pre-determined objects. An *obiter* statement by Mr Justice Arnold in *SAS Institute* provides evidence for this argument. The meaning given to algorithms by Mr Justice Arnold can be traced back to the analogy provided by the Commission in 1989,

³⁵ Council Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs [2009] OJ L111/16, recital 11.

³⁶ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (88) 816 final 6 [2.3], [2.4].

³⁷ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (88) 816 final 6 [2.3], [2.4].

³⁸ Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (88) 816 final 6 [2.3], [2.4].

which represents algorithms as specifications or procedures. Mr Justice Arnold quotes from the proposal by the Commission when he refers to the analogy.³⁹ The use of the analogy in 2010 demonstrates how algorithms are treated as static units of knowledge. As technology has advanced since 1989, doubt may be raised over the reliability of the understanding of algorithms by Mr Justice Arnold when one considers the warning by the Economic and Social Committee. The doubt increases further when one takes account of the reasoning from Angius and Primiero.⁴⁰

An analysis of *Google v Oracle* illustrates the case can be used as a close analogy to further understand how algorithms are abstracted by the English judiciary. Although *Google v Oracle* is a case dealt with by the US courts, the judgments refer to the *Altai* test and the merger test,⁴¹ both of which have been transplanted into English law.⁴² Akin to English copyright, the US treats the SSO of a computer program as a literary work.⁴³ Even Mr Justice Ferris acknowledged there was nothing in English law which conflicts with the *Altai* test.⁴⁴ The *Altai* test is a variation on the English idea/expression dichotomy.⁴⁵ The research reveals that the method-class-package organisation (the SSO of Oracle's API) was abstracted by the district court to correspond with algorithms as specifications or informal descriptions of procedures.⁴⁶ The way the algorithm was abstracted obscured the original expression in the

³⁹ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [229].

⁴⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Question' (2020) *Philosophy & Technology* 283.

⁴¹ *Computer Associates v Altai* 982 F 2d 693, 709 (CA 2d Cir 1992) was referred to in *Oracle America Inc v Google LLC* 872 F supp 2d 974, 988, 989 (ND Cal 2012) and in *Oracle America Inc v Google LLC* 750 F 3d 1339, 1366-67 (Fed Cir 2014).

⁴² *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497; Ken Moon mentions how the merger style US test was used by Lord Justice Lewison in *SAS Institute*. See Ken Moon 'Another nail in the coffin for non-literal software copyright infringement?' (2015) 10 *Journal of Intellectual Property Law & Practice* 927; *SAS Institute Inc v World Programming Ltd* [2013] EWCA Civ 1482, [2014] RPC 8 [31].

⁴³ CDPA, s3(1) (b), (c) and US Code § 102 (a).

⁴⁴ This argument was also raised by Mr Justice Ferris in *John Richardson v Flanders* [1993] 3 WLUK 398 [1994] FSR 497, 527.

⁴⁵ Cross refer to chapter 2, 2.3.2, 77.

⁴⁶ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 304. An examination of the legal reasoning by the district judge also corroborates this finding. Cross refer s5.1.2, 201.

procedures which were developed by Oracle/Sun.⁴⁷ Drawing on the district court judgment may reveal some useful insights on the SSO for the English judiciary.

Similarities with Angius and Primiero's reasoning in how the district court in *Oracle v Google* abstracted the SSO and how the formalist model produces copyright matter is visible. The research reveals that the SSO of a computer program is only visible to the English judicial eye as an idea unless it is on preparatory design documents. Put differently, formalism only exposes the functional ontology of the SSO of a computer program due to its sensory and physical properties.⁴⁸ The CA observed the SSO in a computer program was only visible to the district court in *Oracle v Google* as functional material,⁴⁹ which Angius and Primiero claim was abstracted by way of algorithms as specifications or procedures. Similarly, as the SSO does not generally attract protection under English law due to the SSO only visible by the material's functional ontology, it is conceivable the SSO is also being abstracted by way of algorithms as specifications or procedures.

The lack of certainty from the doctrinal legal research on *how* the SSO is abstracted is likely to be of no surprise as formalism acts more as a distraction for the judiciary. The interpretative tool, or the legal material of formalism,⁵⁰ forces the judiciary to engage in semantic exercises. Judicial focus is on whether the SSO fits neatly into an original literary object according to the categorisation system of the CDPA,⁵¹ akin to statutory law also in the US.⁵²

⁴⁷ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 304.

⁴⁸ There have generally been no cases where the SSO has taken the form of a literary work.

⁴⁹ *Oracle America Inc v Google LLC* 750 F 3d 1339, 1367 (Fed Cir 2014).

⁵⁰ Kang and Kendall refer to both texts of rulings and interpretative techniques as law's matters. Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 7.

⁵¹ CDPA, s3-8 identify how a work needs to fit into one of eight forms. However, the SSO and a computer program needs to fit the mould of an original literary work. See s3 (1) (b), (c).

⁵² 17 USC §102 (a).

The argument above offers a more nuanced understanding to that of Mr Justice Ferris who asserts that the judiciary are uncertain as to *how* to abstract the SSO of a computer program for copyright purposes.⁵³ When (re) examining the doctrinal legal research through a new materialist lens, the literary object starts to dissolve which appears to support Mr Justice Ferris's assertions. For example, this is illustrated by Mr Justice Pumfrey's *dicta* in *Navitaire*.⁵⁴ Mr Justice Pumfrey had to consider whether the business logic of *Navitaire's* computer program under Directive 1991 could be categorised as an original literary work.⁵⁵ Business logic could not be shoehorned into the form of a literary work metamorphosing into a dynamic user interface instead.⁵⁶ The change was made very late in the court hearing by *Navitaire's* team and to the frustration of Mr Justice Pumfrey.⁵⁷ Mr Justice Pumfrey decided to focus his reasoning on the policy of the directive for his decision in rejecting business logic as an expression of an idea. Although Mr Justice Pumfrey did not reveal any detail about the policy of the directive, the reasoning is clear that business logic was an idea which the policy of the directive did not stretch to covering.⁵⁸ It may be unjustifiable to extend copyright to business logic, however, questions regarding the reliability of the decision are raised. Doubt emerges about the reliability of conceptualising business logic as an idea when there was so much uncertainty from *Navitaire's* team about business logic as a concept. However, policy reasons can also hide how the SSO is being *indirectly* abstracted.

The argument that the SSO is being *indirectly* abstracted to correspond with algorithms as specifications or procedures gathers strength when one examines the *travaux préparatoires*

⁵³ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527.

⁵⁴ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [130].

⁵⁵ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725, [2006] RPC 3 [125].

⁵⁶ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [131].

⁵⁷ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [131].

⁵⁸ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [130].

of the directive. The opinion of the Economic and Social Committee at the time of creating the directive explains how algorithms were not clear terms and were frequently interchangeably referred to as logic.⁵⁹ Part of the judgment in *Navitaire* was focused on understanding business logic for copyright purposes. The business logic was described by Dr Hunt as the relationship between the commands and the screens.⁶⁰ As logic can be used interchangeably with algorithms, there is nothing in *Navitaire* to conflict with the argument that the material was abstracted as algorithms-specifications or procedures. Further, the proposal for the directive produced by the Commission, understands algorithms as ideas in a way that corresponds with Angius and Primiero's understanding of algorithms as specifications or procedures. And although this definition was omitted in the final directive, algorithms remain as ideas in the recital. The research reveals Mr Justice Arnold even referred to the Commission's proposals when explaining the meaning of algorithms in *SAS Institute*. There is nothing in the doctrinal legal research that conflicts with the understanding the SSO of a computer program is abstracted as specification or procedures.

If the above argument is accepted, there are likely to be implications for authorship of CGWs under s9(3). The research indicates that algorithms are abstracted as an idea, as algorithms appear to be reduced to a functional ontology making the abstraction correspond with algorithms as specifications or procedures. What this means for creators of algorithms of a CGW is that their contribution is brought to the forefront for computer experts to give an opinion on in the context of s9(3). Put another way, it brings more meaning to how an algorithm is classified as an idea. Whether the contribution can satisfy what is deemed to be the arrangements necessary in the creation of a CGW will depend on the other designers in the

⁵⁹ Economic and Social Committee, 'Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs' [1989] OJ No C 91, 12 4 (3.3.2.2).

⁶⁰ *Navitaire Inc v Easyjet Airline Co, Bulletproof Technologies Inc* [2004] EWHC 1725 (Ch), [2006] RPC 3 [109].

material process. Moreover, it will depend on whether an originality component is required for s9(3). Nevertheless, if algorithms could be classified as an expression of an idea, arguably, the creator should be in a stronger position to advance an argument around authorship under s9(3).

6.2 Computer-generated works visible as material-discursive reconfigurings⁶¹

Through a new materialist lens CGWs are visible as a process,⁶² or as an assemblage of materials.⁶³ New materialism confronts the formalist conception of a copyright work due to its dualist nature of tangible and (in)tangible property by re-emphasising the centrality of matter.⁶⁴ Avoiding drawing boundaries around copyright matter, recognises that a CGW is porous in nature and can transform in meaning depending on relations and intra-actions with other materials. Meaning can be sought through discursive material practices rather than fixed properties and distinctions made between internal and external materials.⁶⁵ Inorganic material such as the SSO of a computer program should not be interpreted as a literary work based on limited properties of the formalist model. What this means is that there is material within the SSO that is deemed external for copyright purposes but can be made visible when other interpretative materials (techniques) such as the purposive approach is used. Uncovering more material in the SSO of a computer program will bring more meaning to the contributions of a creator of an algorithm for the purposes of s9(3) of the CDPA.

⁶¹ I borrow the term material-discursive reconfiguring from Barad. Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813, 822.

⁶² Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813, 822.

⁶³ Giles Deleuze, Felix Guattari '*A thousand plateaus*' (University of Minnesota Press London 1987) 21.

⁶⁴ Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44, 62 62.

⁶⁵ Karen Barad in 'Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819-824.

The purposive approach allows the judge to discover Parliament's subjective purpose (intent/will) for the CDPA and Directive 2009 by exploring not only the texts, but the legal materials associated to the law coming into being.⁶⁶ Adopting a purposive approach allows a CGW to emerge from its legal materials and legal context. The purposive approach strips a computer program as a literary work from being visible as an object or thing to vibrant matter. This is akin to how Guattari and Deleuze understand matter.⁶⁷ Concepts are de-stratified and broken down, dismantling cultural, political and historical materialisations.⁶⁸ It follows that knowledge on CGWs should not be treated as discrete pre-determined units. Following this line of argument, the travaux préparatoires in creating a computer program is used as a building block to provide more meaning for authorship on CGWs under s9(3).

6.2.1 Creators of algorithms as authors of computer-generated works

A purposive construction of the legal materials on CGWs reveals the layered ontology of algorithms, arguably, making the *arrangements necessary* by the creator visible in a meaningful way for authorship under s9(3).

Using a purposive approach allows one to draw on new knowledge when interpreting algorithms in Directive 2009. The research demonstrates how both Lord Bingham and Lord Steyn drew on new scientific knowledge to interpret an embryo under the HEA Act 1990.⁶⁹ I draw on Angius and Primiero's reasoning on algorithms from the philosophy of computer science.⁷⁰ Angius and Primiero suggest that algorithms can also be abstracted as an abstract

⁶⁶ Aharon Barak, *Purposive Interpretation in Law* (Sari Bashi tr, Princeton University Press, 2005) 135.

⁶⁷ Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987).

⁶⁸ Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987) 1-4, 21.

⁶⁹ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13, [2003] 2 1WLR 693; [2003] 2AC 687 [19], [27]. For a more in-depth discussion of how the purposive approach operates, cross refer to 'n 70' in chapter 4.

⁷⁰ Karen Barad draws on the work of physicist Bohr (1885-1962) who does not treat philosophy-physics separately. Akin to the authors' research, I do not treat material from the philosophy of computer science separate from computer science. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813.

machine.⁷¹ Abstracting algorithms at this level is akin to how a new materialist understands matter. Algorithms emerge from the different layers of abstraction of a computer program. The layers of abstraction and algorithmic material are not understood as discreet units of measurements. Instead, a computer program is visible through different levels of abstraction, whilst an algorithm emerges from the levels of abstraction above, and below, within this hierarchy.⁷² The abstraction process allows algorithms to be viewed as prescriptions of the executions of the computer program on an abstract machine which corresponds to both the input and output.⁷³ Algorithms are made visible through the material process of the program. By recognising that algorithms can be abstracted in more than one way departs from algorithms being viewed as static objects but also exposes the prescribed behaviours for copyright consideration.

Making algorithms visible in the way described above, allows for a deeper understanding of the sequence and organisation of a computer program. Rather than focusing on the observed behaviours of the SSO in a computer program, whereby the judicial eye is either on the code or the structure insofar as the preparatory design documents, judicial gaze is shifted to the prescribed behaviours. For example, a distinction can be made between exact, inexact, and approximate copies of a program depending on the number of computational paths copied.⁷⁴ Shifting the judicial gaze provides an opportunity to have a more meaningful understanding of the material associated to the sequence and organisation of a program. The legal material analysis of Directive 2009 exposes the space within the directive to

⁷¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 294.

⁷² Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 289.

⁷³ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 294.

⁷⁴ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 295-296.

accommodate algorithms other than specifications or procedures. Using the legal material analysis, an argument is advanced to suggest that abstracting algorithms as an abstract machine is within the permissible boundaries of the directive.⁷⁵ In other words, it is contended that the way the algorithm is abstracted is within Parliament's subjective intent or will for the directive,⁷⁶ although the abstraction must also be within the objective intent for the directive.

A purposive construction of the directive requires the objective purpose of the directive to be satisfied. It must be ensured that if copyright protection is given to algorithms, a strong monopoly will not be created over any utilitarian material.⁷⁷ Algorithms can be vital material to designers for interoperable purposes. For example, one could not have a monopoly over behaviours that can only be expressed in limited ways or over newly discovered solutions to computational problems.⁷⁸ In the light of the importance of having material available for interoperable purposes, a threshold of paths for these purposes should be agreed in the evidence provided by a computer expert to the court.⁷⁹ When the copying of the computational paths exceeds the agreed threshold of paths, then copyright arguably can subsist in the remaining pathways. The remaining pathways should be expressed in a way that exudes an original expression of an idea.⁸⁰

Algorithms understood as an original expression of an idea can qualify as a literary work for copyright purposes. This can be done by providing a textual description of the

⁷⁵ Lord Wilberforce discusses how one may be able to decide whether the interpretation is within the permissible boundaries of the instrument. *Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279; [1981] AC 800, 822 (Lord Wilberforce). Cross refer 'n 95' in chapter 4 for a full explanation of Lord Wilberforce's principles.

⁷⁶ For a purposive construction of the Directive, cross refer to 'n 174' in chapter 5.

⁷⁷ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] OJ L111/16, recital 15.

⁷⁸ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 303.

⁷⁹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 305.

⁸⁰ Cross refer to ('n 95') from chapter 1 for a discussion on originality.

prescriptions of the executions of the program as the algorithmic material may be visible as more than a specification or procedure.⁸¹ There is an additional argument that a textual description may not be warranted. This argument gathers strength when one considers the *obiter* remark by Lord Justice Jacob in *Nova* which moots the possibility of the design materials not needing to be separate from the computer program.⁸² Mr Justice Arnold confirms that the SSO is the design of the program.⁸³ Art 1(1) of Directive 2009 reads that a computer program includes their preparatory design material.⁸⁴ Further, the proposal for the directive states that the preparatory design materials can also be called computer software.⁸⁵ Logically, if the design material can be called computer software, and computer software can be deemed a literary work then there may be no need for the design to be accompanied by separate design documents. Nonetheless, if a designer wants to ensure the case is strong, it may be advisable to produce separate design documents, considering Lord Justice Jacob's comment is only of persuasive authority.

A stronger case for creators of algorithms to claim authorship of a CGW under s9(3) may arguably be advanced if algorithms are visible as an abstract machine. This argument is based on reasonable grounds as the ontological nature of the algorithms are illuminated. More specifically, as the numbers of computational paths are brought to the forefront for copyright consideration, the contributions by the creator should be more meaningfully understood.

⁸¹ Angius and Primerio also mention this point. Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 307.

⁸² *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWCA Civ 219, [2007] *Bus Law Review* 1041.

⁸³ *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] *RPC* 1, 82 [232].

⁸⁴ Council Directive 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs [2009] *OJ L111/16*, art1(1).

⁸⁵ Commission, 'Proposal for a Council Directive on the Legal Protection of Computer Programs' COM (88) 816 final 3 [1.1].

Further, as algorithms as abstract machines have been assessed legally by taking a purposive construction to Directive 2009, the contributions can also be understood in a legal sense.

However, for algorithms to be visible as part of the legal discourse on CGWs as abstract machines, interpretations must not conflict with existing precedents under English law. If the judiciary interpret the sequence and the organisation of a computer program in the way described above, judges can distinguish between existing precedents. If a similar case to *SAS Institute* graces the English courts, the precedent set that the SSO of a computer program was functional in nature can be distinguished on the material facts.⁸⁶ In other words, the way the SSO is abstracted will be different from *SAS Institute* as the SSO could be abstracted by way of algorithms as abstract machines.

Conversely, if litigation involves business logic in the future, there is scope for any new decisions to be distinguished from the material facts of *Navitaire*. Even if the logic was abstracted indirectly as an algorithm, it is more than likely that the algorithm would have been abstracted as specifications or procedures. This abstraction would not attract copyright protection under the directive.⁸⁷ It follows there is room to distinguish from *Navitaire* if algorithms as abstract machines are how the SSO of a computer program is abstracted.

Overall, CGWs are vibrant matter, where the legal materiality and the materials are made visible through adopting a purposive construction to a computer program.⁸⁸ Legal materiality emerges, fluctuates and dissipates depending on the (re)articulation of the legal

⁸⁶ Mr Justice Arnold implemented Bot's guidance from the CJEU and found that the SSO was of functional material. See *SAS Institute Inc v World Programming Ltd* [2013] EWHC 69, [2013] RPC 17 [42].

⁸⁷ Tracing the roots of why an algorithm is classed as an idea leads back to the Commission proposal that defines an algorithm as a specification/procedure.

⁸⁸ Legal materiality is the process of how the law is made rather than a physical object. See Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 4.

materials associated to CGWs.⁸⁹ The material-legal process of CGWs exposes the likelihood of how the SSO of a computer program is being abstracted. Further, the material-legal process reveals how algorithms could be abstracted and perceived legally for a stronger case on authorship of a CGW under s9(3) for creators of algorithms.

6.3 Original contribution

The research uses an innovative ontological approach to understand the law on CGWs. The theory chosen, i.e. new materialism, has underpinnings in quantum physics and philosophy. The theory focuses on understanding the materiality of CGWs or in other words the materials and material context to explain the ontological nature of a copyright work. Focusing on epistemology debates may not be suitable for the copyright of CGWs as the arrangements necessary in creating the works often appear to be intangible.⁹⁰ Further, intellectual property, can also appear intangible, due to its dualist nature of tangible and intangible property.⁹¹ It follows, using a theory that traces the materials to understand the existence of copyright law on CGWs, arguably, is an original contribution and more suitable to the field.

Borrowing a theory with underpinnings from quantum physics and philosophy is not totally alien to law,⁹² however, the theory, to the best of the author's knowledge, has not been

⁸⁹ This statement is inspired by the work of Karen Barad and the synopsis by Diane Coole and Samantha Frost. See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813-818; Diana Coole, Samantha Frost, 'Introducing the New Materialism' in Diana Coole, Samantha Frost (eds), 'New Materialism ontology, agency and Politics' (Duke University Press 2010) 13.

⁹⁰ This is likely to be why the formalism model cannot make visible the properties of the SSO for copyright protection, without the SSO being transferred to preparatory design documents,

⁹¹ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *OJLS* 229, 233; Lucy Finchett-Maddock, 'Forming the Legal Avant Garde: A Theory of Art/Law' (2019) 19 *Law, Culture and The Humanities* 19; Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44; Cristina S Martinez, 'Art and law in the Age of Digital Production' (1998) 22 *History of Photography* 14-15; Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 8.

⁹² Cross refer to chapter 3, 'n 115' for more information on this.

used for the copyright of CGWs. As the theory has not been used to examine the ontology of CGWs for copyright, the theory allows one to produce original and creative copyright matter. The original research can contribute to research on CGWs.⁹³ The theory arguably offers a very creative way to examine CGWs as rather than getting bogged down in semantics; a manifestation of formalism, the theory focuses on the power of language for copyright discourse. Formalism, with its limited properties produces vacuous exercises in an attempt to distinguish the original expression in functional material for the purposes of understanding the SSO in a program. New materialism avoids producing matter based on differences in materials.⁹⁴ Instead, new materialism allows one to understand the legal discourse of copyright

⁹³ Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5, King's College London Law School Research Paper 1-19 < <https://ssrn.com/abstract=3419481> > accessed 29 March 2024. Yaniv Benhamou, Ana Andrijevic, 'The Protection of AI-Generated Pictures (photograph and painting) under Copyright Law' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar, 2022) 198-217; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 225-244; Gunther Teubner, 'Rights of Non-Humans? Electronic agents and Animals as New Actors in Politics and Law' (2006) 33 *Journal of Law and Society* 497-521; Madeleine de Cock Buning, 'Artificial Intelligence and the Creative Industry: New Challenges for the EU Paradigm for Art and Technology by Autonomous Creation' in Woodrow Barfield & Ugo Pagallo, *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar 2018) 511- 535; Enrico Bonadio, Nicola Lucchi, Giuseppe Mazziotti, 'Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence (2022) 53 *International Review of Intellectual Property and Competition Law* 1174-1200; Kanchana Kariyawasam, 'Artificial Intelligence and Challenges for Copyright Law' (2020) 28 *International Journal of Law and Information Technology* 279-296; Jani McCutcheon, 'Curing the Authorless Void: Protecting Computer-Generated Works Following *ICETV* and *Phone Directories*' (2013) 37 *Melbourne University Law Review* 46-102; Oways A Kinsara, 'Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?' (2021) 6 *Cambridge Law Review* 62-85; Julia Dickenson, Alex Morgan, Birgit Clark, 'Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications' (2017) 39 *European Intellectual Property Review* 457-460; Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 *Columbia Law Journal and Arts* 395, 399; Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver, David Komuves 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) *CREATE* 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024; Enricho Bonadio and Nicola Lucchi, 'How Far Can Copyright Be Stretched? Framing the Debate on Whether New And Different Forms of Creativity Can Be Protected' (2019) 2 *Intellectual Property Quarterly* 115, 131; Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169; Paul Lambert, 'Computer-Generated Works and Copyright: Selfies, Traps, AI And Machine Learning' (2017) 39 *European Intellectual Property Review* 12, 17; Jessica Fjeld, Ziv Epstein, Aaron Hertzmann, Memo Akten, Hany Farid, Morgan R. Frank, Matthew Groh, Laura Herman, Neil Leach, Robert Mahari, Alex Sandy Pentland, Olga Russakovsky, Hope Schroeder, and Amy Smith, 'Art and the Science of Generative AI' (2023) 380 *Science* 1110, 1111.

⁹⁴ Rosi Braidotti, *The Posthuman* (Polity 2013) 100.

not by eliminating the differences but by confronting them.⁹⁵ What this means is that the research produces an original perspective for CGWs. The theory allows CGWs to be visible as material-discursive reconfigurations, acknowledging that the legal materials will be (re) examined rather than erroneously understood as a static object or thing. This argument is advanced in the light of Barad, Coole and Frost's work on new materialism.⁹⁶ As quantum physics undergirds the authors' work, the material illustrates how Cartesian and Newtonian physics challenges knowledge that matter is an object or thing.⁹⁷ As formalism reduces copyright matter to a static thing or object with pre-determined boundaries, new materialism can be used to question the reliability of understanding copyright matter in the way formalism conventionally does.⁹⁸

Understanding CGWs through a new materialist lens, uncovers hidden materials illuminating original research. The material legal analysis makes more readily visible the legal materials, i.e., the statutory interpretative tools.⁹⁹ What emerges is not only how formalism corresponds with Cartesian and Newtonian understandings of matter, but how a purposive construction of a legal instrument has new materialist undertones. The thesis draws on the striking resemblance in the reasoning from Lord Steyn for using a purposive approach to new materialism. Lord Steyn employs a quote from Lord Thring to illuminate the benefits of the purposive approach. The quote 'that statutes ought generally to be constructed as "always

⁹⁵ Dan L Burk, 'Copyright and the New Materialism' in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44.

⁹⁶ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813-814; Diana Coole, Samantha Frost, *Introducing the New Materialism* in Diana Coole, Samantha Frost (eds), *New Materialism ontology, Agency and Politics* (Duke University Press 2010) 11-13.

⁹⁷ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 813-814; Diana Coole, Samantha Frost, *Introducing the New Materialism* in Diana Coole, Samantha Frost (eds), *New Materialism ontology, Agency and Politics* (Duke University Press 2010) 11-13.

⁹⁸ Cross refer to chapter 3, s3.3, 131.

⁹⁹ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 8. Both authors explain how interpretive techniques can be classified as legal materials.

speaking statutes”¹⁰⁰ is almost congruent with Barad’s statement that ‘matter is substance in its intra-active becoming’.¹⁰¹ Put differently, a copyright work should be visible as a process rather than a static, measurable unit of knowledge. Understanding a copyright work as a vibrant process allows a copyright work to be interpreted in a way that aligns with new knowledge on material which may be considered for copyright.

New materialist undertones are also present in Lord Bingham’s purposive construction of s1(1) of the Human Fertilisation and Embryology Act 1990 in *R (Quintavalle) v Secretary of State for Health*. Lord Bingham discusses the importance of the material context of the Act, which includes the historical context, when interpreting the section in question.¹⁰² Similarities between Guattari, Deleuze and Latour’s approach regarding matter emerging from a phenomena’s connections or assemblages¹⁰³ and Bingham’s reasoning for applying a purposive construction of the said Act are visible in the case materials.¹⁰⁴ It would appear how the purposive approach is being used by Lord Bingham corresponds with new materialism.

Guattari and Deleuze’s example of the orchid and the wasp can be used as an analogy to illuminate the similarities that a purposive approach has with new materialism.¹⁰⁵ The *original* use of the analogy illustrates how an assemblage grows with more multiplicities, as more materials are considered by the judiciary. As the purposive approach allows the judiciary to consider new knowledge on algorithms, it means that the SSO is ontologically different in

¹⁰⁰ Lord Steyn was quoting Lord Thring, a great Victorian draftsman. See *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13; [2003] 2 1WLR 693 [22] (Lord Steyn).

¹⁰¹ Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 822.

¹⁰² *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13, [2003] 2 1WLR 693, [2003] 2 AC 687 [8] (Lord Bingham).

¹⁰³ Giles Deleuze, Felix Guattari, *A thousand plateaus: Capitalism and Schizophrenia* (Massumi tr, University of Minnesota Press London 1987); Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005).

¹⁰⁴ *R (Quintavalle) v Secretary of State for Health* [2013] UKHL 13, [2003] 2 1WLR 693, [2003] 2 AC 687 [8] (Lord Bingham).

¹⁰⁵ Giles Deleuze, Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Massumi tr, University of Minnesota Press London 1987) 10.

comparison with when the formalist model is used. This is akin to the ontology of the orchid and the wasp.¹⁰⁶ The wasp's ontological nature changing as it becomes part of the orchid's reproduction cycle, whilst simultaneously changing the nature of the orchid.¹⁰⁷

Copyright matter is ontologically different to what is produced by formalism. Originality is highlighted in the way algorithms are abstracted by a purposive construction of Directive 2009. The SSO as matter becomes visible through the process of intra-activity.¹⁰⁸ Algorithms arguably emerge as an expression of an idea from relations between the legal materials associated to the directive and material contexts i.e. the state of technology at the time. The legal materials are composed of the travaux préparatoires of the directive. The legal material process exposes the vibrancy of a literary work. A purposive construction of Directive 2009 lead to algorithms (re) emerging as more than static, rigid, specifications/procedures; a meaning produced all the way back in 1989. The intra-active legal material allows algorithms to (re) emerge as material for copyright matter.

Algorithms emerge as abstract machines within the permissible boundaries of the directive. A purposive construction allows new material from the philosophy of computer science to be considered as part of the understanding of the ontology of algorithms. The abstraction allows for the (in) tangible nature of algorithms to be visible for copyright consideration. An analysis of the subjective and objective purpose-intent of the directive explains that algorithms as abstract machines are within the intentions for the directive. The material-legal analysis provides an original contribution to the existing literature not only on

¹⁰⁶ For a more detailed discussion of the new materialistic undertones of the purposive approach, cross reference to chapter 4 'n 82'.

¹⁰⁷ Giles Deleuze, Felix Guattari, *A thousand plateaus* (University of Minnesota Press London 1987) 10.

¹⁰⁸ See Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

the SSO of a computer program,¹⁰⁹ but more importantly, for this thesis, on authorship of CGWs.¹¹⁰

The material-legal analysis leads to *Google v Oracle* being used for analogical reasoning on how the English judiciary are abstracting the SSO of a computer program for copyright purposes. The analogical reasoning constitutes in an original contribution to the literature on the SSO as it appears that formalism obscures how algorithms are being abstracted as specifications or procedures. However, algorithms as matter should not be understood consistently as static units but should be considered by the law as an ongoing phenomena, emerging and fluctuating akin to the law on copyright.

6.4 Implications of research

It is hoped that the research on CGWs will contribute in a more meaningful way to the existing academic discussion on CGWs in England. For example, Guadamuz's research on CGWs makes an assertion that programmers may be assigned authorship of the work under s9(3) of the CDPA.¹¹¹ Further, Guadamuz's reasoning does not address the situation where the programmer and the creator of the algorithm are different people. This was evident in the creating of the Edmond de Belamy painting. The research in this thesis attempts to illuminate

¹⁰⁹ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) *JILP*, 921; Pamela Samuelson, 'Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement' (2016) 31 *Berkeley Tech L J* 1216; David I Bainbridge, 'The Look and Feel of Computer Programs after *Richardson v Flanders* (1993) 2 *Law Computers & Artificial Intelligence* 275; Sally Weston, 'Software Interfaces – Stuck in the Middle: The Relationship Between the Law and Software Interfaces in Regulating and Encouraging Interoperability' (2012) 43 *International Review of Intellectual Property and Competition law* 428, 443; Jakub Menci, 'When the Court of Justice Interferes with Interfaces – Case C-393/09 *Bezpečnostní Softwarová Asociace – Svaz Softwarové Ochrany v Ministerstvo Kultury*, Court of Justice of the European Union (Third Chamber) (2010) 2 *Queen Mary Journal Intellectual Property* 90; Stephen Vousden, 'Protecting GUIs in EU law: *Bezpečnostní Softwarová Asociace*' (2011) 6 *Journal of Intellectual Property Law & Practice* 728; See Nicola Angius, Giuseppe Primiero 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 304.

¹¹⁰ Cross refer to chapter 1 'n 42.

¹¹¹ Andres Guadamuz, 'Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works' (2017) 2 *Intellectual Property Quarterly* 169, 176.

how a creator of an algorithm can be assigned authorship under s9(3). Therefore, the research may extend assertions made by Guadamuz.

Providing more clarity on the meaning of the SSO in a computer program, and by extension, arrangements necessary in a CGW, will be welcomed by the likes of Ghosh, Aplin and Pasqualetto who discuss the nexus between a computer program, the functions of a program and authorship of a CGW.¹¹² Similarly, the research is likely to have the support of Lambert and Rosati who call for further research on the meaning of *arrangements necessary* in s9(3) of the CDPA.¹¹³ Given there is virtually no case law on CGWs, these authors' calls are understandable. *Nova* is only a decision from a Court of First Instance on CGWs.¹¹⁴ Moreover, *Nova* does not deal with the creator of an algorithm for authorship of s9(3). It follows that this research should assist with the authorship of CGWs.

This research also has persuasive value in other commonwealth countries that have adopted similar provision. Similar statutory provision to s9(3) can be found in common law countries of New Zealand and India.¹¹⁵ Hong Kong and Ireland also have similar provision to s9(3) so the thesis may be of interest to the judiciary and academics also from those jurisdictions.¹¹⁶ Therefore, the significance of this thesis may extend well beyond England's legal jurisdiction.

¹¹² Tanya Aplin, Giulia Pasqualetto, 'Artificial Intelligence and Copyright Protection' in Rosa Ballardini, Petri Kuoppamäki, Olli Pitkänen (eds) *Regulating Industrial Internet Through IPS, Data Protection and Competition Law* (Kluwer 2019) ch 5 King's College London Research Paper 16; Shubha Ghosh, 'Ain't it Just Software?' in Ryan Abbott (ed), *Research Handbook on Intellectual Property and Artificial Intelligence* (Edward Elgar 2022) 242.

¹¹³ Paul Lambert, 'Computer-generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning' (2017) 39 *European Intellectual Property Review* 15, 17; Eleonora Rosati, 'The Monkey Selfie Case and the Concept of Authorship: An EU Perspective' (2017) 12 *Journal of Intellectual Property Law & Practice* 973, 977; Annsley Merelle Ward, 'Auctioning Art(ificial Intelligence): The IP Implications of Edmond de Belamy' (IP Kitten 31 Oct 2018) <<https://ipkitten.blogspot.com/2018/10/auctioning-artificial-intelligence-ip.html>> accessed 4 April 2024.

¹¹⁴ *Nova Productions Ltd and Mazooma Games Ltd and Others Nova Productions Ltd and Bell Fruit Games Ltd* [2006] EWHC (Ch), [2006] EMLR 14 24.

¹¹⁵ The Copyright Act 1994, s5(2)(a); The Copyright Act 1957, s2(d)(vi).

¹¹⁶ Copyright Ordinance cap 528, s11(3); Copyright and Related Rights Act 2000, s21(f).

This research could also influence the work conducted on CGWs more broadly across other jurisdictions. For example, Yanisky-Ravid and Velez-Hernandez's research is on US copyright of artworks produced by creative robots.¹¹⁷ However, their research focusses more on the meaning of originality, and whether such works can be deemed to be original rather than authorship of the works.¹¹⁸ The thesis may be useful to provide another interpretative perspective, but a material legal analysis would have to be conducted for US law. Nevertheless, the research in this thesis does engage with the most recent US case on the SSO, e.g. *Google v Oracle* which could be useful for CGWs. Further, Bridy potentially addresses the gap on who, and how one can own a CGW.¹¹⁹ Bridy suggests that the US and the EU could adopt a work made for hire doctrine, which effectively means that work prepared by an employee, or as she argues, a computer, within the scope of employment, can be authored by the employer.¹²⁰ This proposal is not likely to recognise the creative expression of designers of algorithms who are employed. By-passing the designer is not a credible option, if viewed against the CA's decision in *Thaler v Comptroller General of Patents Trade Marks and Designs*.¹²¹ Therefore, Bridy's research does not adequately address whether the creator of an algorithm can be assigned authorship of a CGW under US or EU law leaving space for the findings in this thesis to be carefully considered.

¹¹⁷ Shlomit Yanisky-Ravid, Luis Antonio Velez- Hernandez, 'Copyrightability of Artworks Produced by Creative Robots and Originality: The Formality-Objective Model' (2018) 19 Minnesota Journal of Law, Science & Technology 1.

¹¹⁸ Shlomit Yanisky-Ravid, Luis Antonio Velez- Hernandez, 'Copyrightability of Artworks Produced by Creative Robots and Originality: The Formality-Objective Model' (2018) 19 Minnesota Journal of Law, Science & Technology 1, 22-53.

¹¹⁹ Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 Columbia Law Journal and Arts 395, 400.

¹²⁰ Annemarie Bridy, 'The Evolution of Authorship: Work Made by Code' (2015) 39 Columbia Law Journal and Arts 395, 400.

¹²¹ *Thaler v Comptroller General of Patents Trade Marks and Designs* [2021] EWCA Civ 1374..

At the time of submitting the thesis, cases are beginning to emerge on CGWs. These cases involve US class actions demanding jury trial.¹²² The complaint documents suggest the allegations are to do with how the datasets which are used to train the algorithms are compiled. More specifically, the datasets may involve unauthorised use of copyright materials.¹²³ The complaint documents appear to be focused on copyright infringement rather than authorship. Nevertheless, it is clear from the facts that the computer-generated programs are being bought and used widely.¹²⁴ This may increase the likelihood of cases in the future arriving in court regarding other legal issues. One of the main issues of copyright law is determining authorship of a work. For example, *Ward*, *Fjeld et al* all raise the question whether a creator of an algorithm can be assigned authorship over CGWs. It is hoped the research within this thesis will be of interest to designers of the algorithms which produce CGWs.

The implications of this research also extend to the SSO of a computer program. The findings may mean a way out of the impasse for the judiciary on the SSO for copyright purposes.¹²⁵ The research may help to put flesh on the statements made by Mr Justice Ferris, Mr Justice Arnold and Mr Justice Jacob insofar as the SSO can attract copyright protection when the SSO almost never does.¹²⁶ The research does this by illustrating to the judiciary how they have become hamstrung with the use of the formalist model. Nevertheless, a new materialist approach illuminates the power of language and how language can either restrict or

¹²² *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23; *DOE 3 and DOE 4, individually and on behalf of all others similarly situated v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC* Case 3: 22-cv-07074 Document 1 filed 11/10/22.

¹²³ *Anderson, McKernan, Ortiz v Stability AI Ltd, Stability AI Inc, Midjourney Inc, Deviantart Inc*, Case 3:23-cv-00201 Document 1 Filed 1/13/23 [58]; *DOE 3 and DOE 4, individually and on behalf of all others similarly situated v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC* Case 3: 22-cv-07074 Document 1 filed 11/10/22 [8].

¹²⁴ The companies were selling the computer programs that produce CGWs for a subscription.

¹²⁵ Cross refer to chapter 2, s2.3.2, 77.

¹²⁶ *John Richardson v Flanders* [1993] (No 2) FSR 497, 527; *SAS Institute Inc v World Programming Ltd* [2010] EWHC 1829 (Ch), [2011] RPC 1 [232]; *IBCOS Computers Ltd and Another v Barclays Mercantile Highland Finance Ltd and Others* [1994] FSR 275, 302.

enable matter.¹²⁷ Put differently, new materialism shines a light on the legal discourse by illustrating how formalism limits copyright matter on the SSO of a computer program. Conversely, a new materialist model acts as an enabler to unlock material that is hidden to the judicial eye. New materialism invites the judiciary to (re) consider the meaning of algorithms by taking a purposive construction to Directive 2009/24.

This research also contributes to a better understanding of the SSO in the existing scholarly literature.¹²⁸ Moon's proposal is similar to this research as Moon focuses on understanding the levels of abstraction that the SSO in a computer program is being discerned with.¹²⁹ However, Moon's suggestion is to focus on the software engineering design processes.¹³⁰ The findings in this thesis may be of interest to Moon's research as the thesis takes a different approach but has the same goal in mind, most notably, to make visible the SSO in a meaningful way. Further, as the thesis draws on Angius and Primiero's research, it is hoped it is useful to the authors as the author's invite academics to assess the abstractions legally.¹³¹

It is contended that the research will also be of an interest to Pila, as Pila purports that a more coherent theory should be found for interpreting copyright works.¹³² Akin to this research, Pila's research suggests departing from the formalist conceptual model.¹³³ Pila's research not only corroborates the findings in this thesis but also the concerns with

¹²⁷ Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 819.

¹²⁸ Cross refer chapter 2, 2.3.2 77.

¹²⁹ Ken Moon, 'Another Nail in the Coffin for Non-Literal Software Copyright Infringement?' (2015) *Journal of Intellectual Property Law & Practice* 921, 924.

¹³⁰ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283.

¹³¹ Nicola Angius, Giuseppe Primiero, 'Infringing Software Property Rights: Ontological, Methodological, and Ethical Questions' (2020) 33 *Philosophy & Technology* 283, 288.

¹³² Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 241.

¹³³ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 *Oxford Journal of Legal Studies* 229, 241.

formalism.¹³⁴ This is especially the case since Pila discusses how a copyright work is ontologically unstable inferring that an ontological theory would be preferred.¹³⁵ Therefore, as new materialism is an ontological theory, there is a strong argument that the research will be of value to Pila.

6.5 Recommendations for future research

The research examines the materiality and the legal discourse in CGWs under English law, but future research by other academics could use a similar approach to assess US copyright law. Abstracting algorithms as an abstract machine could be used in conjunction with the *Altai* test. Examining Angius and Primiero's reasoning to make stage one of the *Altai* test more relevant in understanding the SSO for copyright purposes is an attractive option for academics. This is especially the case when viewed against Moon's criticism of the *Altai* test. Even Samuelson who is generally a keen proponent of the test suggests reform is required. The abstraction could be assessed legally in future research. As the US do not have statutory provision on CGWs, much of the legal analysis will hinge on originality. Moreover, a material legal analysis could also focus solely on the SSO of computer software for US copyright law purposes. This is likely to be a significant contribution given the uncertain landscape the Supreme Court in *Google v Oracle* left the software industry in. Further, as the research in this thesis focuses on the materiality of copyright law, more research on the legal materials could be conducted. More specifically, future research could explore the nexus between the purposive technique and new materialism. This type of research would offer the opportunity to build on the PhD

¹³⁴ Pila conducts doctrinal research but not on computer software or CGWs. Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229-242.

¹³⁵ Justine Pila, 'Copyright and its Categories of Original Works' (2010) 30 Oxford Journal of Legal Studies 229, 241.

findings which lays the foundations for new materialism to be a theoretical basis for the purposive interpretative approach.

6.6 Limitations

A limitation of this research is an author's active role in conceptualising a CGW for copyright purposes. An awareness of how the author's involvement is also part of the materiality of a copyright work is important to a new materialist researcher. Foucault faced criticism for lack of awareness in his research on this issue; a criticism levelled at his work by both Barad and Bradotte.¹³⁶ This research has been conducted with this in mind, as the research attempts to (re) examine the doctrinal legal methods to confront any historic and cultural materialisations. The (re) examination has been carefully constructed to consider law's matters aligned with Kang and Kendall's reasoning.¹³⁷ Further, the purposive approach is employed in a way that hopefully adheres to Lord Wilberforce's principles so interpretations on algorithms are within the permissible boundaries of the directive.¹³⁸ Ultimately, no matter which methods are used to attempt to ensure objectivity, a new materialist is of the view that this can never be achieved. Put differently, one should accept that the author is always part of the materiality of the law, just as much as the judiciary are, when interpreting the law in a court of law. This is the essence of new materialism. It is unlikely replacing the judiciary or even an academic by an AI system, will attain objectively. Some well-known examples comprise of Amazon finding that some of the AI recruitment systems produced discriminatory results which affected women and their

¹³⁶ A new materialist would refer to the body rather than the human. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 809; Rosi Braidotti, *The Posthuman* (Polity 2013) 61.

¹³⁷ Hyo Yoon Kang, Sara Kendall, 'Legal Materiality' (2019) 23 *Law Text Culture* 1, 8. Both authors explain how interpretive techniques can be classified as legal materials.

¹³⁸ *Royal College of Nursing of the United Kingdom v Department of Health and Social Security* [1981] 2 WLR 279, [1981] AC 800, 822 (Lord Wilberforce).

chances of being interviewed.¹³⁹ Similarly, when a generative AI system produces an image of an older person, the image is always male.¹⁴⁰ As algorithms are trained on datasets which comprise of human data, the human involvement still plays a part of the materiality in decision-making. By adopting a new materialistic perspective in this thesis, CGWs are visible as an ‘ongoing reconfiguring’¹⁴¹ of the material world.¹⁴² The boundaries of the law shift and metamorphosise as the material world does.

6.7 Concluding remarks

This thesis suggests that the answer to the question whether a creator of an algorithm can be assigned authorship under s9(3) of the CDPA lies with adopting a theoretical lens of new materialism. The theoretical lens allows the ontological nature of algorithms to be exposed with a new materialist approach to the statutory interpretation of Directive 2009. This approach allows algorithms to emerge through their material process and context of the directive. Computer experts who provide evidence in court on copyright issues would benefit also from Angius and Primiero’s research on computational artefacts.¹⁴³ The research provides further details for computer experts regarding the verification of inexact and approximate copies of a

¹³⁹ Alexander Orakhelashvili, ‘Professor Karen Yeung and Milla Vidina Discuss How We Can Guard Against AI-Generated Discrimination?’ (University of Birmingham, 6 March 2024) < [How can we guard against AI-generated discrimination? – Birmingham Law School Research Blog \(bham.ac.uk\)](https://www.bham.ac.uk/law/research-blog/2024/03/06/how-can-we-guard-against-ai-generated-discrimination/) > accessed 1 May 2024.

¹⁴⁰ Alexander Orakhelashvili, ‘Professor Karen Yeung and Milla Vidina Discuss How We Can Guard Against AI-Generated Discrimination?’ (University of Birmingham, 6 March 2024) < [How can we guard against AI-generated discrimination? – Birmingham Law School Research Blog \(bham.ac.uk\)](https://www.bham.ac.uk/law/research-blog/2024/03/06/how-can-we-guard-against-ai-generated-discrimination/) > accessed 1 May 2024.

¹⁴¹ The statement is inspired by Barad. Karen Barad uses the term ‘re-configuring’. Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 822.

¹⁴² The statement is inspired by Barad. Karen Barad, ‘Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter’ (2003) 28 *Journal of Women in Culture and Society* 801, 822.

¹⁴³ Nicola Angius, Giuseppe Primiero, ‘Copying Safety and Liveness Properties of Computational Artefacts’ (2023) 33 *Journal of Logic and Computation* 1089.

computer program.¹⁴⁴ As the visibility of the ontology of algorithms becomes clearer, a case for the creator of algorithms attaining authorship under s9(3) can be advanced.

However, new materialism also offers an innovative look at copyright law. The theory makes one think about existing knowledge, where it derives from, and to what extent the knowledge can be relied upon. The theory makes one reflect not only on how s9(3) operates, but more broadly, how the categorisation of the CDPA works. Laws are rules that are based on the outside of the material world,¹⁴⁵ as the research on formalism illustrates,¹⁴⁶ yet materials are made to stretch legal forms by judicial interpretations and legal materials enmeshed in the material world.¹⁴⁷

New materialism is a theory that highlights how the methodology of doctrinal copyright is antiquated. Differences in materials produce doctrinal copyright matter. In a digital era, when materials are becoming fused, i.e. human and non-human arrangements, a question needs to be asked whether differences should be used to create copyright matter. Research needs to be conducted, as it is in this thesis, to deterritorialise¹⁴⁸ material from the phenomena's context, illuminating ontologies of different copyright works. This research focuses on CGWs. Once new reconfigurings of boundaries emerge, new material can be re-materialised, helping to meaningfully understand the ontology of a copyright work through the material-legal process.¹⁴⁹

¹⁴⁴ Nicola Angius, Giuseppe Primiero, 'Copying Safety and Liveness Properties of Computational Artefacts' (2023) 33 *Journal of Logic and Computation* 1089.

¹⁴⁵ Margaret Davies, *Law Unlimited Materialism, Pluralism, and Legal Theory* (Routledge 2017) 74-89.

¹⁴⁶ Cross refer to chapter 3 'n 146'.

¹⁴⁷ Cross refer to chapter 4, 'n 34'.

¹⁴⁸ A word borrowed from Giles Deleuze, Felix Guattari, *A thousand plateaus: Capitalism and Schizophrenia* (Massumi tr, University of Minnesota Press London 1987) 4, 10, 21.

¹⁴⁹ This statement is inspired by Barad. Karen Barad, 'Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter' (2003) 28 *Journal of Women in Culture and Society* 801, 822.

New materialism invites readers to ask the question whether existing copyright laws can provide answers for CGWs. It is contended that there is no need for making separate legal provisions such as a *sui generis* law,¹⁵⁰ as this would only exacerbate the differences in CGWs to other materials. Instead, all contributions should be examined without artificial labels such as functional, original, human, non-human, tangible, intangible and so on. The material processes and material contexts are key. This brings readers to the crux of the thesis and how the very existence of copyright law on materials depends on the role that language takes. As copyright of CGWs depends on the interpretation of language, the law does not exist in isolation to materials. CGWs are reflections of the material world, and the material world are reflections of CGWs. This was the very point that Nicholson raised in the Parliamentary debate when the provision on CGWs were being debated.¹⁵¹ It is submitted that the law need not be developed in a dualist fashion that focuses merely on human authorship. Instead, the future of authorship should be based on material assemblages¹⁵² rather than works as arbitrary, inert, things or objects.

¹⁵⁰ Schafer advocates for a *sui generis* law. Burkhard Schafer, Jesus Niebla Zatarain, Laurence Diver, David Komuves 'Monkeying around with Copyright – Animals, AI's and Authorship in Law' (2015) CREATE 2015/02 3.0 < <http://www.create.ac.uk/publications/monkeying-around-with-copyright-animals-ais-and-authorship-in-law> > accessed 14 March 2024.

¹⁵¹ Hansard, HC Vol 132 col 577 (28 April 1988).

¹⁵² This is a term used by Latour and Burk. See Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (OUP 2005) 2-23; Dan L Burk, Copyright and the New Materialism in Jessica C Lai and Antoinette Maget Dominice, *Intellectual Property and Access to Im/material Goods* (Edward Elgar Publishing Ltd 2016) 44, 61.

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DOE 3 and DOE 4, individually and on behalf of all others similarly situated v Github Inc, Microsoft Corporation, Open AI Inc, Open AI LP, Open AI GP, LLC, OpenAI startup fund GP1 LLC Case 3: 22-cv-07074 Document 1 filed 11/10/22.

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