

# Clash of Dilemmas: How Should UK Copyright Law Approach the Advent of Autonomous AI Creations?

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## ABSTRACT

The advancement of artificial intelligence (AI) and deep learning (DL) has given rise to pressing dilemmas and long-standing debates, primarily in the US, on how AI-generated works ought to be conceived in copyright law. Meanwhile, there is a widely held presumption among scholars that the UK, particularly through section 9(3) of its Copyright, Designs and Patents Act 1988, is well-prepared to accommodate such works. Although today's AI differs from yesterday's generative computers, there is limited research doubting the presumption or suggesting alternative UK frameworks to address AI-generated works. Aiming to fill the gap, this article revisits the different manners in which today's AI creations encounter copyright law and explains why the current UK approach fails to address the issue. In doing so, it analyses, *inter alia*, the provision's legal fiction, legislature intention and judicial interpretation. It then turns to the path forward by carefully inspecting various proposed approaches to the question of copyright ownership for AI-generated works in view of the UK regime. Upon examining different models, the article highlights numerous dilemmas in each and thus argues in favour of

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entrance into the public domain as the least dilemmatic and most appropriate solution for AI-generated works, with promising economic and social benefits.

*Keywords:* AI-generated works, deep learning, copyright law, UK, public domain

## I. INTRODUCTION

Technological advances, such as in artificial intelligence (AI), may be regarded as legally disruptive in many ways. They are not, however, disruptive in the sense that they are unregulable,<sup>1</sup> nor are they “an outside force acting upon the law”.<sup>2</sup> Indeed, to the extent that AI challenges the law, “it does so because of how it encounters existing features of the law, both doctrinal and theoretical”.<sup>3</sup>

To this end, the UK government requested views on the new implications of AI developments on copyright protection, with the key issue of “how we should treat works created [...] by AI systems and whether the current approach is right”.<sup>4</sup> Likewise, AI has given rise to frustration for both the US government<sup>5</sup> and the WIPO.<sup>6</sup>

While AI-generated works have engendered long-lasting debates primarily in the US, there is surprisingly extensive research arguing for the preparedness of the UK, specifically of its 1988 Copyright, Designs and Patents Act (CDPA) to accommodate such works through section 9(3) on computer-generated works (CGWs). Consequently, with today’s AI diverging from yesterday’s generative computers, published research suggesting alternative UK frameworks to address AI-generated works is lacking.

This article aims to fill the gap by examining the ways in which today’s generative AI and its ever-increasing advances of deep learning (DL) encounter copyright law, focusing primarily on the UK regime. First, it briefly overviews the evolution of AI and clarifies what is meant by “today’s AI”. Second, it discusses the extent to which, if any, AI disrupts the traditional copyright framework. It then turns, in Part IV, to the UK’s CGW approach, assessing its viability against new

<sup>1</sup> Margot Kaminski, ‘Authorship, Disrupted: AI Authors in Copyright and First Amendment Law’ (2017) 51 UC Davis L Rev 589, 615.

<sup>2</sup> *ibid* 591.

<sup>3</sup> *ibid* 590.

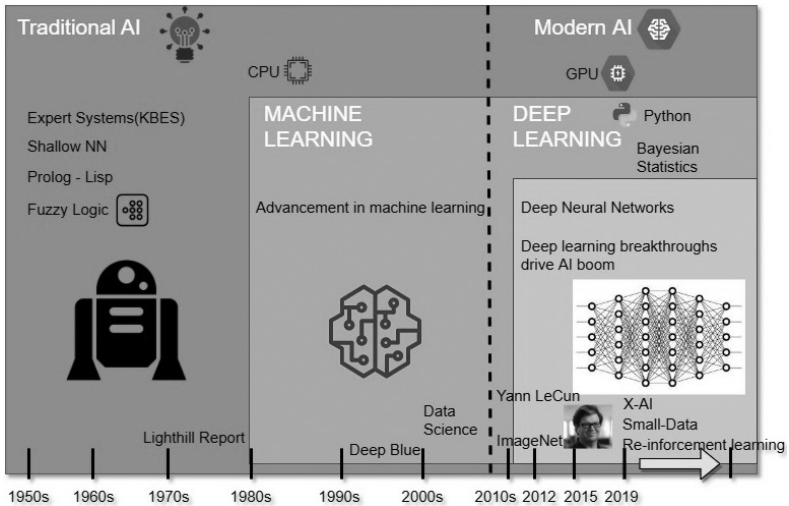
<sup>4</sup> UK Intellectual Property Office (IPO), ‘Artificial Intelligence Call for Views: Copyright and Related Rights’ (*GOV.UK*, 7 September 2020) <[www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/artificial-intelligence-call-for-views-copyright-and-related-rights](http://www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/artificial-intelligence-call-for-views-copyright-and-related-rights)> accessed 1 March 2021.

<sup>5</sup> US Copyright Office, ‘Copyright in the Age of Artificial Intelligence’ (*Copyright.gov*, 5 February 2020) >[www.copyright.gov/events/artificial-intelligence](http://www.copyright.gov/events/artificial-intelligence)< accessed 14 April 2021.

<sup>6</sup> World Intellectual Property Organization, ‘WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)’ WIPO/IP/AI/GE/19 (27 September 2019)

AI creations by analysing, inter alia, its legal fiction, legislature intention and judicial interpretation Eventually, Part V critically analyses various alternative propositions on how the law should treat AI-generated works. Upon inspecting different models, traditional and recently proposed, the article finds numerous dilemmas in each and thus argues in favour of entrance into the public domain as the least dilemmatic and most appropriate solution for AI-generated works, with promising economic and social benefits.

## II. AI EVOLUTION IN BRIEF



70-year evolution of AI by Awais Bajwa<sup>7</sup>

The umbrella term AI “simply means making computers act intelligently”.<sup>8</sup> It encompasses numerous technologies ranging from expert systems and machine learning (ML), which largely depend on a rule-based (if x then y) approach, as the primary focus from the 1950s onwards, to the advent of DL in the 2000s.<sup>9</sup> DL is an advancement of ML, which utilises brain-like neural networks and has the ability to learn by itself, making it more autonomous, whereas “non-deep ML is dependent on

<sup>7</sup> Awais Bajwa, ‘Traditional AI vs. Modern AI’ (*Towards Data Science*, 5 December 2019) <<http://towardsdatascience.com/traditional-ai-vs-modern-ai-5117b469a0c9>> accessed 8 March 2021.

<sup>8</sup> Michael Schmidt, ‘Clarifying the Uses of Artificial Intelligence in the Enterprise’ (*Tech Crunch*, 12 May 2016) <<https://techcrunch.com/2016/05/12/clarifying-the-uses-of-artificial-intelligence-in-the-enterprise/?gucounter=1>> accessed 9 March 2021.

<sup>9</sup> Bajwa (n 7).

human intervention to learn”.<sup>10</sup> The latest trend in DL techniques is generative adversarial network (GANs), which were introduced in 2014 and are sometimes broadly referred to as generative AI. GANs are often described by their ability to “use existing content [...] to create new plausible content”.<sup>11</sup> In 2018, the MIT Technology Review classified GANs as one of the most promising AI advances in the past decade.<sup>12</sup> GAN architecture enables applications to be highly autonomous in generating strikingly unique outputs, which are indistinguishable from human intellectual creations, in the realm of copyright subject matter. These include *Portrait of Edmond de Belamy*, which sold for \$432,500 in New York,<sup>13</sup> AWS DeepComposer (music generation)<sup>14</sup> and InferKit (text generation including articles, novels and poetry).<sup>15</sup> These examples are indicative of a substantial shift in how computers generate creative works, which has raised important questions on how such works encounter copyright law.

### III. CREATIVITY, AUTHORSHIP AND AI: LEGAL DISRUPTION OR TECHNOLOGICAL MISUNDERSTANDING?

This part discusses how AI-generated works encounter traditional copyright frameworks of creativity, authorship and originality and the extent to which and how they may be disrupted.

#### A. WHAT IS CREATIVITY?

A preliminary point is to ascertain whether works generated by today’s AI are creative. While many appear so at first sight, the question under debate is whether computational creativity is different from human creativity owing to how it is generated. It is then a matter of how creativity is defined. This philosophical question is beyond the scope of this article; nevertheless, a conceptual definition is needed to continue exploring the authorship issue of AI-generated works. To

<sup>10</sup> Eda Kavlakoglu, ‘AI vs. Machine Learning vs. Deep Learning vs. Neural Networks: What’s the Difference?’ (*IBM*, 27 May 2020) <[www.ibm.com/cloud/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks](http://www.ibm.com/cloud/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks)> accessed 7 March 2021.

<sup>11</sup> Huzaifah Saleem, ‘What Is Generative AI and How Much Power Does It Have?’ (*IBM*, 20 August 2020) <<https://developer.ibm.com/technologies/artificial-intelligence/blogs/what-is-generative-ai-and-how-much-power-does-it-have/>> accessed 7 March 2021.

<sup>12</sup> MIT Technology Review, ‘10 Breakthrough Technologies’ (*Technology Review*, 21 February 2018) <[www.technologyreview.com/10-breakthrough-technologies/2018/](http://www.technologyreview.com/10-breakthrough-technologies/2018/)> accessed 7 March 2021.

<sup>13</sup> Gabe Cohn, ‘AI Art at Christie’s Sells for \$432,500’ (*New York Times*, 25 October 2018) <[www.nytimes.com/2018/10/25/arts/design/ai-art-sold-christies.amp.html](http://www.nytimes.com/2018/10/25/arts/design/ai-art-sold-christies.amp.html)> accessed 7 March 2021.

<sup>14</sup> Amazon Web Services Inc, ‘AWS DeepComposer Concepts and Terminology’ (*AWS Amazon*, 2021) <<http://docs.aws.amazon.com/deepcomposer/latest/devguide/deepcomposer-basic-concepts.html>> accessed 9 March 2021.

<sup>15</sup> InferKit Website, ‘FAQ’ <<https://inferkit.com/docs/generation>> accessed 9 March 2021.

this end, AI researchers and computer scientists often approach the question of creativity either (a) in terms of absolute novelty<sup>16</sup> or (b) in operational terms which hold that AI can never be creative because it merely follows algorithmic orders.<sup>17</sup> In essence, their logic may be right but nonetheless irrelevant to creativity in copyright. Arguably, human creativity depends likewise on algorithmic, or algorithm-like, methods. In the words of some non-AI-sceptic researchers, “all human thought is completely algorithmic, that is, it can be broken down into a series of mathematical operations”.<sup>18</sup> Even as regards the most intuitive romanticised literary works, Calvino characterises his creative process as:

“[A] constant series of attempts to make one-word stay put after another by following certain definite rules; or, more often, rules that were neither definite nor definable, but that might be extracted from a series of examples, or rules made up for the occasion—that is to say, derived from the rules followed by other writers”.<sup>19</sup>

Accordingly, he sees writers as “writing machines” fed by the appropriate logic.<sup>20</sup> Alternatively, in considering novelty as a proxy of creativity, one must consider the latter’s relative nature on a contextual basis. Bridy presented Boyden’s conceptualisation of creativity as relevant to intellectual property (IP) discourse, as it differentiates between physiological (P) and historical (H) creativity.<sup>21</sup> The former is found in a work “that’s new to the person who generated it”,<sup>22</sup> whereas “historical novelty [...] is one that is P-creative and has never occurred in history before”.<sup>23</sup> As Bridy found, Boden’s H-creativity reflects the originality threshold in patents (absolute novelty), while P-creativity – focused on the work’s novelty per se relative to its originator – “aligns with the originality standard in copyright law... [where all] work can still be considered original [...] even if another person has already created it, as long as the second work is not copied from the first”.<sup>24</sup> Bridy here is particularly referring to the US originality doctrine as established through the *Feist* case<sup>25</sup>. This standard of P-creativity likewise speaks to the traditional

<sup>16</sup> Roger Schank and Christopher Owens, ‘The Mechanics of Creativity’ in Raymond Kurzweil (ed), *The Age of Intelligent Machines* (MIT Press 1992) 395.

<sup>17</sup> Selmer Bringsjord, ‘Chess is Too Easy’ (1998) 101 MIT Tech Rev 23.

<sup>18</sup> *ibid.*

<sup>19</sup> Italo Calvino, *The Uses of Literature: Essays* (Harcourt Brace Jovanovich 1986) 15.

<sup>20</sup> *ibid.*

<sup>21</sup> Annemarie Bridy, ‘Coding Creativity: Copyright and the Artificially Intelligent Author’ (2012) 5 Stan Tech L Rev 1, 12–13.

<sup>22</sup> Margaret Boden, ‘Computer Models of Creativity’ (2009) 30 AI Magazine 23, 24.

<sup>23</sup> *ibid.*

<sup>24</sup> Bridy, ‘Coding Creativity’ (n 21).

<sup>25</sup> *Feist Publications Inc v Rural Telephone Service Co Inc*, 499 US 340 (1991).

UK originality requirement of skill, labour and/or judgment;<sup>26</sup> in the *University of London Press* case, Peterson J clarified, “The Act does not require that the expression must be in an original or novel form, but that the work must not be copied from another work”.<sup>27</sup> This is often seen as a lower standard compared to *Feist*.<sup>28</sup> The traditional criteria applicable in the UK have nevertheless changed after the EU 2009 *Infopaq* case<sup>29</sup> in which the “author’s own intellectual creation” standard became harmonised throughout Member States; the court explained: “It is only through the choice, sequence and combination of [the] words that the author may express his creativity in an original manner and achieve a result which is an intellectual creation”.<sup>30</sup>

In principle, putting aside the authorship conundrum for a moment, the creativity standard “has been [only] lifted slightly by the Court of Justice European Union (CJEU) in a US *Feist*-like manner”.<sup>31</sup> Therefore, it can be argued that AI-generated works are intellectual-like creations as they show a nexus with human intellectuality.

A dilemma, nevertheless, appears in subsequent cases, such as *Painer*<sup>32</sup> and *Football Dataco*,<sup>33</sup> where the court emphasised that originality is satisfied only if the author is employing her creative ability or creative choices that “stamp his ‘personal touch’”.<sup>34</sup> Therefore, the EU case law interlinked the intellectual creativity threshold with the reflection of one’s personality, which indicates a strong association between creativity and authorship. The question of authorship will be examined in the following section. It is worth noting for now that it is yet unclear

<sup>26</sup> Courts have used the phrase separately and sometimes cumulatively; see Lionel Bently and others, *Intellectual Property Law* (OUP 2018) 97 giving a broad context for exploring the key principles of the subject. In this fifth edition, the introduction has been updated to take account of Brexit. Important developments covered include the introduction of a doctrine of equivalents into UK patent law, the reforms of EU trade mark law (particularly with respect to ‘representation’ of marks, and the ‘functionality exclusions’.

<sup>27</sup> *University of London Press v University Tutorial Press* [1916] 2 Chapter 601, 608–609.

<sup>28</sup> Andreas Rahmatian, ‘Originality in UK Copyright Law: The Old “Skill and Labour” Doctrine Under Pressure’ (2013) 44 IIC 4, 14.

<sup>29</sup> *Case C-5/08 Infopaq International A/S v Danske Dagblades Forening*, ECLI: EU:C:2009:465.

<sup>30</sup> *ibid* [45].

<sup>31</sup> Rahmatian (n 28) 15.

<sup>32</sup> C-145/10, *Painer v Standard Verlags GmbH*, ECLI: EU:C:2011:798, [92].

<sup>33</sup> C-604/10, *Football Dataco Ltd v Yahoo! UK Ltd*, ECLI:EU:C:2012:115.

<sup>34</sup> *ibid* [38].

whether the UK courts will revert to the traditional originality standard (i.e. pre-Infopaq) after Brexit.

## B. AUTHORSHIP DILEMMA

Although international treaties have been silent on defining authorship, there is a strong presumption that authors are humans as a default rule. For example, the Explanatory Memorandum to the EU Software Directive Proposal states, “In common with all literary works, the question of authorship of the program is to be resolved in favour of the natural person or group of persons who have created the work”.<sup>35</sup>

The derogation from this entrenched rule is seen in the granting of authorship to legal persons. In the UK, section 9(1) of the CDPA 1988 states that the author “in relation to a work, means the person who creates it”. The use of “person” clearly affirms the understanding that an author can either be a human being or exceptionally, such as in works by employees, a non-human *legal* person; in either case, personhood is a prerequisite for authorship.

In EU case law, authorship, like creativity, seems to be attached with the originality requirement. The interlinkage with “personal touch” infers a human origin requirement, which is resolutely affirmed by the Advocate General in *Painer*: “Only human creations are [...] protected”.<sup>36</sup> Therefore, if the work in question is acknowledged as having been autonomously originated by AI, even if deemed creative, it collides with the authorship aspect of originality in the EU and, therefore, would not be copyrighted. AI-generated works of today, therefore, are not congruent with the authorship framework in both EU and UK copyright regimes.

### (i) *Tool vs Autonomous Creator*

Copyright works generated by the “aid” of yesterday’s computers do not raise any problems concerning authorship, as such computers can easily be regarded as tools insofar as human beings are involved in the creative process of the resulting work.

A prominent example is the 1985 English *Express Newspapers* case<sup>37</sup>, which concerned a lottery competition that was run through sequences of letters incorporated into a grid of five columns and rows. Liverpool Daily contended that copyright did not subsist in the work as it was produced by a computer, that

<sup>35</sup> Commission, ‘Proposal for a Council Directive on the Legal Protection of Computer Programs’ COM (1989) 816, [1989] OJ C91/9, 20.

<sup>36</sup> *Painer* (n 32) Opinion of AG Trstenjak, [121].

<sup>37</sup> *Express Newspapers Plc v Liverpool Daily Post & Echo Plc and Others* [1985] 1 WLR 1089.

is, without a human author. Mr Justice Whitford, however, emphasised that the involvement of a human author in addition to his intellectual skill and labour were necessary to arrive at such sequences as precise as necessary for the lottery competition to not be “hopelessly uneconomic”.

Therefore, in his rejection, Mr Justice Whitford clarified that the computer is merely an aid:

“The computer was no more than the tool by which the varying grids of five-letter sequences were produced to the instructions [...] 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”.<sup>38</sup>

Furthermore, according to the Advocate General’s opinion in *Painer*, protected human creations may “include those for which the person employs a technical *aid*, such as a camera”<sup>39</sup> insofar as

“the photographer still enjoy[s] sufficient formative freedom [...] [such as determining] the angle, the position and the facial expression of the person portrayed, the background, the sharpness, and the light/lighting. To put it vividly, the crucial factor is that a photographer ‘leaves his mark’ on a photo”.<sup>40</sup>

As such, yesterday’s AIs are viewed as tools since a human author’s input is present in the resulting work itself, in which her stamp, skill, labour or creative choices are reflected. Conversely, today’s AI cannot sit comfortably with this feature of copyright law. It is autonomous in its creations; it learns from its own experience and performs creative choices. To borrow a precise description from a computational creativity authority:

“[The] performance [...] [is] a stand-alone matter, wherein the computer generates the result all by itself. Having written the program, the human artist then stands back, hands off, to let it run [...] [thus] where G-art [(generative art)] is involved, it’s especially likely that the AI system itself [...] will be credited with

<sup>38</sup> *ibid* 1093.

<sup>39</sup> *Painer* (n 32) [121].

<sup>40</sup> *ibid* [124].



creativity”.<sup>41</sup>

To be further assured, let us briefly take the GAN type of DL algorithms as a case study alongside the exercise of judgment as an indication of autonomy. As conceptualised by a recent study,<sup>42</sup> GANs, which mimic the human mind, come from two main networks: generative and discriminator – both working against the other. The former creates new data simulating the artistic pattern of the training data, while the latter ensures that the process does not produce fake art and also improves its performance through feedback, which “maps the human process of trial and error”.<sup>43</sup> This means that the AI judges its output throughout the creation process independently, “[u]nlike other algorithms which make use of human judges”.<sup>44</sup>

Notwithstanding this study, one may take the ability to break free from rules and historical patterns as the required autonomy level under the EU originality-authorship standard and thus argue for the impossibility of AI systems, howsoever sophisticated, to cross that “free choices” threshold. This argument, however, does not take into account a corresponding AI case study, particularly called the creative adversarial networks (CANs), which increase the novelty of DL outputs and move away from the patterns of training datasets, thereby creating new artistic styles, where

“the generator does not only need to fool the discriminator to think that the image that it produces is ‘art’, it needs also to confuse the discriminator about the style of the generated work [...] [which means that] CANs ‘create’ instead of merely ‘emulate’ [artistic creativity]”.<sup>45</sup>

If, additionally, a work’s predictability shall be the sought linkage to human authorship, today’s AI has been proven to eliminate this possibility in many instances. One example is DeepDream, a generative art DL by Google, for which the programmers and training specialists could not predict the works in any great precision:

“The results surprised Google’s team. It turns out that much in the same way a child can look at a fluffy cloud and see a duck carrying

<sup>41</sup> Boden (n 22) 31.

<sup>42</sup> Caterina Moruzzi, ‘Measuring Creativity: An Account of Natural and Artificial Creativity’ (2020) 11 *Eur J Philos Sci* 1, 14.

<sup>43</sup> *ibid* 15.

<sup>44</sup> *ibid*.

<sup>45</sup> *ibid* 14.

a top hat, so can a computer. The resulting psychedelic images are like little drawings from the AI's imagination".<sup>46</sup>

Therefore, "[b]y any rational measure AI systems can be said to produce works creatively [...] in an accurate, logical and independent way".<sup>47</sup>

### C. IS THERE ANYTHING NEW UNDER THE SUN?

In light of the foregoing, are today's AI creations disruptive to a sufficient extent to compel reconsideration of our copyright frameworks? Grimmelmann argues that "old-fashioned pen-and-paper works raise all of the same issues; there is nothing new under the sun".<sup>48</sup> However, his view was informed by intrinsic human involvement in the creative process,<sup>49</sup> whereas works generated by today's

<sup>46</sup> Jack Clark, 'Trippy AI Art Jumps from Internet to TV Screens, Music Videos' (*Bloomberg*, 21 October 2015) >[www.bloomberg.com/news/articles/2015-10-21/google-deepdream-s-ai-art-will-star-in-music-videos](http://www.bloomberg.com/news/articles/2015-10-21/google-deepdream-s-ai-art-will-star-in-music-videos)< accessed 10 April 2021.

<sup>47</sup> Enrico Bonadio and Luke McDonagh, 'Artificial Intelligence as Producer and Consumer of Copyright Works: Evaluating the Consequences of Algorithmic Creativity' (2020) 2 IPQ 112, 114.music and literature. There is no doubt that, as has often happened in the past during previous waves of technological advances, AI platforms-and especially, machine learning-have brought with them new opportunities as well as challenges. Machine learning is an AI application enabling programs to learn and progress automatically from experience. Its main feature is accessing data and often using it for the purpose of creating outputs, including music, literature, movies and art. Amounts of data are observed and analysed by the machine, which enables the latter to learn and then make creative decisions leading to final outputs that, as precise works of art, are often not foreseeable by the people who developed and started the initial program. Such a process is characterised by the absence of substantial human intervention or assistance after the program is operated, and by the use of algorithms-namely a sequence of instructions aimed at solving a problem or performing a computation. 1 It can be deemed "algorithmic creativity", or the way by which AI/machines create new works."; "author": [{"dropping-particle": "", "family": "Bonadio", "given": "Enrico", "non-dropping-particle": ""}, {"parse-names": false, "suffix": ""}, {"dropping-particle": "", "family": "McDonagh", "given": "Luke", "non-dropping-particle": ""}, {"parse-names": false, "suffix": ""}], "container-title": "Intellectual Property Quarterly", "id": "ITEM-1", "issued": {"date-parts": [{"2020"}]}, "page": "112-137", "title": "Artificial Intelligence as Producer and Consumer of Copyright Works: Evaluating the Consequences of Algorithmic Creativity", "type": "article-journal", "volume": "2", "uris": [{"http": "http://www.mendeley.com/documents/?uid=815f1eb3-0dd9-460b-b686-dbe3fc91a57b"}]}, "mendeley": {"formattedCitation": "Enrico Bonadio and Luke McDonagh, 'Artificial Intelligence as Producer and Consumer of Copyright Works: Evaluating the Consequences of Algorithmic Creativity' (2020

<sup>48</sup> James Grimmelmann, 'There's No Such Thing as a Computer-Authored Work - And It's a Good Thing, Too' (2016) 39 Colum.JL & Arts 403, 404.

<sup>49</sup> Especially as Grimmelmann could only imagine five differences of AI creations, which informed his analysis: "(1) [...] embedded in digital copies. (2) People create them using computers rather than by hand. (3) Programs can generate them algorithmically. (4) Programmers, as well as users, contribute to them. (5) Programs can generate them non-deterministically". See Grimmelmann (n 48).

AI are different in that they “destabilize copyright law’s approach to authorship by obscuring the connection between the creative process and the work”.<sup>50</sup>

Boyden sees the emergence of algorithmic authorship in general as a “novel problem” not only in that it “fails to fall well in existing doctrinal categories”,<sup>51</sup> such as the tool designation, but also disrupts the rationale behind the originality doctrine. Therefore, in Boyden’s words, CGWs disrupt the authorship framework because “it [is] no longer [...] possible to simply assume that all minimally creative elements stemmed from the mind of one or more human authors”.<sup>52</sup> The US Copyright Office confirms Boyden’s view by stating that “[copyright] law [...] excludes photographs and artwork created by animals or by machines without human intervention”.<sup>53</sup>

In between Grimmelmann’s denial and Boyden’s assertion of disruption, Bridy argues that US copyright law shifted long ago from the romantic notion of authorship that centres on humanness, as evidenced by the work-made-for-hire (WMFH) doctrine, which grants copyright to corporations.<sup>54</sup> Thus, in Bridy’s eyes, AI creations do not pose a novel disruption but rather one that can easily be accommodated through extending the doctrine’s legal fiction.

Regardless of whether the disruption is deeper in kind or a minor one merely requiring doctrinal tweaks, as Kaminski respectively classifies Boyden’s and Bridy’s stances,<sup>55</sup> how today’s AI encounters the law should impel us to revisit its doctrines and rationales – and, more importantly, our understanding of them – for the sake of legal certainty. Therefore, the following Parts revisit various untraditional features of the law to assess whether they may effectively accommodate AI-generated works. These includes existent features, such as section 9(3) of the UK CDPA 1988, and newly invented propositions by legal scholars.

#### IV. DOES THE UK PROVISION ON CGWs ACCOMMODATE THE ADVENT OF THE AUTONOMOUS CREATOR?

The current UK trend took off through the 1988 CDPA, wherein section 9(3) states that, where a literary, dramatic, musical or artistic (LDMA) work 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”. The CDPA

<sup>50</sup> Bruce E Boyden, ‘Emergent Works’ (2016) 39 Colum.JL & Arts 377, 380.

<sup>51</sup> *ibid* 379.

<sup>52</sup> *ibid*.

<sup>53</sup> US Copyright Office, ‘Compendium of US Copyright Office Practices’ (3rd edn., US Copyright Office 2019) Section 313.2.

<sup>54</sup> Annemarie Bridy, ‘The Evolution of Authorship: Work Made by Code’ (2016) 39 Colum.JL & Arts 395, 400.

<sup>55</sup> Kaminski (n 1) 603.

defines a CGW as a work “generated by computer in circumstances such that there is no human author”.<sup>56</sup> Lord Yang, then Secretary of State for Trade and Industry, described the Act as “the first copyright legislation anywhere in the world which attempts to deal specifically with the advent of artificial intelligence”.<sup>57</sup> Nevertheless, today’s AI may challenge the legal certainty of determining who, if anyone, made the necessary arrangements to create a particular work. This Part critically analyses the UK model and assesses its viability.

### A. CATEGORISATION PARADOX AND LEGISLATIVE INTENTION

The first dilemma lies in the wording of the designated category for CGWs, which has misled recent scholarship to suppose that CGWs are different from computer-aided works. For the latter, analogies with a camera, pen and paper or a keyboard are usually used to illustrate the idea of AI being a mere tool versus CGWs, which, by contrast, are considered to be “autonomously created by AI”.<sup>58</sup> It is indeed tempting to draw a binary distinction, as such understanding ensures the UK approach does away, as some scholars believe, “with most potential debates about the creative works produced by artificially intelligent agents”<sup>59</sup> and “in many scenarios where original works are produced by computers or robots with no or little human input”.<sup>60</sup> While this solution may sound rational at the outset, it is problematic when examined through the copyright lens of the 33-year-old Act for several reasons.

First, it contradicts the legislature’s stipulation that copyright is granted to “the person by whom arrangements are undertaken”,<sup>61</sup> which presupposes a causal link between human intervention and creative output. Thus, the CGW

<sup>56</sup> Copyright, Designs and Patents Act 1988 (CDPA 1998), section 178.

<sup>57</sup> HL Deb 12 November 1987, vol 489, col WA1477.

<sup>58</sup> Enrico Bonadio, Luke McDonagh and Christopher Arvidsson, ‘Intellectual Property Aspects of Robotics’ (2018) 9 EJRR 655. with many social settings now entailing and increasingly requiring the use of robots to support a variety of human activities. Unsurprisingly, robots’ form and shape, their level of intelligence and intended purpose can vary significantly depending on the relevant industry. 1 Domestic robots are already a reality in a growing number of family homes. They include both humanoid robots which support those in need (such as the elderly, people with disabilities or children

<sup>59</sup> Andres Guadamuz, ‘Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works’ (2017) 2 IPQ 169, 175.

<sup>60</sup> Bonadio, McDonagh and Arvidsson (n 58) 670. with many social settings now entailing and increasingly requiring the use of robots to support a variety of human activities. Unsurprisingly, robots’ form and shape, their level of intelligence and intended purpose can vary significantly depending on the relevant industry. 1 Domestic robots are already a reality in a growing number of family homes. They include both humanoid robots which support those in need (such as the elderly, people with disabilities or children

<sup>61</sup> CDPA, section 9(3).

regime “still trace[s] back authorship to human intervention [...] so, to a certain extent, computers are still tools in this construction”.<sup>62</sup> Second, the expansive interpretation resulting from this categorisation error contradicts the fact that the technology coinciding with the 1988 enactment was no more than a rule-based AI and, therefore, subject to significant human intervention. It would be unreasonable to argue that the enactment intended to deal with advanced non-existent technologies, since such an argument unjustifiably credits the legislature with regulating what was, at the time, mere science fiction. Third, as analysed later, there is no judicial approach to support this understanding. Fourth, it collides with the legislature’s intention as manifested in the parliamentary discussion that preceded the enactment, which asserted:

“[T]he correct approach is to look on the computer as a mere tool in much the same way as a slide rule or even, in a simple sense, a paintbrush. A very sophisticated tool it may be, with considerable powers to extend man’s capabilities to create new works, but a tool nevertheless”.<sup>63</sup>

One might wonder why, if the provision is thus interpreted, it was then legislated in the first place. Is it not enough to apply the courts’ traditional pen-and-paper analogy? Such an argument is often supplemented with an additional compelling question: How do we then read section 9(3) in conjunction with section 178(b), which defines CGWs as works generated “in circumstances where there is no human author”? The response can be found in the Whitford command paper:

“On that basis it is clear that the author of the output can be none other than the person, or persons, who devised the instructions and originated the data used to control and condition the computer to produce the particular result. In many cases it will be a matter of joint authorship. We realise this in itself can cause problems, but no more than in some other fields, and we are not convinced there is a need for special treatment”.<sup>64</sup>

It follows that the provision was indeed considered unnecessary, and if one wishes to read it in conjunction with the definition, it can only make sense to interpret it as referring to circumstances where it is too unfathomable to identify a person’s contribution as distinct from that of the computer, in which case the protection would otherwise be (in a conventional sense) given jointly.

Accordingly, the CGW provision is often seen as legal fiction in that it “derogates from the general rule that defines the author as the one who creates the

<sup>62</sup> Ana Ramalho, ‘Will Robots Rule the (Artistic) World? A Proposed Model for the Legal Status of Creations by Artificial Intelligence Systems’ (2017) 21 J Internet L 12, 17.

<sup>63</sup> Mr Justice Whitford Committee, *Report of the Committee to Consider the Law on Copyright and Designs* (Cmnd 6732, 1977) [514].

<sup>64</sup> *ibid* [515].

work”.<sup>65</sup> The legal fiction can be further understood as a way to avoid the factual determination of ownership, where otherwise there would be joint authorship between the person and the machine. In other words, the legal fiction is an extension of the pen-and-paper tool analogy – not an expansion to the WMFH doctrine in the sense that it “vest[s] ownership of such a work in the person for whom it was prepared”,<sup>66</sup> as some scholars wrongly believe.

## B. NECESSARY ARRANGEMENTS AND THEIR RESPONSIBLE PERSON

Interpreting the vague term “arrangements” is another dilemmatic task. Ramalho considered the term to be equivalent to “preparing or organising something so that the work may be created”.<sup>67</sup> Bently and others offer greater clarity by suggesting that, in “an appropriate case”, the arrangements would include the operation of the computer, the input feed or the programming.<sup>68</sup>

In seeking further explanation from the only available case law, the High Court had to determine whether copyrights had been infringed in graphical frames generated and displayed when playing a video game.<sup>69</sup> The computer software, on the one hand, plays its role by overlaying a pre-created set of bitmap images together in different orientations with a relevant cue and storing them in the memory so that it can later select and display a certain image matching the cue when prompted. The videogame developer has devised “the appearance of the various elements of the game”,<sup>70</sup> namely by creating bitmap files, “the rules and logic by which each frame is generated and [...] the relevant computer program”.<sup>71</sup> The player’s essential arrangement is to press a specific button at a certain moment, which determines, to some extent, the frames displayed. The player, as per Mr Justice Kitchin, “is not, however, an author of any of the artistic works created in the successive frame images. His input is not artistic in nature and he has contributed no skill or labour of an artistic kind [...]. All he has done is to

<sup>65</sup> Ramalho (n 62).

<sup>66</sup> Bridy, ‘Coding Creativity’ (n 21) 27.

<sup>67</sup> Ramalho (n 62).

<sup>68</sup> Bently and others (n 26) 128, giving a broad context for exploring the key principles of the subject. In this fifth edition, the introduction has been updated to take account of Brexit. Important developments covered include the introduction of a doctrine of equivalents into UK patent law, the reforms of EU trade mark law (particularly with respect to ‘representation’ of marks, and the ‘functionality exclusions’

<sup>69</sup> *Nova Productions Ltd v Mazooma Games Ltd* [2007] EWCA Civ 219; [2007] EMLR 14, 427.

<sup>70</sup> *ibid* [105].

<sup>71</sup> *ibid*.

play the game”.<sup>72</sup> Thus, it was held that it is the programmer by whom the necessary arrangements are undertaken and, therefore, who is entitled to authorship.

Three distinct, though related, observations can be made based on this orphan case, which seem to have not been highlighted in legal scholarships. First, the technology underlying the graphical output is not sophisticated. It does not involve ML or DL, thereby calling into question whether it can be called AI. Indeed, the court’s judgment begins with exploring the technicalities in detail; Mr Justice Kitchin states, “Mr Jones did his programming work in Visual Basic. In writing the game he switched between writing aspects of the program and producing the graphics in the form of bitmap files. In order to create the bitmaps he used software called Adobe Photoshop”.<sup>73</sup> Suffice it to say, *Visual Basic* was declared legacy (i.e. outdated) soon after the case. Second, the court applied a high threshold by requiring a direct causal link between the intellectual creation of the human input and that of the output, notably, by highlighting the player’s input as not being artistic. Third, there are only two persons at stake in the case: a developer and an end-user.

Such a two-fold determination is too onerous to be implemented on generative DL, where multiple persons are involved, and the technical intermediaries blur the lines between the input of the human and that of the software. If the previous UK case had involved state-of-the-art DL, there would likely have been various persons at stake: an investor who funds the development of the software, a developer, a person who inserts the big data, a person who trains the system and an end-user who prompts the content.

### C. THE ORIGINALITY OF CGWs

Reconciling the CGW provision with section 1(1), which requires all LDMA works to be original, begs another dilemma: Can CGWs be original? The CDPA does not establish any special test of originality for CGWs, nor does it explicitly exempt them from the originality requirement, as explained above. Meanwhile, some scholars only acknowledge the undefined challenge,<sup>74</sup> whereas others

<sup>72</sup> *ibid.*

<sup>73</sup> *ibid* [16].

<sup>74</sup> Bently and others (n 26) 117, giving a broad context for exploring the key principles of the subject. In this fifth edition, the introduction has been updated to take account of Brexit. Important developments covered include the introduction of a doctrine of equivalents into UK patent law, the reforms of EU trade mark law (particularly with respect to ‘representation’ of marks, and the ‘functionality exclusions’

argue that the section 9(3) provision “evidently constitute[s] an exception”<sup>75</sup> and “divorce”<sup>76</sup> from originality. Others are more creative in their conclusion that originality is “self-standing and independent of authorship”.<sup>77</sup> In McCutcheon’s words, by a hypothetical analogy, “if the work had been authored by a human, or if that human could be identified, would it be original?”<sup>78</sup> Lacking consideration by the English courts, these understandings unjustifiably eschew the explicit language of the CDPA, which does not imply any discrimination in CGWs’ favour.

As demonstrated, it is neither viable to rely on the 33-year-old provisions to solve a complexity involving increasingly autonomous AI, nor did the legislature aim to regulate such advancement at the time. Indeed, “even where they are a solution to less autonomous AIs, it is unclear who the person responsible for the arrangements is”.<sup>79</sup> In sum, while the UK CDPA 1988 may accommodate AI-generated works in circumstances such that the AI, if a human, would be at most a joint author, it does not address circumstances where the AI, if a human, would be

<sup>75</sup> Bonadio and McDonagh (n 47) 120.music and literature. There is no doubt that, as has often happened in the past during previous waves of technological advances, AI platforms-and especially, machine learning-have brought with them new opportunities as well as challenges. Machine learning is an AI application enabling programs to learn and progress automatically from experience. Its main feature is accessing data and often using it for the purpose of creating outputs, including music, literature, movies and art. Amounts of data are observed and analysed by the machine, which enables the latter to learn and then make creative decisions leading to final outputs that, as precise works of art, are often not foreseeable by the people who developed and started the initial program. Such a process is characterised by the absence of substantial human intervention or assistance after the program is operated, and by the use of algorithms-namely a sequence of instructions aimed at solving a problem or performing a computation. 1 It can be deemed “algorithmic creativity”, or the way by which AI/machines create new works.”;author:“[{“dropping-particle”：“”,“family”：“Bonadio”,“given”：“Enrico”,“non-dropping-particle”：“”,“parse-names”:-false,”suffix”：“”}],{“dropping-particle”：“”,“family”：“McDonagh”,“given”：“Luke”,“non-dropping-particle”：“”,“parse-names”:-false,”suffix”：“”}],“container-title”：“Intellectual Property Quarterly”,“id”：“ITEM-1”,“issued”:{“date-parts”:[["2020"]]},“page”：“112-137”,“title”：“Artificial Intelligence as Producer and Consumer of Copyright Works: Evaluating the Consequences of Algorithmic Creativity”,“type”：“article-journal”,“volume”：“2”,“uris”:[“http://www.mendeley.com/documents/?uuid=815f1eb3-0dd9-460b-b686-dbe3fc91a57b”]};“mendeley”:{“formatted-Citation”：“Bonadio and McDonagh (n 46

<sup>76</sup> Guadamuz (n 59) 176.

<sup>77</sup> Ramalho (n 62).

<sup>78</sup> Jani McCutcheon, ‘Curing the Authorless Void: Protecting Computer-Generated Works Following IceTV and Phone Directories’ (2013) 37 MULR 46, 51.

<sup>79</sup> Ramalho (n 62) 18.



eligible for copyright protection. Therefore, a new UK approach to AI-generated works is vitally needed.

## V. THE PATH FORWARD: INSPECTING ALTERNATIVE PROPOSALS

Since the CGW model is not useful, legal certainty may require “doctrinal tweaks” or the introduction of further legal fictions. This Part inspects three propositions on how the law should treat AI creations: (a) AI as the author of its own generated works; (b) employer (either programmer, end-user or company) authorship; and (c) entrance into the public domain.

### A. AI AS THE AUTHOR

Today’s AI can autonomously produce works that would be copyrightable had they been created by a human; should authorship then be vested in the AI system itself? This solution, though radical, may arguably solve all the copyright allocation dilemmas in AI-generated works and “incentivize the creation of new and valuable creative output”.<sup>80</sup> It would also align with the fundamental authorship principle of copyright law, which provides that the author is the person who creates the work.<sup>81</sup> Authorship, however, cannot be given to AI systems, at least at present, for two reasons: (a) lack of legal personhood; and (b) inability to respond to incentives.

The first reason belongs to a different territory of law, but its discussions, interestingly, are not so far from the presently discussed authorship dilemma. For scholars such as Solum, legal personhood must not be granted to AI essentially upon two grounds: (a) AI is simply not human and should be treated as property; and (b) AI lacks crucial aspects of personhood (such as consciousness).<sup>82</sup> Thus, Solum’s reasons echo the concept of the romantic author and its associated arguments against protection for AI-generated works. His justification regarding the critical elements lacking in AI also aligns with the romantic belief that “belonging to the category of ‘author’ requires participation in the social, relational and dialogic practice of authorship”.<sup>83</sup> On the other hand, Teubner finds no reason why AI

<sup>80</sup> Ryan Abbott, ‘I Think, Therefore I Invent: Creative Computers and the Future of Patent Law’ (2016) 57 BCL Rev 1079, 1121. While the article is mainly about patent law, the author did designate a section to ‘Lessons for Copyright Law’.

<sup>81</sup> E.g., CDPA1998, section 9(1).

<sup>82</sup> Lawrence Solum, ‘Legal Personhood for Artificial Intelligences’ (1991) 70 NCL Rev 1231.

<sup>83</sup> Carys Craig and Lan Kerr, ‘The Death of the AI Author’ (2019) Osgood Legal Studies Research Papers 1, 7 <[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3374951](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=3374951)> accessed 27 March 2021.

cannot be a legal actor, drawing analogies with corporate entities.<sup>84</sup> This aligns with those who argue for protection on the basis that the law has already shifted from the humanness of authorship by vesting copyright in nonhuman entities.

Had the AI been considered an author of its generated works, the copyright purpose of incentives could easily be served by having the AI enter a contract of service with other natural or legal persons that respond to monetary and exclusive right incentives. Or, perhaps, by designing it to imitate a response to such incentives. Nonetheless, for now, AIs cannot (and should not) be authors until the law decides to personify them. Otherwise, the copyright law would initiate uncertainties and create unsettled questions.<sup>85</sup> Therefore, until such a time, it may be more reasonable to consider granting copyright to whom is already a person.

## B. EMPLOYER AUTHORSHIP

There are plenty of arguments supporting the WMFH model by expanding and reinterpreting or, as Kaminski perceived, “tweaking”<sup>86</sup> it to cover AI-generated works. Under the WMFH doctrine, an employer is considered the author for copyright purposes even when an employee is the author-in-fact.<sup>87</sup> In other words, the approach deems autonomous AI outputs as employee works under section 11(2) of the CDPA 1988 – the English equivalent of the US WMFH. The section explains that, if a “work is made by an employee in the course of his employment, his employer is the first owner of any copyright”.

Notwithstanding this, employment in this sense cannot exist unless it is between two humans or between a legal person (i.e. a corporation) and a human being.<sup>88</sup> Proponents of the WMFH approach, however, want the relationship between the generative AI and, say, the programmer to be deemed employment for copyright purposes by amending the doctrine definition in the sense that it “would vest ownership of such a work in the person for whom it was prepared”.<sup>89</sup> The equivalent solution for the UK copyright law would be to broaden its definition of employment to include circumstances where a person employs an AI system to generate works with no human involvement in the creative process. Hence,

<sup>84</sup> Gunther Teubner, ‘Rights of Non-Humans? Electronic Agents and Animals as New Actors in Politics and Law’ (2006) 33 *J Law Soc* 497.

<sup>85</sup> E.g. Victor Palace, ‘What If Artificial Intelligence Wrote This? Artificial Intelligence and Copyright Law’ (2019) 71 *Fla L Rev* 217, 234 (“Who enforces the right? What remedies should artificial intelligence be granted? What other rights should artificial intelligence receive?”). See also Kalin Hristov, ‘Artificial Intelligence and the Copyright Dilemma’ (2017) 57 *IDEA* 431, 441.

<sup>86</sup> Kaminski (n 1).

<sup>87</sup> Bridy, ‘Coding Creativity’ (n 21) 26.

<sup>88</sup> CDPA 1988, section 178 defines “employment” as to “refer to employment under a contract of service or of apprenticeship”.

<sup>89</sup> Bridy, ‘Coding Creativity’ (n 21) 27.

by assigning copyright to natural or legal persons while disregarding traditional originality analysis, the WMFH solution “avoids the predicament of vesting rights in a machine”,<sup>90</sup> which lacks personhood and does not respond to copyright incentives, as explained above. The solution also avoids entrance into the public domain of such works. The ultimate advantage of the WMFH approach is “[p]roviding financial incentives in order to encourage the growth and development of the AI industry”.<sup>91</sup>

The approach, however, is not free of dilemmas. From a conceptual level, such a change is not a mere “tweaking” that the confines of the WMFH doctrine can easily realise; rather, it goes beyond the doctrine to touch upon the rationale for which it has emerged. To illustrate this point, the purpose of the doctrine is to transfer the copyright of works between two parties with personhood: the real author is a human being, and her employer, who would be the author-in-law, may be a human or a corporate entity, but a person nevertheless. The proposed approach is at the end of a different spectrum: it transfers the copyright to a natural or legal person from a machine that has no personality nor any right whatsoever. Thus, the proposition “flips the purpose of the doctrine on its head”.<sup>92</sup> Additionally, such a proposition may conflict with an essential concept associated with copyright, that is, “with rights comes responsibilities”.<sup>93</sup> If the AI *employer*, whoever this may be, is deemed the author-in-law for an AI-generated work, she must bear responsibility when that work involves infringement, defamation or any harm. Will AI stakeholders accept such a burden for a creative process they cannot predict or control? This article joins Gervais in suggesting that “it is safer to answer in the negative”.<sup>94</sup>

From a practical perspective, the proposition leaves uncertain who is to be deemed the AI employer. In Bridy’s model, “that person would generally be the programmer in the first instance, although one could imagine situations in which it could be either the user of the program or the programmer’s employer”,<sup>95</sup> suggesting that the determination could be solved by the courts. Nevertheless, such a proposition would likely bring us back to square one, similar to the CGW model, as previously analysed, which is riddled with uncertainties. In the CGW model, we at least had human involvement in creativity as a determinate standard for

<sup>90</sup> *ibid* 25.

<sup>91</sup> Hristov (n 85) 444.

<sup>92</sup> Daniel J Gervais, ‘The Machine as Author’ (2020) 104 *Iowa L Rev* 2053, 2094.

<sup>93</sup> *ibid* 2085.

<sup>94</sup> *ibid* 2087.

<sup>95</sup> Bridy, ‘Coding Creativity’ (n 21) 27.

authorship allocation, whereas, in the proposed WMFH expansion, no certain standards seem to be agreed upon for determining the supposed AI employer.

It has been argued, instead, that copyright should be vested in a certain party, but such arguments for either the programmer, the end-user or the company as the employer (and, therefore, the author) vary. The most notable of these lend support for the AI developer, based on the assumption that AI proliferation depends on “the investment of time and skills by AI programmers and the financial backing of the companies for which they work”.<sup>96</sup> They also contend that end-users contribute the least, if anything, to the construction and dissemination of AI systems, and thus their copyright demands should be deemed the weakest.<sup>97</sup> Therefore, Hristov warns that, “[b]y losing copyright claims to end users, owners and programmers may restrict the use of AI by third parties”,<sup>98</sup> which would hinder the very objective that the copyright rationale of incentives seeks to achieve. He also suggests that there would be no conflict of authorship allocation between the AI developers and companies under the WMFH model, since independent developers would obtain copyright, while those whose services are employed would concede the copyright to their employer, who is a company or natural person.<sup>99</sup>

Nonetheless, arguments for end-users seem equally compelling. End-users undertake a considerable risk in purchasing the AI system hoping to end up with valuable work for commercial purposes or otherwise.<sup>100</sup> Furthermore, it has been argued that end-users “are in the best position to take the initial steps that will bring a work into the marketplace”; after all, it will be only at their insistence that the sought creations are brought to life.<sup>101</sup> Therefore, awarding them authorship of AI-generated works achieves the copyright rationale in that it will “most efficiently promote the proliferation of the devices and the works they produce”.<sup>102</sup>

What is to be deduced here is that, even if the proposed WMFH tweak is rekindled to award authorship to a *particular* employer for the sake of certainty, there is no certain way to find a player who is more deserving than the other candidates of this incentive. In each case, it would be over-rewarding. Developers or their companies already enjoy copyright in the literary work embedded in their program and the payments consequent to their sales. They would also enjoy noneconomic

<sup>96</sup> Hristov (n 85) 444.

<sup>97</sup> *ibid.*

<sup>98</sup> *ibid.*

<sup>99</sup> *ibid.* 445.

<sup>100</sup> Shlomit Yanisky-Ravid, ‘Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era – The Human-like Authors Are Already Here – A New Model’ (2017) 2017 Michigan State L Rev 659, 712.

<sup>101</sup> Pamela Samuelson, ‘Allocating Ownership Rights in Computer-Generated Works’ (1986) 47 U Pitt L Rev 1185, 1227.

<sup>102</sup> Yanisky-Ravid (n 100).

fruits, such as an enhanced reputation within their industry and the wider society. End-users, on the other hand, can freely make use of such works in many ways: they may enjoy the generated poetry, art, music or drama for their pleasure, build upon it as a source of inspiration<sup>103</sup> and share it to raise publicity.

There is no plausible candidate who, if attained copyright, would facilitate the ultimate public policy objective of AI proliferation. On the contrary, the approach may provoke access limitations, inequality and promote “a grab-all environment”.<sup>104</sup> To this effect, consider the case in which the programmer or her company has been deemed to be the AI employer and, therefore, the copyright owner of its generated works; thusly “enticed with the highly lucrative opportunity of obtaining copyrights at an unprecedented rate”,<sup>105</sup> what would their response to such an incentive likely be? It is highly likely that they would obscure access to autonomous generative AIs so that they could maintain the advantage of their “AI employer” status and, in so doing, become the authors of countless commercially valuable works.<sup>106</sup> Otherwise, AI programmers and companies might risk losing many copyright entitlements in the hands of end-users, some of whom would withhold the work or lie about its creation source. On the other hand, if the approach decides to award end-users the copyright, it is again fairly rational to presume that AI developers and companies would hoard accessibility so as to remain users and authors in perpetuity. They might as well increase the prices of such generative DL systems at a tremendous rate instead of squandering their potential copyright advantages.

In sum, the approach introduces potential uncertainties for judges and distorts the purpose to uphold the copyright incentive whoever is the incentivised party. Furthermore, it would inevitably undermine AI growth and access equality. In all circumstances, no stakeholder would be happy under the new sun. Therefore, without any author worthy of being granted copyright, it is necessary to consider entrance into the public domain.

### C. PUBLIC DOMAIN

The dilemmas of the above-inspected models lead us to favour the entrance of AI-generated works into the public domain. This approach is arguably the least dilemmatic and most appropriate solution to maintain the objective of

<sup>103</sup> Palace (n 85) 237.

<sup>104</sup> *ibid* 238.

<sup>105</sup> *ibid* 237.

<sup>106</sup> *ibid*.

creativity proliferation while, at the same time, eliminating uncertainties regarding authorship, rights allocation and public benefit.

Opposition to the public domain solution primarily takes the form of concern that it would inevitably diminish AI innovation and discourage creativity within the sector. Nevertheless, is it actually the case that AI pioneers and developers view a copyright monopoly as the principal means to reap the fruits of their efforts? In addition to the rewards already enjoyed by various stakeholders, as previously discussed, the incentives for companies and programmers extend far beyond copyright, which, except for the literary elements of the written software itself, is not a determining factor to AI development in this century. Indeed, AI advancement is set to move forward, with or without copyright, as it has become a race between countries, whose outcome will affect both national pride and policy;<sup>107</sup> the issue was put succinctly by Russian President Putin: “Who becomes the leader in this sphere will be the ruler of the world”.<sup>108</sup>

On the other hand, the public domain solution for AI-generated works is an underappreciated mechanism. A recent empirical study found multivalued benefits for British companies using public domain works.<sup>109</sup> The study also illustrated that such works can attract a higher rate of funding and foster greater creativity.<sup>110</sup> The study, therefore, strongly opposed the notion that “overgrazing will diminish the value of public domain works”.<sup>111</sup> Another study on the social value of the public domain suggested that, notwithstanding the protection rationale, “promoting and expanding the public domain in several key areas would yield large benefits for society in the form of increased access, greater development of complementary goods and services, and the ability to decentralise and widen the innovation process”.<sup>112</sup> This article argues that the sphere of AI creations is ideal to unlock these advantages.

A final and important point is that the public domain solution for AI-generated works neither negates the work’s creator, nor does it mean that there is nothing new under the sun; moreover, it does not contradict our previous analysis that AI systems are autonomously capable of creativity. It rather acknowledges

<sup>107</sup> *ibid* 239.

<sup>108</sup> CNBC, ‘Putin: Leader in Artificial Intelligence Will Rule World’ (*CNBC*, 4 September 2017) <[www.cnbc.com/2017/09/04/putin-leader-in-artificial-intelligence-will-rule-world.html](http://www.cnbc.com/2017/09/04/putin-leader-in-artificial-intelligence-will-rule-world.html)> accessed 8 April 2021.

<sup>109</sup> Kris Erickson and others, ‘Copyright and the Value of the Public Domain’ (UK Intellectual Property Office 2015) <[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/561543/Copyright-and-the-public-domain.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/561543/Copyright-and-the-public-domain.pdf)> accessed 5 April 2021.

<sup>110</sup> *ibid* 67.

<sup>111</sup> *ibid*.

<sup>112</sup> Rufus Pollock, ‘The Value of the Public Domain’ (Institute for Public Policy Research 2006) 15 <[www.ippr.org/files/images/media/files/publication/2011/05/value\\_of\\_public\\_domain\\_1526.pdf](http://www.ippr.org/files/images/media/files/publication/2011/05/value_of_public_domain_1526.pdf)> accessed 8 April 2021.

that an AI can rightly be an author-in-fact but cannot be the author-in-law insofar as the law does not assign it any legal right or personhood, let alone the incentive-related dilemma until the personification day comes. The solution moreover does not prevent incentivising users to publish the works generated by their AI as is currently done under the EU regime for unpublished public domain works.<sup>113</sup> In sum, the public domain solution serves us here as a technique to minimise uncertainties while maintaining copyright concepts, theories and rationales against potential undermining effects.

## VI. CONCLUSION

When facing creative works, lawyers and judges promptly search for someone to award copyright to; the feasibility of vesting this right, however, is rarely questioned. This entrenched idea of protection necessity can be understood in circumstances where all forms of creative works are presumed to be human-created. Nevertheless, today's circumstances, under which computational creativity races humankind, compel us to understand how today's AI encounters copyright law and to revisit the law's ultimate objectives, not to be misguided by outdated presumptions.

By examining the operation of creativity in today's AI through numerous interdisciplinary lenses, this article emphasised that AI is drifting further away from the law's old understanding, in whose framework AI could be viewed as a mere tool, judicially analogous to a pen, involving the intervention of a human being throughout the creative process. Generative AI in relation to humans indeed reflects the *Star Wars* quote from Darth Vader: "When I left you, I was but the learner, now I am the master". Following this deduction, the article discussed how the autonomous capability of creative AI encounters traditional doctrines of copyright and concluded that, in some aspects, incompatibility exists. While AI-generated works easily meet the creativity aspect of originality, they fall short in terms of authorship. This is not merely because of the latter's romance but, more so, the personhood requirement. Likewise, the article challenged the widely held assumption that the UK CDPA 1988 provision on CGWs accommodates today's AI creations. In doing so, it analysed the provision's legal fiction, legislature intention and judicial interpretation.

Various newly invented frameworks were subsequently discussed to assess whether any could accommodate today's AI-generated works. The article rejected the AI-as-the-author proposal insofar as the law does not currently personify such systems; therefore, recognising their copyright would inevitably raise serious uncertainties undermining the legal system. While protection proponents are

<sup>113</sup> See Ramalho (n 62) 22.

mostly supportive of the employer-authorship solution, the article demonstrated its poor viability. Putting aside the conceptual flaws in expanding the employment doctrine, the entrenched disagreements over determining the AI *employer* reflect that copyright would be, in all circumstances, a wasted incentive to already-rewarded players, while potentially leading to access inequality and a grab-all environment and also risking public policy objectives alongside copyright rationales.

Therefore, it was found that entrance into the public domain is the least dilemmatic and most promising solution for AI-generated works. This solution would prevent over-rewarding, align with public policy and ensure fair access to an unprecedented volume of creative works. As discussed, technology innovation will inevitably continue to advance under all circumstances.

While undeniably presenting dilemmas, AI-generated works also offer an opportunity to rethink copyright doctrines, theories and rationales and our understanding of them. The article, having undertaken such rethinking, urges judiciary, legislature and legal scholars to consider a public domain model for AI creations, thereby unlocking its significant potential value, socially and economically, both to the public as well as to various stakeholders.