# Painting by Numbers: Copyright Protection and AI-generated Art

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Artificial intelligence; Artistic works; Copyright

## Abstract

*Who owns the copyright when AI systems make art? Grounded in a detailed discussion of the technology, this article argues against the creation of legal exceptions for computer-generated artwork and instead views AI like any other tool. It argues for a utilitarian understanding of intellectual property rights in which the user (as opposed to the programmer) would hold the copyright for such works.*

As artificial intelligence (AI) progresses, we are faced with an exciting yet daunting question: is there anything this technology cannot do? After all, AI programmes have written award-winning poems,[1] tricked critics with their paintings[2] and beaten grandmasters at chess.[3] Indeed, AI seems at times to have become more "man" than "machine". AI engineers compare their creations to the human brain, describing "neural networks" that "train" on data and "learn" for themselves. For Alan Turing, if a machine could reach a level of sophistication that mimics, surprises and even deceives humans,[4] it would have achieved intelligence. With its poems, paintings and chess-playing prowess, AI seems to have met this challenge.

But what does it mean for the law if machines have "digital neural networks"[5] that "learn from experiences",[6] "make creative decisions"[7] and "operate autonomously?"[8] Like Turing, legal scholars also measure the technology against a human standard, emphasising its ability to "mimic human traits, such as reason, creativity and learning".[9] This human connection is often presented as the root of the legal problem, and nowhere is this clearer than the scholarship on AI and copyright. If machines are approaching human levels of creative ability, the scholars ask, where does this leave copyright for the poems they write or the pictures they paint? Should copyright subsist in AI-generated artworks at all? And, if so, who should benefit?

The premise of this article is straightforward: descriptions of AI as "autonomous", "creative" or "intelligent" are largely incorrect. Further, in the context of copyright, failure by researchers to accurately consider the technical functionality of AI has significant implications for legal analysis. Taking a different approach, this article first explains how AI works and, in an attempt to avoid metaphor and analogy, does so in some technical detail. Second, it considers afresh whether copyright should subsist in AI-generated artwork, particularly under UK law. The article finally provides a framework for deciding who might benefit from such copyright. To this end, it draws on a utilitarian understanding of copyright as economic assurance for creative effort.

## How does artificial intelligence generate art?

All computer programs consist of code. Each line of code provides a rule. When lines of code are combined to produce a particular function, they form an algorithm. This is not unlike using Excel tables for arithmetic. If I "code" the C1 cell to calculate the sum of A1 and B1 (C1 = A1 + B1), the computer performs the function whenever I input new data into those cells.

AI only differs from this sort of algorithm in the inclusion of a second, intersecting layer of code. AI systems can therefore be understood as two levels of programming:

(1) code instructing it to perform an algorithm on a given data set; and

(2) code instructing it to adjust elements of that algorithm if it turns out that the algorithm works for one data point but not for another.

In essence, the machine not only performs the coded function, but also tweaks the function under set conditions.

### *A worked example*

Imagine that Jim and Sally are law students. Their intellectual property course includes a paper and an exam. Both assessments are marked out of 100 but are weighted differently. Their results are as follows:

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[1] R. Kurzweil, "Poetry by the Cybermetric Poet" available at: *http://www.kurzweilcyberart.com/poetry/rkcp_overview.php* [Accessed 28 September 2021].

[2] G. Cohn, "AI Art at Christie's Sells for $432,500" available at: *http://www.nytimes.com/2018/10/25/arts/design/ai-art-sold-christies.html* [Accessed 28 September 2021].

[3] S. Gibbs, "AlphaZero AI beats chess champion" available at: *http://www.theguardian.com/technology/2017/dec/07/alphazero-google-deepmind-ai-beats-champion-program-teaching-itself-to-play-four-hours* [pAccessed 28 September 2021].

[4] A. Guadamuz, "Do androids dream of electric copyright? Comparative analysis of originality in artificial intelligence generated works" [2017] I.P.Q. 169–186, 181.

[5] J. Ginsburg, "People Not Machines, Authorship and What It Means in the Berne Convention" (2018) 49 I.I.C. 131, 133.

[6] P. Devarapalli, "Machine Learning to Machine Owning: Redefining the Copyright Ownership from the Perspective of Australian, US, UK and EU Law" (2018) 40 E.I.P.R. 722.

[7] E. Bonadio and L. McDonagh, "Artificial intelligence as producer and consumer of copyright works: evaluating the consequences of algorithmic creativity" [2020] I.P.Q. 112.

[8] A. Bridy, "Coding Creativity: Copyright and the Artificially Intelligent Author" (2012) 5 *Stanford Technology Law Review* 1, 3.

[9] M. Senftleben and L. Buijtelaar, "Robot Creativity: An Incentive-based Neighbouring Rights Approach" (2020) 42 E.I.P.R. 797.

| **Jim** | | **Sally** | |
|---|---|---|---|
| Paper: | 50 | Paper: | 100 |
| Exam: | 50 | Exam: | 50 |
| *Final Mark* | *50* | *Final Mark* | *65* |

Jim and Sally want to know the weighting of the paper and exam in their final marks.

Straightforward computer algorithms could not solve the problem. This is because a programmer cannot code an algorithm to calculate a weighted average without first knowing which weighting to use. To follow the Excel example above, Excel tables can work out an average (C1 = (A1 + B1) / 2) and apply a weighting (20% being E1 = D1 * 0.2), but a simple Excel table cannot take the raw data from the mark sheets and determine the weighting for itself.

A human could solve the problem using logic and simple maths. They might, for example, start by comparing Jim and Sally's marks, noting the 15-point difference between the final marks. The human would also note that Jim and Sally have the same mark in the exam. They therefore know that the 15-point difference comes from the paper. In the paper marks, Sally's 100 is twice as good as Jim's 50. It then follows that the value of the paper must be twice her lead over Jim (15 x 2 = 30). With the paper worth 30 final marks, 70 remain for the exam, and the course has a 30:70 weighted split.[10]

AI could also solve the problem. But rather than looking at differences in the raw data to "spot the pattern", it would need an explicitly coded system of rules to follow:

(1) "The Model"—code providing an algorithm for weighted averages with random starting weights
i.e. (Exam x Weight) + (Paper x Weight) = Final Mark

(2) "The Forward Pass"—code instructing the AI to run Jim and Sally's data through the algorithm.

(3) "The Backward Pass"—code instructing the AI to adjust the random starting weights if the final marks generated by the algorithm do not match Jim and Sally's data.

(4) "The Convergence Criterion"—code instructing the AI to repeat this process until the weighting works for all the data.

Using a randomly generated 50:50 starting weight, the AI would run Jim's data through its algorithm ((50 x 0.5) + (50 x 0.5) = 50). It would not adjust the rule, because the result matches Jim's final mark (50). When it runs Sally's data, however, it finds a problem ((100 x 0.5) + (50 x 0.5) = 75), as 75 is larger than the 65 it was told to expect. Its code instructs it to adjust the weighting and try again. If the result is still wrong, it repeats this process until the algorithm is accurate for both Jim and Sally ((100 x 0.3) + (50 x 0.7) = 65). If it is then fed a new student's raw scores, it will calculate an accurate final mark using this newly adjusted algorithm.

To Jim and Sally, the AI would seem impressive. After all, it appears to have "worked out" the pattern and "learned" how to grade students on its own. Importantly, though, that is not what has happened. No part of the process involved creative decision-making or autonomous judgment by the computer. The computer did not decide which data to run, when to adjust the code or even how much to adjust it. Rather, every step in the sequence is pre-coded. The AI system simply performs the functions written in the code.

A human too could decide to follow the same set of rules as the AI. Writing out each calculation by hand, they would start with a randomly generated weighting, testing it for Jim, altering it for Sally, and repeating the process over and over. If that human followed the strictly coded set of rules exactly, they too would not be engaging in autonomous decision-making. They would not have "learned" how to use logic to find the weighting. They would simply be applying the rules in a mechanical way. Ultimately, then, AI systems are electronic tools for carrying out this sort of mechanistic calculation.

## *The principle in practice*

In modern AI systems—such as those that generate art, music or literature—this principle is applied on a massive scale. Instead of two sets of data to test, there could be millions. Instead of two weights for the machine to adjust, there could be billions. It would perform billions and billions of calculations and adjustments. The current record for number of adjustable weights stands at 175 billion.[11]

Take, for example, the AI used in The Next Rembrandt Project. This AI was fitted with algorithms that analysed many features of Rembrandt's paintings: facial spacing, shadow distribution, colour pallet, brush consistency, paint thickness, canvas texture, etc. It was fed 346 paintings as its data set, broken down into thousands of pixels. This data was used to tweak a set of algorithms that, instead of analysing more paintings, were then used to produce one.[12] The result was the most mathematically typical Rembrandt painting as determined by the data. It was all of the paintings, without being any specific one.

Crucially, though, the technology used to "work out" the rule behind Rembrandt's paintings is the same as the technology used to "work out" Sally and Jim's weighted average. All that changed was the scale of the operation.

[10] A human being could, of course, also solve the problem using algebra. The algebraic functions could then be coded or written into an Excel sheet. Importantly though, the code or Excel tables could not replicate the logical human thought process that generated the algebraic sequence. Though algebraic functions are a useful intellectual scaffolding for expressing logical thought processes, they are not the same as the thought processes.

[11] Medium, "175 Billion Parameter AI" available at: *https://synced.medium.com/openai-unveils-175-billion-parameter-gpt-3-language-model-3d3f453124cd* [Accessed 3 November 2021].

[12] The Next Rembrandt Project available at: *http://www.nextrembrandt.com* [Accessed 20 February 2021].

Though it would take many lifetimes to take all the measurements and complete all the necessary calculations by hand, if a human were to follow the original code, they would generate exactly the same outcome as The Next Rembrandt Project. As Grimmelmann puts it, "there is nothing new under the sun, … computers make some kinds of creativity practically feasible, but they do not make anything newly possible".[13] AI remains fundamentally mechanistic in nature. Its results are mathematically certain and its processes deterministic. A tool this effective is truly remarkable, but it is still just a tool.

Even when AI generates "multiple" or "different" results, the technology is still deterministic in nature. For example, DeepDream allows users to upload a picture and watch as the AI "edits" the image. Here, Guadamuz, a legal scholar, incorrectly describes DeepDream as "making its own decisions" and "entirely independent of human input".[14] Quite the opposite; DeepDream is entirely dependent on human input. DeepDream's results vary because an element of randomness is built into the system to assist some of the functions. But as computers are incapable of generating truly random numbers, they require an initial starter value—a "seed"—provided by a human. This seed allows for the results to vary from one running of the system to the next; a different starter seed will generate different results. Though it is tempting to see the variations as novel or creative, the technology's deterministic character has not changed; if a human were to complete the calculations by hand and receive the same seed, the results would match the AI. Finally, it is telling that the developers of DeepDream do not refer to "independent decision-making" at all but rather describe the technology as what it is: a "tool for artists".[15]

## Does copyright subsist in AI-gnerated artworks?

### *Qualifications for copyright*

Not all art qualifies for copyright protection. Most jurisdictions require three elements for copyright to subsist: fixation, originality and creativity. Though the precise legal tests vary, these elements mean that copyright does not apply to intangible ideas, methods or concepts (fixation); copies of other artworks (originality); or works that are not the product of some intellectual effort or skill (creativity). Beyond satisfying these elements, however, copyright has traditionally taken a very broad view of art, seeking to foster creative expression regardless of how it might manifest.

In confronting computer-generated art, legal systems have questioned whether human authorship is required under the three elements set out above. Perhaps the clearest position is in the United States, where the US Patent Office has stated unequivocally that "a work must be created by a human being".[16] In case law, US courts have similarly stressed the need for a human author and for that author to be sufficiently proximate in the creation of the work. (Famously, allowing a monkey to press the button on a camera does not meet this standard).[17] The same is true in Australia, with courts finding that computer-generated information sheets "did not have any author and could not be protected by copyright".[18]

EU law also follows this trend. Building on the laws of several Member States (including France, Spain and Germany),[19] *Infopaq* found that "originality" under EU law includes a requirement that works be the "author's own intellectual creation".[20] *Painer* subsequently expanded on this point to find that "an intellectual creation is an author's own if it reflects their personality".[21] The literature on this point considers these two cases as requiring a "human author"[22] or at the very least "a human touch in the generative process".[23] However, as a copyright case specifically concerning the subsistence of copyright in computer-generated works has (to this author's knowledge) yet to be heard before an EU Member State court, the exact standing of AI-generated artworks remains unsettled.

### *Copyright in the UK*

The UK has taken a different approach. Instead of evolving gradually through case law, the Copyright, Designs and Patents Act 1988 appears—at least at first—to provide legal authority on both authorship and computer-generated works. Section 1(1) provides that "copyright is a property right which subsists … in … original … artistic work". Case law had found this "originality" to be a two-stage test: the work must not be a copy and must be the product of the author's "skill, labour and judgment".[24] In this sense, "original" in s.1(1) encompasses both the "originality" and "creativity" tests common to most copyright systems.[25] More recently, in line with the UK's former status as a European Member State, the "skill, labour and judgment" test has also been

[13] J. Grimmelmann, "There's No Such Thing as a Computer-Generated Work" (2016) 39 *Columbia Journal of Law & the Arts* 404.
[14] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 178.
[15] Google Blog, "Inceptionsim" available at: *https://ai.googleblog.com/2015/06/inceptionism-going-deeper-into-neural.html* [Accessed 3 November 2021].
[16] Balganesh, "Causing Copyright" (2017) 117 *Columbia Law Review* 1, 3.
[17] *Naruto v Slater* 888 F. 3d 418 (9th Cir.) (2018) (US).
[18] *Acohs Pty Ltd v Ucorp Pty Ltd* [2012] FCAFC 16 (Aus).
[19] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 116.
[20] *Infopaq International A/S v Danske Dagblades Forening* (C-5/08) EU:C:2009:465; [2009] E.C.D.R. 16.
[21] *Painer v Standard Verlags GmbH* (C-145/10) [2011] E.C.D.R. 13 AGO.
[22] Devarapalli, "Machine Learning to Machine Owning" (2018) 40 E.I.P.R. 722, 726.
[23] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 118.
[24] Pinto, "Robo ART! The copyright implications of artificial intelligence generated art" (2019) 30 Ent. L.R. 174, 175.
[25] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 180.

interpreted to include the EU creativity requirement for "intellectual creation" that "reflects an author's personality".[26]

Section 178 of the statute explicitly provides that the term "computer-generated" means a work "generated by computer in circumstances such that there is no human author". Section 9(3) then provides that copyright may subsist in computer-generated works and that:

> "in the case of a 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".

As such, unlike the position in the US or Australia, the UK appears to provide a basis for copyright to subsist in AI-generated works.

However, the statute's position on human authorship (and, by extension, originality) is inconsistent, stating that computer-generated works "have no author" (s.178), while also defining who "the author shall be" (s.9(3)). This has understandably led to confusion. For Bonadio et al., if there is "no author" under s.178, this "evidently constitute[s] an exception to the originality requirement".[27] Dickinson, meanwhile, argues that the nomination of an author in s.9(3) means that the originality test is simply transferred to that person. For her, the statute's test appears to be

> "whether the deemed author (i.e. the person who made the arrangements necessary for the creation of the work by a computer) uses his/her skill, labour and judgment in that arrangement".[28]

She additionally points out that this approach would fit the "very limited reasoning" given in *Nova Productions v Mazooma Games*.[29]

Most writing on this issue refers to *Express Newspapers v Liverpool Echo* and its distinction between "computer-generated" and "computer-assisted" works.[30] As Dorotheou describes, the court found that

> "in computer-assisted work, the software is merely a tool to produce the final product and so the copyright vests in the person utilising the software. Computer-generated work, by contrast, is work which is created without the expenditure of significant human skill and effort".[31]

The distinction helps to clarify the statute; if a work is computer-generated it bypasses the authorship and originality requirements (i.e. Bonadio's reading), but if it is merely computer-assisted, it has a human author who must show originality (i.e. Dickenson's reading). As copyright subsists in both cases, s.9(3) should therefore be understood not as introducing an "author" for the purpose of the originality test, but rather as introducing an author for the purpose of deciding who should benefit from the copyright. Ultimately, this "assisted versus generated" distinction follows a similar logic to the "sufficiently proximate" relationship arguments seen in other jurisdictions.

However, though the courts have found a way to consistently implement the CDPA, if we consider the statute in light of AI's technological characteristics, the provisions seem misguided. Because AI systems are ultimately a form of computer programming, a legal distinction between "computer-assisted" and "computer-generated" works seems arbitrary. As established above, AI is complex, but it is still just a tool. The law's apparent preoccupation with "sufficiently proximate" relationships is therefore untenable in this context and creates an unnecessary hierarchy of technologies. Indeed, until technology is so advanced as to genuinely replicate human creativity, all art made using computers is "computer-assisted" and the "computer-generated" distinction is redundant.

What would this mean, then, for a work like The Next Rembrandt Project? The answer is to apply the conventional tests of fixation, originality and creativity. The Next Rembrandt painting was a physical work and, as such, easily meets fixation requirements. The painting similarly qualifies as "original" because, as Dorotheou explains, the transformation of paintings to pixels, pixels to code, code to pixels and pixels to an entirely different painting is a transformative process too remote to be "derivative" or "adaptive".[32]

The third requirement for an author's "skill, labour and judgment" (or "intellectual creation" in EU law) is also satisfied. UK law has traditionally set a very low threshold when considering "skill, judgment and labour",[33] requiring only a "more than negligible or trivial effort" that is "sufficient to impart to the product some quality or character which the raw material did not possess".[34] The level of human involvement required by AI systems could be argued to meet this standard. Though some of the "skill" and most of the "labour" fall to the machine, the "judgment" is entirely human. The human clearly imparts to the product some quality that the raw material did not possess; without the human decision to apply the AI to a particular data set, there would be no art at all. The decision to turn on a computer and run an AI system is

[26] J. Dickenson, A. Morgan and B. Clark, "Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications" (2017) 39 E.I.P.R. 457, 458.
[27] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 120.
[28] Dickenson, Morgan and Clark, "Creative Machines" (2017) 39 E.I.P.R. 457, 459.
[29] *Nova Productions Ltd v Mazooma Games Ltd* [2006] EWHC 24 (Ch); [2006] E.M.L.R. 14 Ch D. Dickenson, Morgan and Clark, "Creative Machines" (2017) 39 E.I.P.R. 457, 459.
[30] *Express Newspapers Plc v Liverpool Daily Post & Echo Plc* [1985] 1 W.L.R. 1089; [1986] E.C.C. 204 Ch D.
[31] E. Dorotheou, "Reap the benefits and avoid the legal uncertainty: who owns the creations of artificial intelligence?" (2015) 21 C.T.L.R. 85, 87.
[32] Dorotheou, "Reap the benefits and avoid the legal uncertainty" (2015) 21 C.T.L.R. 85, 90.
[33] Pinto, "Robo ART! The copyright implications of artificial intelligence generated art" (2019) 30 Ent. L.R. 174, 176.
[34] *Macmillan & Co v K & J Cooper* (1924) 26 BomLR 292 (Bombay HC).

ultimately a creative one; it is a decision to make art. To take an example from non-computer art, the "skill" and "labour" involved in Tracey Emin's Turner Prize-nominated *My Bed* could be argued to be minimal. The only transformation from "raw material" to "final product" was the creative decision by Emin to see the bed as art and introduce it to the world. The result of her "judgment" here (not her "skill" or "labour") was a truly brilliant work of art in which undoubtedly copyright would have subsisted. The same should be true of AI-generated art. The law should acknowledge the "judgment" component of its test, no matter the form it takes or the tools it uses.

## Who holds the copyright for AI-generated works?

Building on the above, this section considers who might hold the copyright that subsists in AI-generated artworks. The discussion critiques the current UK legal position in light of our more technical understanding of AI's art-generating capacity, while considering the arguments in favour various parties: the programmer, the user and the AI device itself.

### *The case for machines—my computation, my art*

Some, albeit few, scholars claim that AI devices should hold copyright for works they generate. This article seeks to "challenge the hasty and blanket generalisation that machines cannot have mental states",[35] by focusing "not on what [machines] are, but what they can do".[36] If both the programmer and the AI have human-level ability, they argue, perhaps they are not "man and machine", but "parent and child"[37] or "teacher and student".[38] They draw parallels to other non-natural legal personalities, such as companies, and argue that AI devices should receive credit for the work they perform.[39]

However, this argument misunderstands the technology involved. Even if we consider "what they do" rather than "what they are", their abilities fall under mechanistic computation, not human creativity. Further, providing copyright to a machine is unjust because it gives the economic incentive for creativity to an artist's tool, rather than the artist who has the creative judgment to use it. As others identify, the decision to award AI devices legal personality would also involve other rights and obligations, including criminal and civil liability.[40] Ascribing such rights to a machine invites the very dangerous prospect that machines could be used as scapegoats for human responsibilities.[41]

### *The case for programmers—my AI, my art*

A more commonly held position is that copyright subsisting in AI-generated artworks should be held by programmers. As Bridy puts it, the understanding here is that "people-who-write-programs-that-make-art are authors of the art their programs make".[42] For many, this is the most intuitive approach, as the programmer "undertakes the real creative work … and makes the greatest … investment."[43]

This view also reflects the position in UK law, as programmers have been found to make "the arrangements necessary for the creation of the work" (s.9(3)). In *Nova Productions*, for example, the programmer of a game was found to be the author of the frames generated on the screen, rather than the player of the game. Similarly, in *Express Newspapers*, the programmer of software that generated lottery tables was found to own the copyright for the resulting tables. Indeed, this interpretation is also in keeping with "the spirit of the law",[44] as the statute's drafters intended 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 a computer to produce a particular result".[45]

Some scholars, however, take a more nuanced approach to s.9(3). Although they still argue that authorship "would in all likelihood [fall] to the person who created the underlying algorithm",[46] they acknowledge that because s.9(3) does not identify programmers explicitly, a user might contribute data or select parameters that amount to "making the necessary arrangements". As such, they see s.9(3) as leaving the final decision "in the hands of the court based on the facts of the particular case".[47]

This approach more accurately reflects the reasoning in the above cases. In *Nova Productions*, Jacob LJ found that the player of the game is not the author because "his input is not artistic in nature and he has contributed no skill or labour of an artistic kind", inviting the possibility that a player who did fulfil such requirements might be an author[48]. In practice, it is easy to imagine how this

[35] M. Chatterjee and J. Fromer, "Minds, Machines, and the Law" (2019) 119 *Columbia Law Review* 1887, 1888.
[36] S. Chesterman, "Artificial Intelligence and the limits of legal personality" (2020) 69 I.C.L.Q. 819, 834.
[37] Dorotheou, "Reap the benefits and avoid the legal uncertainty" (2015) 21 C.T.L.R. 85, 90.
[38] Chesterman, "Artificial Intelligence and the limits of legal personality" (2020) 69 I.C.L.Q. 819, 836.
[39] Chesterman, "Artificial Intelligence and the limits of legal personality" (2020) 69 I.C.L.Q. 819, 836.
[40] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 125; and Chatterjee and Fromer, "Minds, Machines, and the Law" (2019) 119 *Columbia Law Review* 1887, 1892.
[41] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 125; and Chatterjee and Fromer, "Minds, Machines, and the Law" (2019) 119 Columbia Law Review 1887, 1892.
[42] Bridy, "Coding Creativity" (2012) 5 *Stanford Technology Law Review*, 1, 25.
[43] Dorotheou, "Reap the benefits and avoid the legal uncertainty" (2015) 21 C.T.L.R. 85, 93.
[44] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 175.
[45] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 176.
[46] Dickenson, Morgan and Clark, "Creative Machines" (2017) 39 E.I.P.R. 457, 459.
[47] Bridy, "Coding Creativity" (2012) 5 *Stanford Technology Law Review* 1, 27.
[48] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 177.

might apply to a game with a significant player-driven design component. Similarly, in dismissing the idea that a computer devised the tables in *Express Newspapers*, Whitford J wrote that "the person who drives the pen"[49] is responsible for the creation of written materials and not the pen itself. This again invites the conclusion that in some circumstances a user might be seen to "drive the computer'" and thus hold the copyright. Unfortunately, the distinction between programmer and user did not arise in this particular case, as a single individual acted as both.

Here, the concept of sufficient proximity colours the interpretation, as the factor assessed by the court is the extent of an individual's involvement in "the necessary arrangements". However, this approach does not align especially well with our technical understanding of AI. Seeing AI as a tool requires us to treat it like any other artistic tool—whether that be a paintbrush or a saxophone, Microsoft Paint or GarageBand. For those tools, the inventor, manufacturer or seller is not given credit for the art that is subsequently created. That right has always—and should always—lie with the artist, its user.

## *The case for users—my input, my art*

Intellectual property rights follow a utilitarian model that believes that society benefits from the innovative and creative work of individuals, and that such innovation or creation should be incentivised through economic protections for those individuals. Whether copyright for artists or patents for inventors, intellectual property rights provide individuals with the security they need to invest time, effort and money in the pursuit of creativity or innovation.[50] Seen through this utilitarian lens, the only logically consistent approach to copyright for AI-generated artworks is to assign the copyright to the users of the technology and to define users as a category that is distinct from programmers. Programmers, as the inventors of AI systems, are better served under patent law.

To illustrate this point, consider a set of complex technologies that are tools for creating art: musical instruments. When Mitsuko Uchida uses a Steinway piano to create music, she holds the copyright for that art. Though her piano makes the sounds we hear, she inputs the necessary creative expression through the keyboard and does so with more than sufficient "skill, labour and judgment" to be the music's author. Steinway is incentivised to develop their technology in other ways; the market value of the raw materials, the manufacturer's effort and expertise, and the inventor's design will be reflected in the piano's price. If Steinway were to develop sufficiently innovative piano technology, the effort, money and time they invested would be rewarded with a patent granting them exclusivity in the provision of that technology for a set period of time.

In comparison, the user input for an AI-device may seem minimal, and those who argue against the recognition of users typically make this point. "The act of tapping a button",[51] they argue, might mean that a user creates a work without any meaningful expectation or foresight as to the outcome. Without such foresight, this argument claims that the user cannot be said to be truly involved in—or "sufficiently proximate"[52] to—the creative process.

Yet, while they argue this for AI, the law does not take this approach for other technologies. Consider, for example, photographers and cameras. In *Temple Island Collections v New English Teas*, the court found that when a photographer takes a picture, their "skill, labour and judgment" stems from the composition, i.e. "the bringing together of different elements at the right place and the right time".[53] The law makes no requirement for artistic foresight. Instead, a photographer would still be protected if, in their artistic judgment, they decided to leave elements of the composition to chance. The photographer could, for example, set a camera to take a picture every three seconds and then throw the camera up into the air. Though they would not have selected the precise angle or even the exact subject in the frame, by bringing together the right elements at the right time, they would undoubtedly have met the threshold for "skill, labour and judgment".

Indeed, it would be absurd to require a photographer to have fully envisioned the precise outcome of their process in order to qualify for copyright. As Grimmelmann writes,

> "we could admit that a composer who plays at dice does not control their fall, any more than Jackson Pollock controlled the fluid dynamics of his paint splatters. … But we are nonetheless willing to sweep them into the composer's copyrights".[54]

To refuse to do so would be to disincentivise a great deal of artistic experimentation. Significantly, then, when it comes to determining the correct threshold for "skill, labour and judgment", it is an error to conflate creativity with foresight and even with "sufficient proximity". As shown in the example from Tracey Emin, the legal threshold for "skill, labour and judgment" has historically required very little, if any, "skill" or "labour". Instead, the decisive element is the artist's "judgment" and the mere decision to use a tool for the creation of art—whether that tool is a piano, a camera or an AI device—is sufficient to meet this requirement. In this way, those who use AI devices to generate works of art

[49] Dorotheou, "Reap the benefits and avoid the legal uncertainty" (2015) 21 C.T.L.R. 85, 85.
[50] Chatterjee and Fromer, "Minds, Machines, and the Law" (2019) 119 *Columbia Law Review* 1887, 1893.
[51] Grimmelmann, "There's No Such Thing as a Computer-Generated Work (2016) 39 *Columbia Journal of Law & the Arts* 404, 411.
[52] Ginsburg, "People Not Machines, Authorship and What It Means in the Berne Convention" (2018) 49 I.I.C. 131, 133.
[53] Guadamuz, "Do androids dream of electric copyright?" [2017] I.P.Q. 169–186, 180; see also *Temple Island Collections Ltd v New English Teas Ltd* [2012] EWPCC 1; [2012] E.C.D.R. 11 at 27.
[54] Grimmelmann, "There's No Such Thing as a Computer-Generated Work" (2016) 39 *Columbia Journal of Law & the Arts* 404, 413.

should qualify as the authors of those works. Further, failure to reward or incentivise such creativity through copyright would be inconsistent with the historic aims of intellectual property rights as a utilitarian concept.

## Next steps: some final remarks

In closing, it is worth reflecting on why the current legal position in the UK is so at odds with the technical reality of artificial intelligence systems.

Though there are many explanations, two factors seem to play particularly important roles. The first is the way that the technology is described. As Richards and Smart write, the tendency to describe AI in human terms has contributed to what they call the "android fallacy".[55] This is the belief that AI systems are "approximating human qualities"[56] and, as such, are substantively different from traditional computer programs. Given how widespread and pervasive this framing appears to be, it is understandable that law-makers should want to treat a radically different class of technology in a radically different way. As this article has sought to illustrate, however, a more technical understanding of AI shows that while the technology is truly remarkable—and is indeed changing much of the world around us—its underlying functionality is not so different at all. Rather than an "autonomous", "intelligent" or "creative" technological being, it is just an especially efficient computational tool.

Secondly, scholars are able to argue in favour of programmers because their work is not currently recognised using patents. The patent-law specific reasons for this are beyond the scope of this article, but there is also an economic explanation. Patent protection is simply not an economic incentive for programmers in today's computer technology market. Because programmers have access to a number of ancillary revenue streams that they can build into their products—e.g. coding advertising functionality into an app or coding a program to only run on a specific operating system—it is no longer in the programmer's interest to restrict who has access to the underlying technology. Quite the opposite; the larger the user base, the greater the revenue from ancillary features and services. Yet, just because programmers do not avail themselves of the intellectual property protections they deserve, this does not qualify them for the intellectual property protections of others. Crediting users with copyright is not "freeriding"[57] or "at the expense of the programmer"[58]; rather, crediting users is to assign them the protections they are due.

Moving forward, the time is not yet right for the discussion of "creative computers". Indeed, it will be some time before the technology gets that far. But the time is right to reconsider how UK law treats AI-generated works of art. Put simply, AI-generated art does not need special provisions of its own, but would instead be more appropriately served by the traditional tests of fixation, originality and creativity. Users should be recognised as the holders of copyright for AI-generated artworks, as their creative judgment—their decision to use the tool to create a work—satisfies the "skill, labour and judgment" test needed to qualify them as authors and to qualify the works for protection. Ultimately, despite its many boundary-defying achievements, under copyright law at least, artificial intelligence is best served by an approach that does not look to the future, but to the past.

[55] N. Richards and M. Smart, "How should the law think about robots?" [2016] E.L.E.C.D. 229, 230.
[56] Chesterman, "Artificial Intelligence and the limits of legal personality" (2020) 69 I.C.L.Q. 819, 831.
[57] Bonadio and McDonagh, "Artificial intelligence as producer and consumer of copyright works" [2020] I.P.Q. 112, 122.
[58] Dorotheou, "Reap the benefits and avoid the legal uncertainty" (2015) 21 C.T.L.R. 85, 90.