

THE MACHINE AS AUTHOR

Daniel J. Gervais, PhD*

The use of Artificial Intelligence (AI) machines using deep learning neural networks to create material that facially looks like it should be protected by copyright is growing exponentially. From articles in national news media to music, film, poetry and painting, AI machines create material that has economic value and that competes with productions of human authors. The Article reviews both normative and doctrinal arguments for and against the protection by copyright of literary and artistic productions made by AI machines. The Article finds that the arguments in favor of protection are flawed and unconvincing and that a proper analysis of the history, purpose, and major doctrines of copyright law all lead to the conclusion that productions that do not result from human creative choices belong to the public domain. The Article proposes a test to determine which productions should be protected, including in case of collaboration between human and machine. Finally, the Article applies the proposed test to three specific fact patterns to illustrate its application.

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“Machines don’t own; they make.”¹

I. INTRODUCTION

What if the robots took over the set, and then wrote and produced the next episode of *Westworld*?² Is this science-fiction? Well, yes. For now. But closing the gap between fiction and reality is only a matter of time because algorithmic creation is here.³

In December 2016, an artificial intelligence (AI) system—what this Article refers to as an “AI machine”—composed polyphonic baroque music bearing the “style” of Johann Sebastian Bach.⁴ So-called “robot reporters” routinely write news bulletins and sports reports, a process called “automated journalism.”⁵ Machines write poems that many

* Milton R. Underwood Chair in Law, Vanderbilt University. Associate Reporter, Restatement of Copyright, First. President, International Association for the Advancement of Teaching and Research in Intellectual Property (ATRIP). The Author is grateful to [TBC].

¹ Paraphrasing Jonathan R. Tung, *Who Owns the Creation of an Artificial Intelligence?* TECHNOLOGIST (Aug. 22, 2016), <https://blogs.findlaw.com/technologist/2016/08/who-owns-the-creation-of-an-artificial-intelligence.html> (accessed January 2, 2019)

² For the reader who may not be familiar with this (*Westworld*) television series—the first season of which was broadcast in 2016—*Westworld* is a “Wild West” amusement park populated by robots, called “hosts.” Human guests indulge their wildest fantasies with the hosts, including shooting them. The robots cannot harm humans. That is, until (spoiler alert) robots become aware, and revolt. A motion picture with the same title was produced in 1973. See imdb.com (accessed January 2, 2019).

³ See Annemarie Bridy, *The Evolution of Authorship: Work Made by Code*, 39 COLUM. J.L. & ARTS 395, 408 (2016) (describing algorithmic creation); and by the same author, *Coding Creativity: Copyright and the Artificially Intelligent Author*, 2012 STAN. TECH. L. REV. 5, ¶ 2 (2012) [hereinafter Bridy, *Coding*] (“[A]ll creativity is inherently algorithmic.”)

⁴ This Article uses “machine” as a generic term that may apply to a computer using Artificial Intelligence (AI) software but could also cover machines capable of movement such as a robot painting on canvas.

On the topic of machines composing music, see Gaëtan Hadjeres & François Pachet, “DeepBach: a Steerable Model for Bach chorales generation” (Dec. 3, 2016) at 1, online: <https://arxiv.org/pdf/1612.01010v1.pdf>; and William T. Ralston, *Copyright in Computer-Composed Music: HAL Meets Handel*, 52 J. COPYRIGHT SOC’Y U.S.A. 281, 306 (2005).

⁵ See Corinna Underwood, *Automated Journalism – AI Applications at New York Times, Reuters, and Other Media Giants*, EMERJ, June 22, 2017 (updated Nov. 29, 2018), online: <https://bit.ly/2Q84BTU> (accessed Dec 5, 2018). The *Washington Post* reportedly published 850 from September 2016 to September 2017, including 300 on the Olympic Games held in Rio de Janeiro. See Lucia Moses, *The Washington Post’s Robot Reporter Has Published 850 Articles In The Past Year*, DIGIDAYUK, Sept. 14, 2017, online: <https://bit.ly/2xmkQSI> (accessed Dec. 4, 2018). See also Robert C. Denicola, *Ex Machina: Copyright Protection for Computer-Generated Works*, 69 RUTGERS U.L. REV. 251, 257 (2016) (“Artificial intelligence is increasingly prominent in journalism.”)

people believe were written by a human author.⁶ Machines draft contracts.⁷ A machine named e-David produces paintings using a complex visual optimization algorithm that “takes pictures with its camera and draws original paintings from these photographs.”⁸ Machines can write scenes of animation movies and improve the design of objects and processes, thus generating outputs that would, were it not for their machine parentage, qualify as subject matter for a copyright or even a patent.⁹ Machines can even write or enhance their own code.¹⁰

General Adversarial Networks (GANs) are perhaps the most promising deployment of machine creativity, the technological path most likely to grow the affordances of AI

⁶ See Samuel Gibbs, *Google AI Project Writes Poetry Which Could Make Vagon Proud*, THE GUARDIAN (May 17, 2016) (“The researchers fed the system starting and ending sentences and then asked it to fill in the gap. [...] The generated sentences make grammatical sense, maintain a sort of theme and for the most part fit with the start and end sentence. Others weren’t quite as poetic, but still maintain the theme set by the start and ending sentences.”)

⁷ See Kathryn D. Betts, Kyle R. Jaep, *The Dawn of Fully Automated Contract Drafting: Machine Learning Breathes New Life into A Decades-Old Promise*, 15 DUKE L. & TECH. REV. 216 (March 29, 2017) (discussing the advances in contract drafting software and the use of AI in that context).

⁸ See 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] MICH. ST. L. REV. 659, 662.

⁹ This Essay focuses on copyright but a number of conclusions it reaches could be applicable to patents, even though patent law has a number of different doctrinal tracks (for example, the mental steps analysis applied by the Supreme Court of the United States in *Alice v. CLS Bank* 134 S. Ct. 2347 (2014)). See Ben Hattenbach, Gavin Snyder, *Rethinking the Mental Steps Doctrine and Other Barriers to Patentability of Artificial Intelligence*, 19 COLUM. SCI. & TECH. L. REV. 313, 317–18 (2018) (“Courts in the aftermath of *Alice* have revived the “mental steps” doctrine as a primary yardstick for assessing patent-eligibility. Under this doctrine, if method claims can be characterized as able to be performed within the mind of a human being.”) The Court of Appeals for the Federal Circuit noted that processes “that automate tasks that humans are capable of performing are patent-eligible if properly claimed.” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. 2016). For a discussion, see Mizuki Hashiguchi, *The Global Artificial Intelligence Revolution Challenges Patent Eligibility Laws*, 13 J. BUS. & TECH. L. 1, 13 (2017).

Then, as with copyright, the basic normative argument that society benefits from inventions whether generated by humans or machine has also been made. See Ben Hattenbach, Joshua Glucoft, *Patents in an Era of Infinite Monkeys and Artificial Intelligence*, 19 STAN. TECH. L. REV. 32, 50–51 (2015) (Arguing that “[c]ompanies that invent [using AI] arguably accelerate inventive activity, and that acceleration is, in and of itself, the type of innovation that society should desire to—and already does—reward with patents.”) See also *iprova.com* (accessed January 3, 2019).

¹⁰ See Michael Grothaus, *An AI Can Now Write Its Own Code*, FAST COMPANY, (April 27, 2018), online: <https://bit.ly/2OzHLmg> (describing how a new app called Bayou “studies all the code posted on GitHub and uses that to write its own code. Using a process called neural sketch learning, the AI reads all the code and then associates an ‘intent’ behind each.”)

machines in this field both qualitatively and quantitatively.¹¹ “GANs’ potential is huge, because they can learn to mimic any distribution of data. That is, GANs can be taught to create worlds eerily similar to our own in any domain: images, music, speech, prose.”¹² A painting produced by a GAN was sold at auction in October 2018 for \$432,500.¹³

In short, machines are increasingly good at emulating humans and laying siege to what has been a strictly human outpost: intellectual creativity¹⁴ At this juncture, we cannot know with certainty how high machines will reach on the creativity ladder when compared to or measured against their human counterparts, but we do know this: They are far enough already to force us to ask a genuinely hard and complex question, one that intellectual property (IP) scholars and courts will need to answer soon, namely whether copyrights should be granted to productions made not by humans, but by machines.¹⁵ The

¹¹ Indeed, Yann LeCun, FaceBook’s AI Research Director and a professor at NYU, described GANs as “the most interesting idea in the last 10 years in [machine learning].” Yann LeCun, *What Are Some Recent And Potentially Upcoming Breakthroughs In Deep Learning?* QUORA (Jul. 28, 2016). GANs emerged in a paper written by a group of Montreal-based scientists in 2014. See Ian J. Goodfellow et al., *Generative Adversarial Nets* (June 10, 2014), online <https://arxiv.org/pdf/1406.2661.pdf> (accessed Dec. 4, 2018). GANs are “adversarial” because two machines work one against the other, creating a constant feedback loop that increases the quality of outputs. See AI Wiki, A BEGINNER’S GUIDE TO GENERATIVE ADVERSARIAL NETWORKS (GANs) [hereinafter BEGINNER’S GUIDE] <https://skymind.ai/wiki/generative-adversarial-network-gan> (accessed Dec. 4, 2018).

¹² More specifically, GANs use an actor-critic model, as one machine, called the *generator*, generates new data instances, the other, the *discriminator*, “evaluates them for authenticity; i.e. the discriminator decides whether each instance of data it reviews belongs to the actual training dataset or not.” BEGINNER’S GUIDE, *supra* note 11.

¹³ James Vincent, *How Three French Students Used Borrowed Code To Put The First AI Portrait In Christie’s*, THE VERGE (Oct 23, 2018, 9:34am EDT), online : <https://www.theverge.com/2018/10/23/18013190/ai-art-portrait-auction-christies-belamy-obvious-robbie-barrat-gans> (accessed Dec. 4, 2018).

¹⁴ We have traveled far from the Greek “myths of Hephaestus, the blacksmith who manufactured mechanical servants, and the bronze man Talos incorporate the idea of ‘intelligent’ robots’,” Association for the Advancement of Artificial Intelligence, A BRIEF HISTORY OF AI, <https://aitopics.org/misc/brief-history> (accessed Dec. 4, 2018).

¹⁵ The Article uses the neutral term “production,” which only means that something that did not exist comes into being, without prejudging its status as a copyrighted work or a patentable invention. See OXFORD ENGLISH DICTIONARY online (accessed June 4, 2018). “To bring into being or existence. To bring (a thing) into existence from its raw materials or elements, or as the result of a process; to give rise to, bring about, effect, cause, make (an action, condition, etc.).”

Answering the question in the affirmative would mean answering a follow-up question, namely in which “person” should the rights vest? Not to the AI machine, at least not for now. In *Naruto v. Slater*, 888 F.3d 418, 126 (9th Cir. 2018), the Ninth Circuit decided that a monkey had no legal standing to claim copyright. It is hard to see how a software program or machine could. See Michael Landau, *Copyrightable Work Must Be Made By A Human Author*—*Naruto v. Slater*, 1 LINDEY ON ENTERTAINMENT, PUBL. & THE

Article's specific objective is to answer the question whether autonomously created AI machine productions in the literary and artistic field (that is, prima facie copyrightable subject matter) should be protected by copyright.

To answer the question, an understanding of the process by which AI machines create productions of the type that copyright law protects is useful. For the purposes of this Article, this process consists of three main steps. First, AI code is written. This code, as technology stands now, is mainly the work of human programmers.¹⁶ The code empowers the second step, "machine-learning."¹⁷ To take a simple example, a machine can be shown hundreds or thousands pictures of (human-identified) cats and dogs and then learn the features of each species by detecting patterns and correlations, which then enables the machine to recognize cats and dogs it has not been shown before.¹⁸ A subset of machine learning known as "deep learning" uses a layered structure of algorithms that allows the machine to learn and *make decisions on its own*.¹⁹ Though deep learning

ARTS § 1:10.50 (3d ed., 2018). *See also* Samuelson, *supra* note 36; and Glenn Cohen, *Should We Grant AI Moral and Legal Personhood?*, ARTIFICIAL BRAIN (Sept. 24, 2016), <http://artificialbrain.xyz/should-we-grant-ai-moral-and-legal-personhood> (accessed Dec. 5, 2018). *See also* Jane Ginsburg and Luke Ali Budiarjo, *Authors and Machines*, __ BERK. TECH. L. J. 1, 20-22, online https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3233885 (accessed March 27, 2019)

¹⁶ Though that may soon change. *See infra* note 24.

¹⁷ *See* Roberto Iriondo, *Differences Between AI and Machine Learning and Why it Matters*, DATA DRIVEN INVESTOR, (Oct. 15, 2018), <https://medium.com/datadriveninvestor/differences-between-ai-and-machine-learning-and-why-it-matters-1255b182fc6> ("Machine learning [ML] is the study of computer algorithms that improve automatically through experience." — ML it's one of the ways we expect to achieve AI. Machine learning relies on working with large data-sets, by examining and comparing the data to find common patterns and explore nuances," quoting Prof. Tom M. Mitchell, former Chair of the Machine Learning Department at Carnegie Mellon University).

¹⁸ *See* Amanda Levendowski, *How Copyright Law Can Fix Artificial Intelligence's Implicit Bias Problem*, 93 WASH. L. REV. 579, 592 (2018) (discussing the importance of good training data and the risk that providing the system with too many similar examples (of cats) would lead the system to make mistakes.)

This does not always require direct human training as machines can learn in autonomous (or "unsupervised" mode). *See* JACOB TURNER, *ROBOT RULES: REGULATING ARTIFICIAL INTELLIGENCE* 72 (Palgrave Macmillan, 2018) ("A particularly vivid example of unsupervised learning was a p[rogram] that, after being exposed to the entire YouTube library, was able to recognize images of cat faces, despite the data being unlabeled.")

¹⁹ *See* Robert D. Hof, *Deep Learning: With Massive Amounts Of Computational Power, Machines Can Now Recognize Objects And Translate Speech In Real Time. Artificial Intelligence Is Finally Getting Smart*, MIT TECH. REV., <https://www.technologyreview.com/s/513696/deep-learning/> (accessed Dec. 5, 2018) ("Deep-learning software attempts to mimic the activity in layers of neurons in the neocortex, the

technology initially fell short of delivering on its early promises, “the concurrent development of novel algorithm training protocols [...], the access to an unprecedented amount of computational power and the accumulation of large quantities of digitized training data” have radically changed the outlook.²⁰ With deep learning, one could say that the computer has its “own brain.”²¹ Importantly for the purposes of this Article, deep learning is *automated* and often removed from direct human input.²² Any human contribution to the output of a deep learning process is thus at least one degree removed from the human programmer(s) of the AI code. This separation directly challenges a core notion of copyright law, namely authorship: who is the *author* of the (unpredictable) outputs created by a (deep learning) AI machine?

The third and final step in the process is the production by the machine of an output, which, for the purposes of this analysis, may facially belong to one of the categories of literary and artistic objects that copyright law protects, such as a text or an image.²³ To

wrinkly 80 percent of the brain where thinking occurs. The software learns, in a very real sense, to recognize patterns in digital representations of sounds, images, and other data.”)

A well-known instantiation of deep learning is the use of AI to micro-target individuals and “consumer propensity” via social media. *See id.*; and Y. Tony Yang & Brian Chen, *Legal Considerations for Social Media Marketing by Pharmaceutical Industry*, 69 FOOD & DRUG L.J. 39 (2014) (“Given the ability to individualize messages, target specific groups, interact in real time with potential consumers, and the potential benefits of instantaneous referrals among trusted individuals, the surge in interest in social media advertising is far from surprising.”)

²⁰ Jean-Marc Deltorn & Franck Macrez, *Authorship in the Age of Machine Learning and Artificial Intelligence*, in Sean M. O’Connor (ed.), *THE OXFORD HANDBOOK OF MUSIC LAW AND POLICY* (Oxford Univ. Press, forthcoming), prepublication copy available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3261329 (last accessed January 15, 2019).

²¹ *See* Brett Grossfeld, *A Simple Way To Understand Machine Learning Vs Deep Learning*, ZENDESK (July 18, 2017), online <https://www.zendesk.com/blog/machine-learning-and-deep-learning/>. This reminds one of David Nimmer’s quip that “electronic brains are posing new challenges for biological brains to unravel.” David Nimmer, *Brains and Other Paraphernalia of the Digital Age*, 10 HARV. J.L. & TECH. 1, 2 (1996).

²² This technology has now gone mainstream. Microsoft introduced a fully automated platform, called Microsoft Custom Vision Services, to process images. *See* customvision.ai; and William Vorhies, *Automated Deep Learning – So Simple Anyone Can Do It*, DATA SCIENCE CENTRAL (April 10, 2018), online: <https://www.datasciencecentral.com/profiles/blogs/automated-deep-learning-so-simple-anyone-can-do-it>.

²³ Copyright subsists in “original works of authorship.” *See* 17 U.S.C. §§101 and 102(a). Works typically belong to one the listed categories: literary works; musical works; dramatic works, including any accompanying music; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; and architectural works.

produce this type of output, AI machines can use a data corpus containing potentially tens of thousands of existing copyrighted works. For example, an AI machine using a corpus of pop music can find correlations among the various songs and identify the elements (melody, harmony, pitch, etc.) that may be causing a song to be popular and then use this knowledge to write its own potential hit.²⁴ In such a scenario, it is but fiction to see a human author as being responsible for—or the owner of rights in—the creation, because the AI machine uses its *own* insights to create.²⁵ Even if the human programmer is considered the machine’s master because she can switch it off or alter its code, is the master truly the *author* of the pupil’s creation?

Clearly, AI machines can generate *value*, and this value is likely to increase over time as deep learning processes become more sophisticated. Who then, if anyone, can and should capture this value, and how? For example, if an AI machine using a corpus of copyrighted works (say all novels published in the last 70 years) were able to write fiction that it is attractive enough to reach an audience willing to pay, it would be natural for the programmer, owner or user of the machine to try to protect this value in every possible way, including by copyright law, technological measures and contract.²⁶ By the

There is no official definition of the term “Big Data.” Some scholars have argued that Big Data “is less about data that is big than it is about a capacity to search, aggregate, and cross-reference large data sets.” Danah Boyd & Kate Crawford, *Critical Questions for Big Data: Provocations for a Cultural, Technological, and Scholarly Phenomenon*, 15 INFO., COMM. & SOC’Y 662, 663 (2012). There is consensus on the fact that the size and depth of the corpus (or dataset) matters at least up to a point. See Max N. Helveston, *Consumer Protection in the Age of Big Data*, 93 WASH. U. L. REV. 859, 867-870 (2016).

²⁴ AI machines used in a laboratory funded by Sony called Flowmachines have produced a number of “pop” songs, including “Daddy’s Car” composed “in the style of The Beatles,” available at https://www.youtube.com/watch?v=LSHZ_b05W7o. For a description of the process, see Lucy Jordan, *Inside the Lab That’s Producing the First AI-Generated Pop Album*, SEEKER, Apr. 13, 2017, available at <https://bit.ly/2odAbwo>. See also Dani Deahl, *How AI-Generated Music Is Changing The Way Hits Are Made*, THE VERGE, Aug 31, 2018, online <https://www.theverge.com/2018/8/31/17777008/artificial-intelligence-taryn-southern-amper-music> (accessed December 21, 2018).

²⁵ Though, in the case of pop music, only with limited success (thus far). See *id.*

²⁶ A period of 70 years was chosen for this example because the principal term of protection of copyright is life of the author plus 70 years thereafter, meaning that a corpus of all books published in the last 70 years (under 17 U.S.C. §302(a)) would contain mostly if not exclusively works still protected by copyright. This is meant to point to a subsidiary question not addressed in this paper, namely whether the authors or owner owners of those works should be compensated for, or even have a right to prohibit the mining of such works.

The Second Circuit’s opinion in the Google Books case provides a negative answer, at least for the mining part, though it did not set boundaries (if any) for the commercial exploitation of the mined data. See

same token, we can expect competitors and the public to try to access and possibly reuse those productions for free or with as few restrictions as possible.

The potential creation of massive amounts of new literary and artistic productions by machines without direct human input may create value in some areas, but it will pose risks in others, not the least of which is to the future of human creativity. The use of machines to produce various types of mostly “low creativity” literary and artistic material has already begun to challenge human-created works in the marketplace.²⁷ Will there still be room for professional creators? Only time will tell, but a world without professional writers, journalists and other creators would be poorer.²⁸

This Article believes that both art in myriad forms and quality journalism have had and should continue to have a role in helping humans understand and better their world, and that they are necessary for a fully engaged polity.²⁹ The presence of art and journalism capable of playing this type of cultural and political role may be the difference between a future of change (a difference between points A and B on a timeline) and one

The Authors Guild v. Google, Inc. 804 F.3d 202 (2d Cir, 2015), cert. denied 136 S.Ct. 1658 (finding that Google’s scan of millions of in-copyright books in their entirety (unquestionably a prima facie infringement of the right of reproduction under copyright law) to make them text-searchable online was a fair use.)

²⁷ See Jared Vasconcellos Grubow, *O.K. Computer: The Devolution of Human Creativity and Granting Musical Copyrights to Artificially Intelligent Joint Authors*, 40 CARDOZO L. REV. 387, 420, 423 (2018) (arguing that the “promotion of progress is best served by giving AIs rights and regulating them” and suggesting that the U.S. Copyright Office removes the barriers for AI joint authorship” and that a Collective AI Rights Organization (CAIRO) should be created to manage a standard fee (set by law) for the use of AI created music.)

²⁸ See DANIEL GERVAIS, *THE LAW OF HUMAN PROGRESS* 15 (Amsterdam: deLex, 2019) (“The decrease of the signal to noise ratio has two major consequences. First, the mimetic and epistemological signals that current generations are sending to the next ones are getting weaker; second, the intellectual toolset we have to understand our world is getting both rougher and poorer.”)

²⁹ The term “quality” is used here not to denote any artistic or aesthetic “merit” but rather works that inform the capacity to build and share a richer understanding of the world, based on the assumption that a less nuanced and sophisticated agent makes for less nuanced and sophisticated agency, and thus a less sophisticated polity. If art, literature, and journalism are impoverished, then that capacity is diminished. Martha Nussbaum might agree. She argued that “literature widens our experience and expands our moral imagination. It gives us the opportunity to vicariously explore seemingly infinite instances of lived practical reason.” Ana Sandoiu, *Martha Nussbaum on Emotions, Ethics, and Literature*, *THE PARTIALLY EXAMINED LIFE* (August 12, 2016) (discussing Nussbaum’s essay *Finely Aware and Richly Responsible*.).

Quality is also the term in *generally* JULIA CAGÉ, *SAVING THE MEDIA: CAPITALISM, CROWDFUNDING AND DEMOCRACY*. (Cambridge, MA: Harvard U. Press, 2016)

of progress (an improvement at point B).³⁰ Using (admittedly rather loosely) Shannon's information theory, if more of the new material made available to read, listen to and watch is of poor quality, it becomes the equivalent intellectual of "noise" (an intended double entendre in the music sphere), that is, material without its intellectually transformative ability. This, in turn, significantly reduces the signal to noise ratio and diminishes the quality of the epistemological and cultural signals that current generations send to future ones.³¹ This belief is directly relevant to this Article's analysis because copyright is meant to create incentives, and creating incentives for machine productions may mean fewer human ones.

The idea that incentives are meant to lead to human progress is deeply anchored in American history. The Constitution provides that copyright is predicated on its ability to produce incentives to "Promote the Progress of Science and Useful Arts."³² Would providing copyright protection to machine productions promote Progress? Put differently, if there are more machine productions—bearing in mind that such productions are likely to reach higher on the creativity ladder in the near future—, will this be an improvement over the current situation, that is, will there be *progress*? While a full discussion of the issue is beyond the scope of this paper—though not beyond the reach of policy levers³³—the Article reflects this belief that *human* progress should serve as a normative guidepost.

One can posit that machines programmed to produce new literary and artistic productions need no economic incentive to do so, unlike human authors who are trying to

³⁰ See CAGÉ, *id.* at 31, discussing "quality news" and noting:

Print journalists have been replaced by computer specialists who are given no opportunity to leave their screens and do shoe-leather reporting. [...] Newspapers have closed foreign bureaus, laid off veteran correspondents, and cut back on local and national political coverage. [...] In the United States, it has become harder and harder to find news about politics at the state level, where corruption is rampant, and local newspapers used to serve as a much-needed countervailing power.)

³¹ See generally J.R. PIERCE, AN INTRODUCTION TO INFORMATION THEORY: SYMBOLS, SIGNALS AND NOISE, 2d ed. 148-172 (Mineola: Dover, 1980) (noting that errors can occur because of the admixture of noise in a signal).

³² U.S. CONST. Art. I §1 cl .8.

³³ New or stronger policies could be adopted to support human-created art and journalism, for example. Though that is certainly a debate worth having, this Article focus on the former issue, and try to answer the question whether machine productions are (doctrinally), or should be (normatively) protected by copyright.

live from their craft.³⁴ As the epigram states, machines just run their code. That code is protected by copyright, which can be seen as an incentive for (human) programmers.³⁵ Should the law provide additional incentives (via copyright law) for machines to execute their code?³⁶ The answer, in this Article's view, is negative. Specifically, this Article argues for the proposition that machine productions are *not* protectible by copyright once the machine has crossed what the Article calls the autonomy threshold and is no longer a tool in the user's hands or a reflection of its (human-made) program. The Article also suggests an appropriate test to implement the proposed principle. The Article acknowledges that, whichever solution is ultimately adopted by courts (or Congress), there will be crucial border definition issues—including productions created jointly by machine and human--, and the Article thus suggests an analytical approach to parse such cases and explains whether the copyright statute's notion of "joint work" applies.³⁷

The Article uses both doctrinal and normative arguments. Doctrine is essential because, in deciding whether copyright protection applies to machine productions, a court is likely to rely first, facially at least, on doctrinal arguments. Yet courts often clothe

³⁴ Whether as traditional "professional" creators or amateurs trying to monetize, e.g., a YouTube channel. See Lawrence LESSIG, *REMIX: MAKING ART AND COMMERCE THRIVE IN THE HYBRID ECONOMY*, 225-231 (New York: Penguin Press, 2008) (discussing the viability "hybrid economies" of online creation and sharing.).

³⁵ See *supra* note 10. The protection by copyright would depend, in this Article's view, on whether humans programmed the machine. At technology stands now, that is still largely the case.

³⁶ In a prescient 1985 article, Pam Samuelson expressed a similar idea. See Pamela Samuelson, *Allocating Ownership Rights in Computer-Generated Works*, 47 PITT. L. REV. 1186, 1224 ("If there is no human author of such a work, how can any human be motivated to create it? The copyright system assumes that society awards a set of exclusive rights to authors for limited times in order to *motivate* them to be creative." [emphasis in original text]. See also Stephen Hewitt, *Protection of Works Created by the Use of Computers*, 133 NEW L.J. 235 (1983); and see Daniel Gervais, *The Protection under International Copyright Law of Works Created with or by Computers*, 5 IIC INTERN'L REV. INDL PROP. & COPYRIGHT L. 629-660 (1991). That article was a shorter version of a thesis written in 1987-1988 at the Graduate Institute of International and Development Studies in Geneva. In it, I argued that a computer was one of three things: a tool, an assistant or an autonomous "creator," for example when a randomizer program is used.

Interestingly, potential computer authorship (and inventorship) was discussed as far back as 1969. See Karl F. Milde, *Can a Computer be an "Author" or an "Inventor"?*, 51 J. PAT. OFF. SOC'Y 378 (1969). See also Mizuki Hashiguchi, *Artificial Intelligence and the Jurisprudence of Patent Eligibility in the United States, Europe, and Japan*, 29 INT. PROP. & TECH. L. J. 3 (2017).

³⁷ 17 U.S.C. § defines a "joint work" as a work prepared by two or more *authors* with the intention that their contributions be merged into inseparable or interdependent parts of a unitary whole" (emphasis added).

normativity in doctrinal garb and it is thus equally likely, in this Article's view, that a court decision on the protection by copyright law of machine productions will also reflect a (normative) sense of copyright's *raison d'être*.³⁸ This Article's structure follows from this understanding.³⁹

The Article proceeds dialectically. Parts II and III of the Article discuss two normative (Part II) and then two doctrinal (Part III) reasonings *in favor of* the protection of machine productions by copyright. Those arguments are that: (1) value is generated by AI machines and that someone should be able to capture it; (2) orderly marketplace competition between human-created and machine-produced content requires that machine productions be protected by copyright on the same footing as human creations; (3) because copyright has traditionally been refractory to judge the quality or aesthetic merit of a work as a condition for protection, machine productions are protected by copyright in the same way as human-created works; and (4) the programmer (or perhaps the owner or user) of an AI machine can be considered a proxy author for copyright purposes, either

³⁸ This is not uncommon generally, and in IP cases in particular. *See e.g.*, Mark P. McKenna, *The Normative Foundations of Trademark Law*, 82 NOTRE DAME L. REV. 1839, 1841–42 (2007):

Underneath the formal doctrinal means through which courts reached their results, they argued, many legal rules were best understood as attempts to promote economic efficiency. Courts simply lacked the necessary sophistication to articulate the true bases of their decisions. The law and economics scholars then relied on this descriptive account to lend legitimacy to their normative conclusions; economic analysis not only explained legal doctrines, but efficiency was the right goal for the law to pursue. (Notes omitted)

³⁹ To avoid any risk of a misunderstanding, this Article uses the term “doctrinal” to refer to a focus on positive law, including of course common law. *See* Joseph William Singer, *Normative Methods for Lawyers*, 56 UCLA LAW REVIEW 56 899, 905 (2009):

Most scholarship either uses economic analysis of law, traditional doctrinal analysis that focuses on precedent and eschews sustained normative argument, critical analysis that reveals inconsistencies in the law or the arguments of others but refuses to make normative claims, or social science analysis that understands law from the outside, developing empirical information about how the world works. [...] The normative work that one finds in the law reviews is often done at such a high level of abstraction that it is unclear how to apply the analysis to particular legal disputes. Or it is so sophisticated, nuanced, and complex that it cannot easily generate the few sentences one can write in a judicial opinion. Although scholars have the luxury of equivocation, the truth is judges decide cases and they need reasons to justify their choices.

The article attempts to eschew the critique contained in the second part of Professor Singer's comment above.

See also Terry Hutchinson, *Doctrinal Research: Researching the Jury*, in RESEARCH METHODS IN LAW (Dawn Watkins & Mandy Burton, eds.) 1, 10 (2d ed., 2017) (explaining how doctrinal research typically forms the basis of most forms of legal research).

directly or under the work made for hire doctrine. These four pro-protection reasonings are not meant to be an exhaustive survey of the reasons that might be used to justify the protection of machine productions.⁴⁰ Based on a review of the literature on the topic, the Article chose the four reasonings that seemed to be used most often or most adroitly in the literature. The Article explains why the four reasonings have dubious convincing power.

Then the Article provides arguments *against* protection by copyright, that is, arguments for considering machine productions as part of the public domain from the moment of their creation. Responding structurally to Parts II and III, in Part IV the Article centers on normative and teleological arguments extracted from the soil of copyright history, for there one can both find the aims of copyright in action over time and identify those aims that have remained constant. In short, the two normative arguments focus on the role of human authors in the establishment of the copyright regime, and the linkages between the protection of copyrighted works, on the one hand, and the liability of those who produce such works when liability for their creation arises (e.g. for libel), on the other hand. Part V considers doctrinal grounds on which courts may prefer to rely to conclude that machine productions should remain copyright-free.⁴¹ Those grounds are, first, the core doctrine of originality, and second, the notion of derivative work, which has also been used as an argument in favor of protection of machine productions by copyright. As the Article explains, however, a proper analysis of the notion leads to the conclusion that it provides an argument against protection. In Part VI, the Article offers a path forward and specifically a test based on some of the latest technological developments to separate the human creative wheat from the machine proto-creative chaff.⁴² It then applies the proposed test to three fact patterns to illustrate its application.

⁴⁰ Indeed, how could someone make a claim of exhaustivity in this context?

⁴¹ Discussing doctrinal arguments after normative ones also allows the Article to illuminate the normativity (or absence thereof) of doctrine

⁴² The Article uses the term “proto-creative” to refer to productions (as the term is defined in note 15 *supra*) that “look like” creative works and, therefore, prima facie copyrightable subject matter, but do not

II. NORMATIVE ARGUMENTS FOR PROTECTION

There are four reasonings identified by this Article that have emerged to justify copyright protection for machine productions. The Article begins by considering two normative positions taken by pro-protection advocates.

A. *Protecting Value*

The first reasoning says that, because some machine productions are worth something to someone, then they should be protected by law. This reasoning can be dealt with quickly. This “intuition” that value must be protected occasionally underpins court decisions *sotto voce*, and sometimes explicitly so, as in a British case in which the court noted “if it is worth copying it is worth protecting.”⁴³ This is a normative error based on a vague restitutionary (or “reap/sow”) impulse that some value was misappropriated.⁴⁴ It is plainly bad law, both doctrinally and normatively, because free riding is not illegal.⁴⁵

result from human creative choices. As the Article explains (*see infra* note 172), creative choices are the *sine qua non* of copyright protection.

⁴³ *University of London Press v. University of London Tutorial Press* [1916] 2 Ch. 601 at 610. The intuition was at play in the well-known case of 1918 case of *International News Service v. Associated Press*, 248 U.S. 215 (1918) in which the Supreme created a “hot news” tort to protect short news releases, noting that the defendant should not “reap where it has not sown.” *Id.* at 239. In a more recent case, the Second Circuit limited (albeit in dicta) the tort to cases where the free-riding would pose a “threat to the very existence of the product or service provided by the plaintiff.” *Nat'l Basketball Ass'n v. Motorola, Inc.*, 105 F.3d 841, 853 (2d Cir. 1997).

⁴⁴ *See* Wendy J. Gordon, *On Owning Information: Intellectual Property and the Restitutionary Impulse*, 78 VA. L. REV. 149, 166–67 (1992):

[A]t the center of the pro-property wave of cases lies the conviction that it is unjust “to appropriate the fruits of another's labor” and its corollary, that one should not reap where another has sown. One might call this either a “restitutionary” or an “appropriative” notion. “Restitutionary” is the more general term: it reflects a belief that some unspecified rewards are due to those whose labor produces benefits and that when third parties intercept these rewards, the law should intervene to effect their restoration. To conceptualize the underlying impulse as “appropriative” is to reflect a belief that the reward due should take the specific form of a grant of property rights.

⁴⁵ *See* Richard A. Posner, *Misappropriation: A Dirge*, 40 HOUS. L. REV. 621, 622 (2003)

“When misappropriation is thought of in the large, as it were, the tendency is to analogize it to theft. [...] But the analogy to theft is imperfect. The car thief deprives me of my property; the copier does not—I retain it and remain free to license or sell it. And while the copying may reduce my income from the work because I have lost the exclusive use of my property, though not the use, the reduction may not be great. It may even be zero.”

The law protects things that have value, and things that do not, but there is no rule that the law must protect everything that has, or may have, value.⁴⁶

There are, moreover, strong examples that illustrate the value of allowing some free-riding in the sphere of copyright, including parody, satire, the creation of transformative works and the enrichment of the public domain.⁴⁷

A variation of the theme of this reasoning is that copyright must create incentives not for the creation of new material (because AI machine need no such incentives to run their code) but to disseminate it.⁴⁸ First of all, whether this incentive is in fact required and would be efficient would need to be demonstrated. Second of all, even if the need for some sort of incentive were demonstrated, whether copyright is the proper legal vector to provide the incentive isn't clear at all.⁴⁹

B. Marketplace Competition

The second reasoning advanced to justify the grant of copyright protection to machine productions strikes this Article as potentially more convincing. It is based on a

⁴⁶ See *id.* Then the question is value to whom? Landes & Posner have argued that overexposure (“overgrazing” the commons) may reduce the societal value of works as they enter the public domain. See William Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 484-88 (2003). Their claim is debatable. For a refutation, see Dennis S. Karjala, *Congestion Externalities and Extended Copyright Protection*, 94 GEO. L.J. 1065, 1073 (2006):

[C]opyright-protected works can be reproduced without in any way inhibiting their further reproduction in the future, so this potential conflict between present and future values does not arise. Nor is there any conflict between current high- and low-valuing users, because both can use the work freely (absent property rights). Neither in the case of grazing fields nor in the case of copyright-protected works do property rights insure “value” against a change in consumer preferences.

⁴⁷ As Professor Lessig has noted, some free-riding is not the issue. That copyright law does not allow enough free-riding may be more of a problem. See Lawrence Lessig, *Re-Marking the Progress in Frischmann*, 89 MINN. L. REV. 1031, 1033 (2005). For an example, see the application of fair use to appropriation art discussed in Daniel Gervais, *The Derivative Right, or Why Copyright Law Protects Foxes Better Than Hedgehogs*, 15 VAND. J. ENT. & TECH. L. 785, 848-852 (2013).

⁴⁸ See Denicola, *supra* note 5, at 283 (arguing that AI machine productions should be protected by copyright to maintain “incentives for humans to disseminate works [which] is also critical in insuring the ultimate public benefits sought by copyright.”).

⁴⁹ Copyright might just do the opposite, as it has demonstrably done in other cases because the incentive only works if licensing structures and other elements of commercial exploitation are in place. See Paul J. Heald, *Property Rights and the Efficient Exploitation of Copyrighted Works: An Empirical Analysis of Public Domain and Copyrighted Fiction Bestsellers*, 92 MINN. L. REV. 1031, 1053 (2008) (“The data presented herein clearly suggest that the public domain status of popular books does not result in underexploitation.”)

consequentialist analysis and argues that machine productions should be protected because, if machine-productions are copyright-free, then machines produce *free* goods (e.g. music) that compete with paid works (that is, those created by humans expecting a financial return) and thus distort the market.⁵⁰ Is this “dystopian vision of a literary market saturated by machine-authored drivel” merely “a moment of historical anxiety within the creative class,” as Professor Bridy suggested?⁵¹ Even now, thousands of articles written by machines compete with human staff in the media.⁵²

The reasoning suggests that protecting machine productions by copyright and making their use (potentially) subject to authorization and payment would level the commercial playing field.⁵³ Given the societal impact of machines competing with humans in this space—and even more so as machines climb the creativity ladder—the doctrinal question that emerges, namely who (which natural or legal person) should be the legal or proxy “author” (and thus the one to authorize the use of, and get paid for, the machine’s work), takes on a deep normative hue: can machines truly create works of authorship?⁵⁴ This boils down to the inquiry that lies at the core of the Article’s analysis:

⁵⁰ For an exemplar of a similar train of thought, see Vasconcellos Grubow, *supra* note 27.

On the largest music platform (by an order of magnitude), namely YouTube, most music is free, however, although users often “pay” by watching ads. See Rebecca Pollack, *Innovation or Exploitation: Is It Time to Update the DMCA Safe Harbors?*, 34-SPR ENT. & SPORTS LAW. 37, 38 (Spring 2018) (“YouTube alone represent[s] 46% of this listening time. 14 85% of YouTube users, approximately 1.3 billion people, use the platform primarily to listen to music.”). Those ads tend to be appended to professionally created content. See T. Randolph Beard et. al., *Safe Harbors and the Evolution of Online Platform Markets: An Economic Analysis*, 36 CARDOZO ARTS & ENT. L.J. 309, 328 (2018) (“Content identification systems have arisen, in part, from the desire of UUC platforms to monetize the viewing of material they host as viewership (and thus advertising potential) is higher for professionally-generated and protected content.”); and Todd Spangler, *YouTube Standardizes Ad-Revenue Split for All Partners, But Offers Upside Potential*, VARIETY (Nov. 1, 2013, 4:39 PM), <http://variety.com/2013/digital/news/youtube-standardizes-ad-revenue-split-for-all-partners-but-offers-upside-potential-1200786223> (“[T]he majority of YouTube’s user-generated content does not have advertising, so YouTube must recoup its costs from content that it can monetize.”).

⁵¹ Bridy, *Coding*, *supra* note 3, at ¶35 (discussing Ron Dahl’s 1954 short story *The Great Automatic Grammatizor*).

⁵² See *supra* note 5.

⁵³ See *supra* note 50.

⁵⁴ A detailed doctrinal analysis shows that using existing concepts to attribute ownership do not lead to consistent results. See Andrew J. Wu, *From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs*, 25 AIPLA Q.J. 131, 178 (1997) (“[A] handful of principles can lead to at least five different results.”)

*is authorship a human prerogative?*⁵⁵ As a matter of copyright law, the Article answers the question in the affirmative.

The Introduction explained the Article’s underlying belief and mobilizing assumption that human progress will best be achieved by humans, not machines.⁵⁶ This means that incentives designed to promote authorship of literary and artistic works, including the very ability to produce them in fields from journalism to art in all its diverse forms of expression—which requires not just talent (however defined) but the investment of time to hone one’s creative skills—*must* be available only to humans.⁵⁷

Part IV continues the discussion law, by focusing on the role of authors in the evolution of copyright law. For now, we turn to pro-protection doctrinal arguments.

III. DOCTRINAL ARGUMENTS FOR PROTECTION

A. *Role of Aesthetic Merit*

This first pro-protection doctrinal reasoning claims that because copyright doctrine does not care about the *quality or merit* of a copyrighted work—this has indeed been a tenet of copyright law for well over a century—machine productions should be protected.⁵⁸ This reasoning can also be discarded in short order, for it is simply an

⁵⁵ There is also an empirical response to the suggestion that free machine productions distort the market: free works competing with paid ones now, including on the largest music platform in the world. YouTube is generally free and Spotify offers free (with advertisement) or paid subscriptions. See Daniel Sanchez, *What Streaming Music Services Pay (Updated for 2018)*, DIGITAL MUSIC NEWS, (Jan. 16, 2018) <https://www.digitalmusicnews.com/2018/01/16/streaming-music-services-pay-2018/>.

The dilemma about whether to grant exclusive rights in machine productions applies not just to writing but to reading as well, as machines are increasingly trusted to identify what we should read. Machine reading in the form of “text and data mining” (which overlaps with deep learning) is typically allowed as a fair use under copyright law, and this process is thus much less subject to copyright restrictions than human reading. See note 26 *supra*.

Professor Grimmelman has suggested that the freer hand of machines valorizes “robotic reading” and “denigrates human reading. James Grimmelman, *Copyright for Literate Robots*, 101 IOWA L. REV. 657, 675 (2016).

⁵⁶ This is explicated in greater detail in DANIEL GERVAIS, *THE LAW OF HUMAN PROGRESS* (Amsterdam: deLex, 2019).

⁵⁷ The pro-protection argument that copyright should provide an incentive to generate more AI machine productions to regulate marketplace competition was rejected. See *supra* note 35 and accompanying text.

⁵⁸ Going back to *Bleistein v. Donaldson Lithographic Co.*, 188 U.S. 239 (1903), a case in which Justice Oliver Wendell Holmes rejected artistic merit as a factor to determine copyright protection.

incorrect application of this venerable principle: Stating that machine productions need not have artistic merit is different from the actual question that must be asked and answered, namely whether such productions are *original works of authorship*, for that is the only thing that copyright protects.⁵⁹ The issue is not aesthetic merit, therefore, but whether authorship (and the originality through which it is manifested) exists.⁶⁰

As applied by courts, originality requires *human* authorship.⁶¹ It is human “creative choices” generate the originality required to benefit from copyright protection.⁶² This principle is reflected in the copyright theories examined in the next Part that lead to the conclusion that there are good reasons to limit copyright protection to human-authored works.⁶³

B. *Humans as Proxy Authors*

In its simplest version, the last pro-protection reasoning goes like this: if A owns the AI code, A also owns what the AI code produces. The same reasoning could be applied to machine’s user or owner.

This is not an entirely new debate, as courts have grappled in the past with the protection by copyright of works “generated by” machines—though not AI machines as they are defined in this Article.⁶⁴ Although the paradigm on which the protection by

⁵⁹ 17 U.S.C. 102 (a) states in part “Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any tangible medium of expression...”

⁶⁰ See Shlomit Yanisky-Ravid & Luis Antonio Velez-Hernandez, *Copyrightability of Artworks Produced by Creative Robots, Driven by Artificial Intelligence Systems and the Originality Requirement: The Formality-Objective Model*, 19 MINN. J.L. SCI. & TECH. 1, 7-8.

⁶¹ See *Urantia Found. v. Maaherra*, 114 F.3d 955, 958 (9th Cir. 1997) (“[S]ome element of *human* creativity must have occurred in order for the book to be copyrightable.”) (Emphasis added); and *Naruto v. Slater*, 2016 WL 362231, at *3 (ND Cal. Jan. 28, 2016), *aff’d*, 888 F.3d 418 (9th Cir. 2018) (“The Supreme Court and Ninth Circuit have repeatedly referred to “persons” or “human beings” when analyzing authorship under the Act.”)

⁶² See *id.* and *infra* Part IV.A.

⁶³ This is also the view of the United States Copyright Office. See UNITED STATES COPYRIGHT OFFICE, COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES, (3rd ed., 2017), 22. (“Examples of situations where the Office will refuse to register a claim include: [...] The work lacks human authorship.”) <https://www.copyright.gov/comp3/docs/compendium.pdf>. “

⁶⁴ So-called “generators” have been in use for a while, though admittedly AI machines add a significant dimension to the discussion because they can make decisions. See note 19 *supra* and accompanying text.

copyright law of such computer-generated works is based dates back to the late 1980s, it was still alive and well until at least 2004-2005.⁶⁵ This paradigm is binary: Either the machine is seen as a mere tool for a human user, in which case the user is the author of any copyrightable subject matter produced; or the machine only generates content as it had been programmed to do, so that the programmer is considered the author of this (predictable) output.⁶⁶ A classic example of the former is the use of word-processing software, which, despite its helpfulness in correcting typos, formatting text, identifying clunky sentences or providing synonyms, does not cross the “mere tool” threshold, in which case the human user of the software is the author of the text.⁶⁷ An example of the latter is a videogame in which the user chooses among predetermined options decided by the programmer.⁶⁸ The programmer of a videogame can be said to have authored the

⁶⁵ For 2004, see Charles Cronin, *Virtual Music Scores, Copyright And The Promotion Of A Marginalized Technology*, 28 COLUM. J.L. & ARTS 1, 18–19 (2004) (“Recent advances in artificial intelligence notwithstanding, [...] the relevant question is not whether a computer can be considered an author, but rather what is the appropriate assignment or apportionment of copyright in computer-generated works between human programmers and human users of their software programs.”)

For 2005, see Ralston, note 4 *supra*, and note 66 *supra*.

Professor Grimmelmann argued in a 2016 article, however, that there is “nothing new under the sun” here, and that it is, at bottom, essentially a question of allocating rights between the programmer and the user. See James Grimmelmann, *There’s No Such Thing As A Computer-Authored Work—and It’s A Good Thing, Too*, 39 COLUM. J.L. & ARTS 403, 404 (2016).

⁶⁶ This was apparently true of computer music composition, at least up to 2005. See Ralston, note 4 *supra*, at 291 (“At various points in between these two extremes, contributions to the character of the musical composition may be dominated by either the programmer (in setting the rules and parameters), the user (in setting parameters or feeding in source material), or HAL (in generating random numbers).”). See also Evan H. Farr, *Copyrightability of Computer-Created Works*, 15 RUTGERS COMPUTER & TECH. L.J. 63, 80 (1989) (“The author of the underlying computer program is the only individual who contributes enough creative intellectual effort to satisfy the copyright requirement of authorship.”) See also Ginsburg and = Budiarjo, *supra* note 15, at 65.

The machine’s output can also be “random.” See note 64, *supra*.

⁶⁷ The debate about the scope and nature of the computer’s role is alive and well in the UK and Ireland, as laws in both jurisdictions define “computer-generated works.” See *infra* Part V.A. As a well-known Irish textbook explains, “[a] work that is produced by a human being who produces that work by using a typewriter or word processor is clearly not deprived of protection because of the mechanical means used.” ROBERT CLARK & SHANE SMYTH, *INTELLECTUAL PROPERTY LAW IN IRELAND* 252 (1997).

⁶⁸ See note 69 *supra*, and accompanying text.

audiovisual output because, in fact, she did: she created the code and files generating the images and sounds.⁶⁹

Both sides of this paradigmatic coin are predicated on a simple analytical device: effacing the creative role, if any, of the machine. There is very little if any unpredictability created *by the machine* in the output. In the word processing example, a human decides virtually everything. In the case of a videogame, the user/player only chooses among a set of predetermined options.⁷⁰ In the case of so-called random generators, no choice is made by either machine or human.⁷¹ The paradigm is a poor reflection of the technological picture painted by AI because AI machines have a degree of autonomy and make decisions.⁷² “AI can function not just by virtue of what it has been programmed to do but learns and changes of its own accord.”⁷³ The automated decision-making feature of deep learning machines, in contrast to the two sides of the old paradigm, adds unpredictability—but not randomness—and in doing so it breaks the causal link between humans (the author of the code or the user of the machine) and the

⁶⁹ See e.g. *Stern Electronics, Inc. v. Kaufman* 669 F. 2d 852 (2d Cir 1981); and *Williams Electronics, Inc. v. Arctic International, Inc.*, 685 F.2d 870 (3d Cir 1982). Both cases held that the programmer of a videogame had copyright in the audiovisual output. In *Stern Elecs*, the Second Circuit noted “[s]omeone first conceived what the audiovisual work would look like and sound like. Originality occurred at that point.”) 669 F.2d at 856

⁷⁰ See *id.*

⁷¹ See *Toro Co. v. R & R Products Co.*, 787 F.2d 1208, 1213 (8th Cir. 1986):

[I]t was undisputed at trial that Toro's parts numbering system was arbitrary and random.” There was no evidence that a particular series or configuration of numbers denoted a certain type or category of parts or that the numbers used encoded any kind of information at all. In short, numbers were assigned to a part without rhyme or reason. This record establishes that appellant's parts numbering “system” falls short of even the low threshold of originality. The random and arbitrary use of numbers in the public domain does not evince enough originality to distinguish authorship.

⁷² For example, machines can make decisions on whether to accept claims for governmental benefits. The European Commission recently published an assessment of automated decision-making based on European personal data transferred to the United States. See EUROPEAN COMMISSION, AUTOMATED DECISION-MAKING ON THE BASIS OF PERSONAL DATA THAT HAS BEEN TRANSFERRED FROM THE EU TO COMPANIES CERTIFIED UNDER THE EU-U.S. PRIVACY SHIELD: FACT-FINDING AND ASSESSMENT OF SAFEGUARDS PROVIDED BY U.S. LAW, 15 (October 2018), online: https://ec.europa.eu/info/sites/info/files/independent_study_on_automated_decision-making.pdf (“referring to “automated processing of personal data to take decisions affecting the individual (e.g. credit lending, mortgage offers, employment).”)

⁷³ TURNER, *supra* note 18, at 56.

output.⁷⁴ Granting copyright protection to the (unpredictable) output of the AI machine would, as Pam Samuelson rightly noted, “over-reward [...] the programmer, particularly in light of the fact that the programmer is no more able to anticipate the output than anyone else.”⁷⁵

The binary paradigm is outdated and cannot be applied *tel quel* to AI for at least two reasons. First, a deep learning AI machine—even more so one capable of writing or modifying its own code—will produce outcomes not foreseeable by the human programmer(s), with little if any human input.⁷⁶ Second, a key feature of machine-learning processes is their ability to detect correlations and patterns.⁷⁷ This is crucial because research on the human creative process suggests that creativity comes from the ability to associate ideas not previously associated.⁷⁸ Machines can find such associations and correlations faster and in much larger pools of data than any human and transform them into new literary and artistic productions.⁷⁹ For example, a semantic Google toolkit known as *word2vec* is already in broad use to understand how words are used in relation

⁷⁴ See Samuelson, *supra* note 36, at 1208.

⁷⁵ *Id.*

⁷⁶ A human user or programmer can provide feedback on outputs as the machine learns. See Mariano-Florentino Cuéllar, *A Simpler World? On Pruning Risks and Harvesting Fruits in an Orchard of Whispering Algorithms*, 51 U. CAL. DAVIS L. REV. 27, 33 n. 16 (2017) (describing issues with feedback in pattern recognition and how algorithms are allowed “to mutate slightly over time.”)

⁷⁷ Creativity can be defined as “the ability to make or otherwise bring into existence something new, whether a new solution to a problem, a new method or device, or a new artistic object or form. creativity.” ENCYCLOPAEDIA BRITANNICA, www.britannica.com (last visited Dec. 13, 2009). See also GEORGE F. KNELLER, *THE ART AND SCIENCE OF CREATIVITY* 59 (Toronto: Holt, Rinehart & Winston, 1965) (“Creativity, as has been said, consists largely of rearranging what we know in order to find out what we do not know.”); and Dana Beldiman, *Utilitarian Information Works-Is Originality the Proper Lens?*, 14 MARQ. INTELL. PROP. L. REV. 1, 46 (2010).

⁷⁸ See Deven R. Desai & Joshua A. Kroll, *Trust but Verify: A Guide to Algorithms and the Law*, 31 HARV. J.L. & TECH. 1, 4 (2017); and Dana Beldiman, *Utilitarian Information Works-Is Originality the Proper Lens?*, 14 MARQ. INTELL. PROP. L. REV. 1, 42 (2010) (“Creativity is defined as a mental process in the course of which new associations between existing ideas or concepts are made and new ideas or concepts are generated.”). See also ROBERT WEISBERG, *CREATIVITY: BEYOND THE MYTH OF GENIUS* 4-5 and 247-48 (1993).

⁷⁹ See note 4 *supra*, for an example. On the ability of AI machines using “big data” corpora (e.g., a database of thousands of existing musical recordings or novels), see OECD, *Hearing on Big Data--Note By BIAC*, DAF/COMP/WD(2016)77, ¶ 7 (Nov. 17, 2016) [https://one.oecd.org/document/DAF/COMP/WD\(2016\)77/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2016)77/en/pdf) (Accessed Dec. 18, 2018) (noting the ability of AI machines to identifying “hidden relations (patterns), e.g., correlations among facts, interactions among entities, [and] relations among concepts.”)

to one another—a process known as “embedding”—, which is a key step in literary creation.⁸⁰ Using neural network technology, such systems are mimicking human information processing activity in several fields, and they are getting ever closer to being truly “creative.”⁸¹

The fourth reasoning is thus flawed as the technology stands now, and it will be increasingly unconvincing as technology progresses. Stating that the extant paradigm is obsolete suggests that it should be replaced with a new analytical prism based on a more nuanced view of the technological present and (near) future that reflects the autonomy of AI machines and the fact pattern now at hand.⁸² AI machines can makes autonomous *choices* too far removed from the machine’s human-programmed code to validly consider the programmer(s) as proxy author(s), and yet not random or entirely functional.⁸³

.⁸⁴ For now, however,

A final note on this last pro-protection reasoning before moving on: The reasoning echoes the first (normative) reasoning in that it assumes that *someone* must own rights in the machine production if that production has (commercial) value. The default normative stance could easily be, and this Article believes that it should be, the exact opposite,

⁸⁰ See Levendowski, note 18 *supra*, at 580.

⁸¹ See Yanisky-Ravid, note 8 *supra*, at 675 (“The current AI systems [...] are called “neural networks” because they mimic the function of human brains by absorbing and distributing their information processing capacity to groups of receptors that function like neurons; they find and create connections and similarities within the data they process.”)

⁸² This will be addressed in Part V, *infra*.

⁸³ Arguably as in the music and newspaper articles mentioned in the Article’s opening paragraph See *supra* notes 5 and 7. The Article returns to this issue in Part VI, *infra*.

⁸⁴ In a more complex version of this reasoning, the machine is recognized as the de facto author but the human who “instigate[s] the creation of computer-generated works.” Denicola, *supra* note 5, at 275. This argument can also be rejected because authorship and instigation are not the same. In the next Part, the Article will demonstrate that expressive human authorship is the basis to grant copyright protection. The person who “instigates” a musical recording is not its author, unless the work made for hire doctrine applies. See, e.g., *Forward v. Thorogood*, 985 F.2d 604, 606–07 (1st Cir. 1993) our concern is with Forward’s musical or artistic contribution rather than his encouragement to the Band or his logistical support.”) This is discussed further *infra*, Part V.A.3.

namely that “we should take this opportunity to rethink rationales for privatization [and...] consider a public domain model for AI creations.”⁸⁵

Let us now turn to arguments against protection.

IV. NORMATIVE ARGUMENTS AGAINST PROTECTION

Is *human* authorship dyed in the wool of copyright?

Many a historiography of copyright places the emergence of the (human) author as its central theme. In other words, authors are often depicted as the pivot around which copyright rights have evolved since their emergence.⁸⁶ This holds true whether copyright is seen in a natural rights perspective (where rights stem from an author’s labor), or in an instrumentalist perspective (as an incentive for authors).⁸⁷ The question to answer is, as noted above, *must authors be human* for purposes of obtaining copyright protection? To answer his question in the affirmative, the Article begins with a look back with the purpose of unearthing the role of humanness in authorship.

Section A of this Part demonstrates that the roots of copyright law were planted in a soil which requires humanness of authorship for a work to be protected. Section B argues that machines productions should not be protected by copyright because machines

⁸⁵ Ana Ramalho, *Will Robots Rule the (Artistic) World?* 21 J. INTERNET L. 1, 22 (2017).

⁸⁶ See e.g., MARK ROSE, *AUTHORS AND OWNERS: THE INVENTION OF COPYRIGHT* 49 (1993). (“What was novel [about the Statute of Anne, the first “copyright” statute adopted in a common law jurisdiction] was that it constituted the author [...] as a person with legal standing.”) About the Statute of Anne, see *infra* Part III.A.2.

⁸⁷ See John Tehranian, *Parchment, Pixels, & Personhood: User Rights and the IP (Identity Politics) of IP (Intellectual Property)*, 82 U. COLO. L. REV. 1, 8–9 (2011)

The historical battle over copyright protection pitted adherents of two different theoretical frameworks against one another: utilitarianism and natural law. The utilitarians emphasized copyright’s role in providing individuals with the necessary economic incentives to encourage the production and dissemination of creative works. [...] [O]ver the past century and a half, utilitarianism has gradually given way to a natural law vision of copyright, heavily influenced by the theories of John Locke and William Blackstone. Born less of welfare-maximization than labor-desert factors labor, this vision is grounded in the inherent rights of authors to the fruits of their labor [...]” (Notes omitted)

cannot be held responsible and, historically, protection and responsibility have been two sides of the same normative coin.

A. *The Humanness of Authorship*

This section of the Article uses a historicist lens to untangle the mesh that binds copyright and authors.

Professor Sam Ricketson—a co-author of the leading treatise on the most important international copyright treaty (the Berne Convention for the protection of Literary and Artistic Works)—opined that the “need for authors to be ‘human’ is a longstanding assumption in national copyright laws.”⁸⁸ He is correct.⁸⁹ Indeed, this assumption dates back to well before the original (1886) text of the Berne Convention; it harkens back to the very roots of copyright, and, as we shall now see, even earlier.

1. The Early Figure of the Author

The figure of the “author” (from the Latin *auctor*, or originator) of an intellectual work as the “natural” holder of rights in that work began to appear in the West as early as the thirteenth century.⁹⁰ That is approximately when the first books were published in the

⁸⁸ Sam Ricketson, *People or Machines: The Berne Convention and the Changing Concept of Authorship*, 16 COLUM. J. L. & ARTS 1, 8 (1991-1992).

Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886, as revised at Paris, July 24, 1971, 828 UNTS 221 [hereinafter Berne Convention]. The Berne Convention had 176 member States as of December 2018. The United States became a party to the Convention on March 1, 1989. See World Intellectual Property Organization, *Contracting Parties: Berne Convention*, https://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=15 (accessed Dec. 15, 2018).

The treatise referred to is SAM RICKETSON AND JANE C GINSBURG, *INTERNATIONAL COPYRIGHT AND NEIGHBOURING RIGHTS: THE BERNE CONVENTION AND BEYOND* (2d ed, 2006).

⁸⁹ An analysis of multiple national laws led another scholar to a similar conclusion. See Andres Guadamuz, *Artificial Intelligence and Copyright*, WIPO MAGAZINE (Oct. 2017) (“Most jurisdictions, including Spain and Germany, state that only works created by a human can be protected by copyright.”), https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.

⁹⁰ See John Tehranian, *Copyright's Male Gaze: Authorship and Inequality in A Panoptic World*, 41 HARV. J.L. & GENDER 343, 385 (2018)

Given the etymological roots of the word “authorship,” its link to the concept of authority should not be surprising. Sharing the same etymological root, the terms “authority” and “author” derive from the Latin word ‘auctor,’ which refers to an originator or promoter. As such, the search for authorship is a quest to determine the originator of a work or, quite literally, the person who possesses authority over it. In one sense, therefore, the idea of authorship speaks to the traditional search for a mastermind *at the time of creation*. [Emphasis in original]

first person: books in which the author claimed that her art and knowledge, and the subjectivity of her work, created value in the work.⁹¹ Divine inspiration gave way to the lyrical “I” as the source of truth and, in doing so, allowed a new aesthetics to emerge.⁹² That distinction, in turn, led to a separation between objective and subjective truth, *between history and story*. This evolution would be felt not just in literature but also in philosophical texts soon after the fall of Constantinople in 1453—the date used as the milestone for the end of the Middle Ages. It is then that humanist philosophy emerged and focused on human creativity, wisdom and individual erudition.⁹³

The introduction of the printing press across Europe in the middle of the 15th Century was a powerful catalyst that accelerated the shift toward individualistic (human) authorship, both qualitatively and quantitatively, as texts could be distributed and read much more widely and more new texts published.⁹⁴ This reinforced the emphasis on the role, and increased the social status, of authors who, freed from the need to rely on patrons, could publish in their own name and hope to make a living from their craft.⁹⁵ The narrative of the individual author and his “genius” thus found fertile soil in the Renaissance.

A crucial first step to be able to acknowledge the author at the time was self-evidently the ability to *name* the author. In medieval Europe, this was far from obvious. Until the sixteenth century, in many European countries there was no fully developed onomastic system, an absence which limited the ability to *name* the author—which seems

⁹¹ See generally MICHEL ZINK, *LA SUBJECTIVITE LITTERAIRE: AUTOUR DU SIECLE DE SAINT LOUIS* (Paris, Presses Universitaires de France, 1985).

⁹² ISABELLE DIU & ÉLISABETH PARINET, *HISTOIRE DES AUTEURS* 44 (Paris, Place des éditeurs, 2013).

⁹³ See *id.*

⁹⁴ William Caxton is believed to have introduced the printing press in England in 1476, 26 years after its purported invention by Gutenberg. See Victoria Baranetsky, *Encryption and the Press Clause*, 6 NYU J. INTELL. PROP. & ENT. L. 179, 188–92 (2017) (explaining how John Milton and many of his contemporaries, including Henry Robinson, William Walwyn, Roger Williams, John Lilburne, John Saltmarsh, and John Goodwin, expounded on the importance of freedom following from introduction of the printing press and quoting Robinson as writing, referring to the printing press, that “no man can have a natural monopoly of [it].”)

⁹⁵ See RICHARD A POSNER, *THE LITTLE BOOK OF PLAGIARISM*, 66–68 (New York, Pantheon, 2007).

a prerequisite to so the attribution of the work.⁹⁶ Shakespeare (1564-1616), for example, “never bothered to regularize the spelling of his name, either in his personal practice or in the practice of others.”⁹⁷ Once the model of a first name and family name (surname) had been more firmly established, however, the author’s name began appearing on the title page of books.⁹⁸ The idea of authorship (as a matter that one could claim) emerged.⁹⁹ It established deep linkages between author and work. This is directly relevant in this discussion because attribution of a work to a machine seems to raise similar naming issues.¹⁰⁰

The seventeenth century would take for granted that identified individuals could and should publish books under their own name and be recognized as authors.¹⁰¹ Descartes’ *Discourse on the Method* is a prime example.¹⁰² Descartes added not just his name but a central philosophical stone to the edifice of individualism. *Cogito ergo sum*: the individual’s ability to think not just as a prerequisite to writing but as the very proof of her existence.¹⁰³

2. The Statute of Anne & Early American Law

⁹⁶ See DIU & PARINET, note 93 *supra*, at, 44-45. See also GEORGE BEECH & MONIQUE BOURIN, PERSONAL NAMES STUDIES OF MEDIEVAL EUROPE: SOCIAL IDENTITY AND FAMILIAL STRUCTURES xiii, 16, 59 and 100 (Kalamazoo, MI, Medieval Institute, 2002) (describing the adoption of “two-element naming” in various European countries (that is, forename and surname)).

⁹⁷ Bruce Thomas Boehrer, *The Poet of Labor: Authorship and Property in the Work of Ben Jonson*, 72 PHILOLOGICAL Q. 289, 289 (1993).

⁹⁸ DIU & PARINET, note 93 *supra*, at 48.

⁹⁹ Erasmus, the famous Dutch scholar, wanted his name on his translation of the New Testament. *Id.* at 49. A book published in Florence in the second half of the sixteenth century, entitled *Lives of the Most Excellent Painters, Sculptors and Architects*, which focused on Michelangelo and other Renaissance artists, is considered a ‘charter text of Renaissance individualism’ Marco Ruffini, *Art Without an Author* (Fordham University Press 2011) 1.

¹⁰⁰ See e.g. the attempt made to name machines precisely for that purpose, as in note 8, *supra*.

¹⁰¹ See Simon Stern, *What Authors Do*, 15 YALE J.L. & HUMANITIES 461, 469 (2003) (explaining the emergence of attribution to authors in 17th century England).

¹⁰² The *Discourse* was published in 1637. René Descartes, *Discourse on Method*, in 1 The Philosophical Works of Descartes 79, 83-85 (Elizabeth S. Haldane & G.R.T. Ross trans., Cambridge Univ. Press rev. ed. 1931) (1637).

¹⁰³ See *id.*

British copyright history also put the human author at the center of the normative stage. The usefulness of this narrative crossing of the Atlantic in the Article follows from the fact that the first state copyright statutes and the first federal (US) copyright statute of 1790 were near identical copies of the (British) Statute of Anne of 1710.¹⁰⁴

The Statute of Anne granted “authors and their assigns” the sole right and liberty of printing books for a period of 14 years from first publication.¹⁰⁵ The question for our purposes is, why *authors*. Starting early in the 16th century and until the Statute of Anne, English law protected publishers, not authors.¹⁰⁶ The stationers (the forefathers of modern publishers) had organized themselves in a guild known as the Stationers Company, and guild membership implied exclusivity of publication.¹⁰⁷ Questions emerged rather quickly concerning the enforcement of the exclusivity stemming from guild membership against non-members.¹⁰⁸ Publishers achieved *erga omnes* protection by combining a ban on the importation of foreign books (in 1534¹⁰⁹) and the grant by Queen Mary of a Charter to the Company (in 1556) that allowed the Stationers to search out and destroy any book printed in contravention of the Statute of proclamation.¹¹⁰ As a result, only books licensed by the Stationers could be registered and legally printed in the UK, as

¹⁰⁴ See Orrin G. Hatch & Thomas R. Lee, “*To Promote the Progress of Science*”: *The Copyright Clause and Congress’s Power to Extend Copyrights*, 16 HARV. J.L. & TECH. 1, 12 (2002) (“American copyright law was patterned after its British counterpart, which was first codified in the Statute of Anne.”).

See also Molly Shaffer Van Houweling, *Author Autonomy and Atomism in Copyright Law*, 96 VA. L. REV. 549, 559 (2010):

[B]oth the first U.S. Copyright Act of 1790 and its predecessor, the British Statute of Anne, distributed initial ownership of copyrights to individual authors, abandoning the previous English practice of consolidating ownership in the members of the exclusive Stationers’ Company of publishers and booksellers. Subsequent amendments to the U.S. Copyright Act have retained the initial allocation of ownership to authors.

¹⁰⁵ A second term of 14 years was possible, provided the author was still alive. See 8 Anne, c. 19 at §§ 1, 11 (1710) (Eng.).

¹⁰⁶ See note 104 *supra*. Authors had a right at common law to prevent first publication.

¹⁰⁷ In other words, no guild member could publish, without authorization, a book already published by another member.

¹⁰⁸ See WILLIAM CORNISH AND DAVID LLEWELLYN *INTELLECTUAL PROPERTY* 5TH ED., 345-6. (2003).

¹⁰⁹ As a point of reference, Caxton introduced the printing press into England in 1476, 26 years after its invention by Gutenberg.

¹¹⁰ See CORNISH AND LLEWELLYN, note *supra* 108, at 346.

entries in the register were restricted to Company members.¹¹¹ This served both the interests of publishers and of the Crown, which could maintain a degree of control over new publications.¹¹² If copyright had continued as a right granted only to economic entities such as publishers, without any emphasis on human creativity, an argument that machine productions deserve the same fate might be easier to make today. History, would, however, take a different path.

John Milton¹¹³ and John Locke were instrumental in the fight to put an end to the Stationers' "licensing" regime, which they (rightly) considered as a form of prepublication censorship.¹¹⁴ This fight, which would sow the seeds of human authorship in copyright law for centuries to come, began as a movement for a protection of authors anchored in natural rights stemming from the protection of the author's labor.¹¹⁵

¹¹¹ See BENJAMIN KAPLAN, AN UNHURRIED VIEW OF COPYRIGHT 2 (1967) ("Caxton founded his press in Westminster in 1476"). See also Howard Jay Graham, *Our Tong Maternall Marvelously Amendyd and Augmentyd: The First Englishing and Printing of the Medieval Statutes at Large, 1530-1533*, 13 UCLA.L.REV. 58 (1965) ("William Caxton printed the first book in English in 1475, the first book in England in 1476.")

¹¹² Interestingly, the system was enforced both through the Star Chamber and, for Elizabeth and her Stuart successors, through the Church, no doubt a reflection of the deep religious struggles of that period.

James I also issued "printing patents", in the same form as letters patent concerning "inventions" to certain publishers, but most were issued to Company members. But those patents were limited in time and thus much less important than the unlimited stationers "copyright". The censorship element was reinforced by various decrees of the Star Chamber issued in 1566, 1586 and 1637. See L RAY PATTERSON, COPYRIGHT IN HISTORICAL PERSPECTIVE, 6 and 346 (1968).

Charles II allowed the privilege to lapse in 1679 but he reinstated it in 1662 after his restoration. While James II revived it for seven more years in 1685, it could not last long in the political climate of his dethronement and Parliament refused to renew it in 1694. See *id.*

¹¹³ See generally AREOPAGITICA (1644).

¹¹⁴ M. ROSE, note 86 *supra*, at 28-32. Milton became famous in copyright history for another reason: his contract with printer Samuel Simmons, by which Milton gave over to Simmons "all that booke copy or manuscript...with the full benefit profit & advantage thereof or which shall or may arise thereby." Peter Lindenbaum *Milton's Contract*, 10 CARDOZO ARTS & ENT. L. J. 439, 441 (1992).

The sale of all his rights in *Paradise Lost* for the sum of £2, was used as evidence both that authors were entitled to proprietorship in their work (as far back as the 1660s), and that publishers were (and are) treating authors unfairly. See *id.*, 452-4.

¹¹⁵ Locke's views justify first and foremost a property right derived from *manual* labor. JOHN LOCKE, TWO TREATISES OF GOVERNMENT, bk II, par. 26.

("Every man has Property in his own Person. This no Body has any Right to but himself. The Labour of his Body, and the Work of his Hands, we may say, are properly his.")

This Article does not need fully to re-litigate the scope and validity of Lockean justification(s) for copyright.¹¹⁶ What matters for our purposes is that, after approximately a century and a half of exclusive publisher privileges amounting to indirect censorship granted to publishers and in a political climate where those privileges could not be renewed (thus leaving the stationers with no protection *erga omnes*), the Statute of Anne granted a right to *authors*.¹¹⁷ The shift was in part the result of the Stationers' instrumental reliance in their petition to Parliament for some kind of legal protection for books on the Lockean/natural right of the authors in their works—indeed this was a pan-European strategy of publishers at the time.¹¹⁸ This strategy paid off because focusing the attention on authors allowed booksellers to achieve their aims, while avoiding the problem of defending an unpopular trade monopoly seen as censorship.¹¹⁹ The embedded question that matters directly here is, *why* did the

Locke also favored a temporary exclusive right for authors in copyrighted works and that he was also aware of the need for the material to enrich the public domain using the work of past authors *See* JOHN LOCKE, MEMORANDUM, King, 203, 208-9

If *intellectual* property, of which copyright forms part, may have emerged from the Lockean font, it started its separation from manual labor early on, both in England and the United States.) *See* Jon M. Garon, *A Conceptual Framework for Copyright Philosophy and Ethics*, CORNELL L. REV. 88, 1278-1315 (2003):

Beginning in 1709, England singled out intellectual property from other areas of law, distinctly from the other forms of labor. The United States and even France took similar approaches. The underlying basis was a recognition that intellectual enterprise serves the public in a manner fundamentally different from other forms of labor, and thus needs to be clothed with sufficient reward for the most capable to serve society in this capacity.

¹¹⁶ It is admittedly the source of fascinating academic debates. *See* Richard Epstein, *Liberty versus Property? Cracks in the Foundations of Copyright Law*, Olin Working Paper No. 204. Available at <http://ssrn.com/abstract=529943>; and Tom Bell, *Escape from Copyright: Market Success vs. Statutory Failure in the Protection of Expressive Works*, 69 U. CIN. L. REV. 741, 762-3 (2001) (“Locke's [...] labor-desert justification of property gives an author clear title only to the particular tangible copy in which she fixes her expression--not to some intangible plat in the noumenal realm of ideas. Locke himself did not try to justify intangible property.”)

¹¹⁷ *See* Catherine Seville, *The Emergence and Development of Intellectual Property Law in Western Europe*, in THE OXFORD HANDBOOK OF INTELLECTUAL PROPERTY LAW (R. Dreyfuss and J. Pila, eds), 171, 181 (2018). (“[T]he novel referenced to authors [in the Statute of Anne] was hailed as significant in subsequent debates regarding the nature of literary property.”)

¹¹⁸ *See* Roger Chartier, *Figures of the Author*, in Brad Sherman & Alain Strowel (eds), OF AUTHORS AND ORIGINS: ESSAYS ON COPYRIGHT LAW 7, 12 (1994) (“In England and in France, it was actually the monarchy's attempt to abolish the *privilège* [...] that led the bookseller-publishers to link the irrevocability of their rights to the recognition of the author's ownership of their work”)

¹¹⁹ *See* PATTERSON, *supra* note 112, at 169. To see the author merely as an excuse to grant an exclusive right would be an oversimplification, however. Rochelle Dreyfuss rightly noted that “publishers created

publishers' reliance on *authors* work so well? Why, in other words, was it preferable that the public see that “beneficiaries were said to be individuals”?¹²⁰ There was a timely convergence of interests: On the one hand, authors were basking in the sun of the Enlightenment, stroked by the rays of individualism.¹²¹ On the other hand, the Stationers' understood that they needed a justificatory theory other than greed, the needs of “industry” or indeed their mere desire to survive to convince both Parliament and the public. That theory was (human) authorship.¹²²

In sum, the path of copyright history follows the milestones of human creativity. Whether seen as a natural right—or even at its human apogee as a human right as the next section demonstrates—or as an economic incentive, the focus of copyright has been the production of the human mind. At a policy junction early in the 18th century, copyright chose to acknowledge authors, not publishers. If copyright had been designed

the authorship category not because they recognized the central importance of authors, but rather to achieve pecuniary objectives—because they thought it would be politically easier to convince Parliament to enact copyright legislation if the intended beneficiaries were said to be individuals.” Rochelle Cooper Dreyfuss, *Collaborative Research: Conflicts on Authorship, Ownership, and Accountability*, 53 VAND. L. REV. 1161, 1214 (2000). See also Mark Rose, *The Author as Proprietor: Donaldson v. Becket and the Genealogy of Modern Authorship*, 23 REPRESENTATIONS 51, 54 (1988).

¹²⁰ See LIONEL BENTLY & BRAD SHERMAN, *INTELLECTUAL PROPERTY LAW*, 33-34 (2001).

¹²¹ Michel Foucault commented that the modern concept of author “constitutes a privileged moment of individualism in the history of ideas.” Michel Foucault, *What is an Author?*, in J. Harari (ed) *TEXTUAL STRATEGIES: PERSPECTIVES IN POST-STRUCTURALIST CRITICISM* (1979), at 141.

¹²² The theory influenced not just Parliament, but courts as well. In a famous 1769 case, a court found it “‘just’ that an author should reap the [profits of his ingenuity.]” C. Seville, note 117 *supra*, at 180. The case, *Millar v. Taylor* 4 Burr. 2303, 98 Eng. Rep. 201 (K.B. 1769), confirmed the existence of a common law right of authors in their literary *property* ostensibly based on natural law considerations. A later case (*Donaldson v. Beckett*, 4 Burr. 2408, 1 E.R. 837 (1774)) found that this right had not survived the adoption of the Statute of Anne, however.

Copyright, if it is considered a natural right of authors at common law, then “the right, like most common law property rights, should be perpetual.” Russ Versteeg, *The Roman Law Roots of Copyright*, 59 MD. L. REV. 522, 529 (2000).

This debate is reminiscent of recent discussions in the United States on the common law right in sound recordings and its interface with (federal) copyright law in the wake of the adoption of the Classics Protection and Access Act [Classics Act], Title II of the Orrin G. Hatch–Bob Goodlatte Music Modernization Act, Pub.L. 115–264 (signed into law on Oct. 11, 2018). The Classics Act extended federal (statutory) protection to pre-1972 sound recordings. In a 2011 letter to the President, the Register of Copyrights had noted that “under current law, sound recordings fixed on or after February 15, 1972 are protected under federal copyright law, but recordings fixed before that date are protected by a patchwork of state statutory and common law.” United States Copyright Office, *Federal Copyright Protection for Pre-1972 Sound Recordings: A Report Of The Register Of Copyrights* (December 2011), at 4.

as an investment protection scheme, or merely a scheme to disseminate “things of value,” then the investment of publishers would have been sufficient, human creativity a mere adjunct, and the basis for protection would have been time and money spent.¹²³ This would have paved a path to argue in favor of the protection of machine productions, based on the time and money spent on the machines and their code. Yet in 1991 the Supreme Court, following in almost three centuries of normativity centered on human authorship, unequivocally threw the investment and time (“sweat of the brow”) test overboard and anchored the copyright ship solidly in the waters of human creativity.

3. Author’s Rights as Human Rights

The theory of authorship just described reached a higher level still due to the influence on the European continent as the prototypical Romantic Author became the model on which much of the more modern copyright system was built.¹²⁴ The Romantic Author was, to quote Michel Foucault, “a privileged moment of individualization in the history of ideas.”¹²⁵

There was no doubt at the time that European authors had natural rights in works produced by them, a view that was given “universal” status when it was enshrined as a human right.¹²⁶ The Universal Declaration on Human Rights (UDHR) protects the moral and material interests of authors resulting from and scientific, literary or artistic production.¹²⁷ This protection of interests resulting from scientific, literary or artistic production objective embraces at least indirectly the Lockean approach.¹²⁸ To quote

¹²³ See *supra* notes 48 & 49 and accompanying text.

¹²⁴ Romanticism is considered to have started in the eighteenth century and peaked during the first half of the nineteenth century. See Matthew Josephson ___.

¹²⁵ Michel Foucault, *What is an Author?*, in TEXTUAL STRATEGIES: PERSPECTIVES IN POST-STRUCTURALIST CRITICISM 141 (J. Harari ed., 1979).

¹²⁶ As René Cassin (recipient of a Nobel Peace Prize and a drafter of the Universal Declaration of Human Rights) noted, “[h]uman beings can claim rights by the fact of their creation.” Quoted in Michel Vivant, *Authors’ Rights, Human Rights?*, 174 REV. INT. DROIT AUTEUR (RIDA) 60, 86 (1997).

¹²⁷ Universal Declaration of Human Rights art. 27, G.A. Res. 217A(III), U.N. GAOR, 3d Sess., 1st plen. mtg., U.N. Doc. A/810 (Dec. 10, 1948) [hereinafter UDHR].

¹²⁸ As Swiss copyright scholar François Dessemontet noted, “[T]he Universal Declaration and the UN Covenant [on Economic, Social and Cultural Rights adopted on 16 December 1966] mark the apex of the French vision of literary and artistic property, as opposed to the Anglo-American ‘mercantilist’ view.”

Professor Julie Cohen, copyright's "mission to foster cultural play" can be read against the backdrop of the UDHR.¹²⁹ While the copyright protection of the output of machines can be the subject of an honest debate, no one can seriously argue that machines should have human rights.¹³⁰

With the UK and the rest of Europe both basing a new form of (intellectual) property on authorship, the next step was to internationalize the protection. After all, natural rights should know no geographical boundaries (as their recognition as human rights demonstrates).¹³¹ The internationalization of the rights of authors as natural rights took the form of the Berne Convention, the seed of which was sown in the 1850s by ALAI, a Paris-based association of writer.¹³² ALAI's first president was the famous French author and human rights campaigner Victor Hugo,¹³³ perhaps best-known today for *Les*

François Dessemontet, *Copyright and Human Rights*, in JAN J.C. KABEL, ED., *INTELLECTUAL PROPERTY AND INFORMATION LAW*, 113 at 114. (1998).

¹²⁹ Also relevant is the International Covenant on Economic, Social, and Cultural Rights arts. 15(1)(b), (c), Dec. 16, 1966, 993 U.N.T.S. 3, 5993 U.N.T.S. 3, 5 [hereinafter ICESCR] (recognizing right "to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author" and to "to enjoy the benefits of scientific progress and its applications"). For a discussion, see Laurence R. Helfer, *Toward A Human Rights Framework for Intellectual Property*, 40 U. CAL. DAVIS L. REV. 971, 1020 (2007).

¹³⁰ See e.g., the decision of the European Court of Human Rights in Fiona De Londras, Saadi v. Italy. App. No. 37201/06, European Court of Human Rights (Grand Chamber), Feb. 28, 2008, 102 AM. J. INTL. L. 616, 619 (2008) (referring to the "humanness of human rights"); George J. Annas, *The Man on the Moon, Immortality, and Other Millennial Myths: The Prospects and Perils of Human Genetic Engineering*, 49 EMORY L.J. 753 (2000) ("[H]uman rights and human dignity depend on our human nature."); and James M. Donovan, *Human Rights: From Legal Transplants to Fair Translation*, 34 WIS. INTL. L.J. 475, 484 (2017) ("Human rights enjoy popular endorsement because they are thought to be obvious, even self-evident consequences of humanness.). Perhaps one day there will be a Bill of Machine Rights.

¹³¹ Authors' rights, as natural or human rights, should be protected in all countries without discrimination, a principle known as *national treatment*. That was the basic premise of the 1886 text of the Convention, namely to ensure that authors who were nationals of countries that would accede to the new treaty would be protected in all countries party to the treaty. See WIPO, *1886–1986: Berne Convention Centenary*, 119 (1986).

¹³² The original text of the Berne Convention was signed in 1886, based on negotiations that started in the 1850s in the wake of the Romantic wave. For a detailed history of that Convention, see SAM RICKETSON AND JANE C GINSBURG, *I INTERNATIONAL COPYRIGHT AND NEIGHBOURING RIGHTS: THE BERNE CONVENTION AND BEYOND*, (2nd edn, 2006; and MATTHEW JOSEPHSON, *VICTOR HUGO: A REALISTIC BIOGRAPHY OF THE GREAT ROMANTIC* (Jorge Pinto Books, 2006) 95. The United States joined the Berne Convention in 1989. See <www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=15> (last accessed December 28, 2018). The association's full official name is *Association littéraire et artistique internationale* (ALAI). See <www.alai.org> last accessed Dec. 28, 2018).

¹³³ As President of ALAI, Hugo was instrumental in the early draft of the Berne Convention. One should note to offer a more accurate picture that Hugo's views changed over time, see Calvin D Peeler,

Misérables (1862) but in his day famous also as an advocate for the Romantic Movement associated on the Continent with the natural rights foundation of authors' rights.¹³⁴ The basis for the protection of rights of authors was, in his view, the needs of the "human spirit" to grow and develop, a notion that can be put in parallel with that of progress.¹³⁵

4. Evolution of Authors' Rights in the United States

For American authors of the late of the eighteenth and up to the early nineteenth-century, fostering creative genius meshed with concurrent interests in preserving and maintaining a cultural commons.¹³⁶ American thinkers and authors at the time sought to articulate and codify competing visions of selfhood in the increasingly important print culture.

Their thinking, and the discussion of the natural rights of authors, directly influenced the text of the United States Constitution. Thomas Jefferson, who was United States Minister to France from 1785 to 1789, witnessed the evolution of author's rights as human rights.¹³⁷ In *The Federalist* No. 43," Madison argued that the proposed federal government should have exclusive jurisdiction over copyright law" (thus superseding the

'From the Providence of Kings to Copyrighted Things (and French Moral Rights)' (1999) 9 *Indiana International & Comparative Law Review* 423, 450–51.

¹³⁴ The prototypical Romantic Author is the model on which much of the early international copyright edifice was built. Romanticism is considered to have started in the eighteenth century and peaked during the first half of the nineteenth century. The Berne Convention was signed in 1886, based on negotiations that started in the 1850s in the wake of the Romantic wave. For a detailed history of that Convention, see Sam Ricketson and Jane C Ginsburg, *INTERNATIONAL COPYRIGHT AND NEIGHBOURING RIGHTS: THE BERNE CONVENTION AND BEYOND* (2nd edn, 2006); and MATTHEW JOSEPHSON, *VICTOR HUGO: A REALISTIC BIOGRAPHY OF THE GREAT ROMANTIC 95* (Bethesda, MD: Jorge Pinto Books, 2006).

¹³⁵ See *supra* notes 32 and 33 and accompanying text. The quote (author's translation) can be found at: Victor Hugo, *Discours d'ouverture du Congrès littéraire international de 1878*. In the original text: "La littérature, c'est le gouvernement du genre humain par l'esprit humain." <http://www.gilles-jobin.org/jobineries/index.php?2005/10/29/290-victor-hugo-en-1878>.

¹³⁶ As legal scholars such as L Ray Patterson have pointed out, the language of the Constitution suggests, in order of priority, that copyright first promote learning, then preserve the public domain, and—only thirdly—encourage creation by benefiting the author. See L RAY PATTERSON & STANLEY W LINDBERG, *THE NATURE OF COPYRIGHT* 49 (1991).

¹³⁷ See WILLIAM HOWARD ADAMS, *THE PARIS YEARS OF THOMAS JEFFERSON* 22-23 (Hartford: Yale Univ. Press, 1997); and JAY FLIEGELMAN, *DECLARING LANGUAGE: JEFFERSON, NATURAL LANGUAGE AND THE CULTURE OF PERFORMANCE* 65 (Stanford: Stanford Univ. Press, 1993).

statutes that most of the colonies already had adopted based on the Statute of Anne).¹³⁸ Recall that common law copyright, with which Madison would have been familiar, was a property-like right anchored in natural law.¹³⁹ In Madison's view, that power would "scarcely be questioned" arguing that "[t]he copyright of authors has been solemnly adjudged in Great Britain to be a right of common law."¹⁴⁰ Madison "proposed to his fellow delegates that Congress be empowered '[t]o secure to literary authors their copyrights for a limited time'."¹⁴¹ This author-centric strategy to justify copyright put the "cultural figuration" of the author at the center of the picture.¹⁴²

Modernism eventually pushed Romanticism out of the normative spotlight. Modernist authors were different: British and American alike, they made use of an array of existing literary materials in their work, embracing techniques such as collage, pastiche, and complex patterns of allusions even as they continued to pay homage to the author as "original genius."¹⁴³ But the author remained front and center.¹⁴⁴ Until, that is,

¹³⁸ Edward L. Carter, *Choking The Channel Of Public Information: Reexamination Of An Eighteenth-Century Warning About Copyright And Free Speech*, 1 NYU J. INTELL. PROP. & ENT. L. 79, 84 (2011).

¹³⁹ See note 122 *supra*.

¹⁴⁰ THE FEDERALIST NO. 43, at 268 (James Madison) (Clinton Rossiter ed., 1961). Commentators have suggested that Madison, who was most likely familiar with *Millar v Taylor* (see note 122 *supra*) might not have known that a later court had found that the Statute of Anne had established the common law right of authors. See Carter, note 138 *supra*, at (« [T]he 1783 edition of Blackstone's Commentaries, which would have contained a report of *Donaldson*, may not have been available to colonial lawyers until after the Revolutionary War, and so American colonists may have continued to apply the precedent of *Millar v Taylor* long after British judges had abandoned it in *Donaldson*."); and Susan P. Liemer, *How We Lost Our Moral Rights and the Door Closed on Non-Economic Values in Copyright*, 5 J. MARSHALL REV. INTELL. PROP. L. 1, 21-22 (2005 (arguing that Madison, in *The Federalist No. 43*, "may have been misled because his Blackstone was printed before the outcome of *Donaldson v. Beckett*."))

¹⁴¹ Paul M. Schwartz & William Michael Treanor, *Eldred and Lochner: Copyright Term Extension and Intellectual Property As Constitutional Property*, 112 YALE L.J. 2331, 2375 (2003), citing 2 THE RECORDS OF THE FEDERAL CONVENTION OF 1787, at 325 (Max Farrand ed.) (1937).

¹⁴² See M. ROSE, note 86 *supra*, at 3) ("Copyright is founded on the concept of the unique individual who creates something original and is entitled to reap a profit from those labors. Until recently, the dominant modes of aesthetic thinking have shared the romantic and individualistic assumptions inscribed in copyright.") See also Peter Jaszi, *On the Author Effect: Contemporary Copyright and Collective Creativity*, 10 CARDOZO ARTS & ENT. L.J. 293, 294 (1992).

¹⁴³ See Paul K. Saint-Amour, *Introduction* in MODERNISM AND COPYRIGHT (Paul K. Saint-Amour, ed) 31 (Oxford: Oxford Univ. Press, 2011).

¹⁴⁴ Ezra Pound, arguably the most prominent and public of the Moderns when it came to politics, engaged in extended meditations on copyright and its relation to the creative process. Pound's international

Foucault announced that the dagger of post-structuralism had stabbed at the very heart of authorship.¹⁴⁵

A major “critique of copyright law by Martha Woodmansee, Peter Jaszi, James Boyle, and others “(very simplified) is that nothing is genuinely creative and innovative; everyone just reworks the commons.”¹⁴⁶ The “death of the author” argument has been used not just to weaken copyright protection but also, in an ironic twist, to argue that machine productions can and should be protected.¹⁴⁷ As Rochelle Dreyfuss contends, however, “[perhaps concepts like authorship and creativity are socially constructed and bear little relationship to what actually goes on in the process of innovation, but these constructs have mediated fairly effectively with production problems over several centuries.”¹⁴⁸

The post-modern burial of the author does not justify the conclusion that machine productions are somehow just as worthy of copyright protection as those of human authors. True, authorship is now more collective and collaborative; but that is a mere constation.¹⁴⁹ This Article does not dispute the diminishment of the role of the monolithic “individualized figure of the romantic author.”¹⁵⁰ Stating that the role of individual authors has diminished eludes the question that needs to be answered because to say that authors cross-fertilize each other in new ways and create more often jointly or by derivation from one another—a phenomenon evidenced by the exponential growth of

copyright law protected authors’ intellectual labour by codifying *perpetual and automatic* copyright. See *id.*, 50–53.

¹⁴⁵ MICHEL FOUCAULT, *THE FOUCAULT READER* 101 (1984) (describing how the “very notion of ‘author’” was but a moment in the “history of ideas, knowledge [and] literature.”)

¹⁴⁶ Dreyfuss, note **Error! Bookmark not defined.** *supra*, at 1214. See also Peter Jaszi, *On the Author Effect: Contemporary Copyright and Collective Creativity*, 10 *CARDOZO ARTS & ENT.L.J.* 293, 319 (1992) (“[E]lectronic technology is playing a crucial role in promoting writing practices in which the identities of individual contributors to shared dynamic texts are deemphasized, and their useful contributions effectively merged.”)

¹⁴⁷ See Bridy, *Coding*, note 3 *supra*, at 7; and

¹⁴⁸ Dreyfuss, note **Error! Bookmark not defined.** *supra*, at 1216.

¹⁴⁹ See, e.g., LAURENCE LESSIG, *REMIX* (2008) (describing wikis and “collaborative hybrids” as newer forms of creation).

¹⁵⁰ James Boyle, *A Theory of Law and Information: Copyright, Spleens, Blackmail, and Insider Trading*, 80 *CAL. L. REV.* 1413, 1423 (1992).

user-generated content—is simply *not* evidence, in this Article’s view, that collaboration between humans and *machines* can be laid on the same reasoning pedestal. Put differently, a broadening of the nature and scope of human interactions does not naturally lead to the conclusion that, *therefore*, collaboration with machines is now encompassed under the same normative umbrella.

Professor Denicola and others have used the “supernatural” cases to argue that authorship need not be human.¹⁵¹

The notion of creativity normatively embedded in copyright law since its very origin has inexorably been linked to the human mind. A number of legal scholars and philosophers often associate agency and mental states, what Kant called “transcendental unity of apperception,” which one might define as the ability to experience first-person self-consciousness, an interiority that transcends mere observable behavior.¹⁵² Asking if AI machines can create might be asking, in their view, whether AI machines have mental states or freewill. To a certain degree, this poses a circular definitional problem: If “mental” is defined in human terms, then AI machines cannot, by definition, have mental states or agency. This paper takes a more functionalist approach.¹⁵³ The underlying premise of the notion of agency is encapsulated in the words “task” and “action” in the

¹⁵¹ See Denicola, *supra* note 5, at 278-281. The Article refers to cases where a human author claims to be a mere intermediary for a nonhuman entity, including *Urantia Found. v. Maaherra*, 114 F.3d 955, 964 (9th Cir. 1997); *Oliver v. Saint Germain Foundation*, 41 F. Supp. 296 (S.D. Cal. 1941); and *Penguin Books U.S.A., Inc. v. New Christian Church of Full Endeavor, Ltd.*, 96 CIV. 4126 (RWS), 2000 WL 1028634 (S.D.N.Y. July 25, 2000), *vacated sub nom. Penguin Books U.S.A., Inc. v. New Christian Church of Full Endeavor*, 96 CIV. 4126 (RWS), 2004 WL 906301 (S.D.N.Y. Apr. 27, 2004).

There is dicta in *Penguin Books* that seems to support this view: “dictation from a non-human source should not be a bar to copyright.” dictation from a non-human source should not be a bar to copyright. *Id.* at *11-12. However, in all the cases a human was found to be the source of the written expression. This is the conclusion of a comparative laws study of cases of this nature (cited by Prof. Denicola). See Roger Syn, *Copyright God: Enforcement of Copyright in the Bible and Religious Works*, 14 REGENT U. L. REV. 1, 24 (2001-2002).

¹⁵² Veuggio and Abney, 354-55. This is more clearly the case in if one follows a “relational” definition of the law based on a legal subject’s decision to follow the law, or not. See generally Herbert L.A. Hart, *THE CONCEPT OF LAW*, 2d ed. (1972). See also Keith Culver, *Leaving the Hart-Dworkin Debate*, 51 UNIV. TORON. L. J. 374, 378 (2001) (referring to “committed participants [in some system of norms who] use norms as shared standards of conduct.”)

¹⁵³ See WILLIAM G. LYCAN, *CONSCIOUSNESS* 8 (1987) (“We may hold onto our anti-Cartesian claim [and] we would do better to individuate mental types more abstractly, in terms (let us say) of the functional roles their tokens play in mediating between stimuli and responses.”). See also Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1264-1268 (1992) (discussing the objection that machines cannot have consciousness or intentionality).

preceding quotes: as an agent *acts*, it *causes* (by its action in performing its task) a difference in the world. As Rebecca Tushnet noted, “creativity is a positive virtue, not just because of its results but because of how the process of making meaning contributes to human flourishing.”¹⁵⁴ In sum, the *human* author, whether portrayed as a pauper toiling away under the pale light of a dying candle with fingerless gloves, or a group of savvy videographers expertly modifying images and sounds for their latest YouTube channel, is still central to the copyright equation.¹⁵⁵

B. With Rights Come Responsibilities

The emergence of rights vested in authors in and since the Statute of Anne has a second normative payoff: it undergirds, as we shall now see, a second point used by the Article to illuminate the path ahead when it comes to machine productions.

A set of arguments in England at the time of the Statute of Anne was that, if authors had an obligation not to write libelous, defamatory or otherwise unacceptable content (which they had), then authors should have a coextensive right in their writings.¹⁵⁶ This created a normative link that seems entirely convincing to this Article: *if one is responsible for one’s writing, then one can legitimately ask for a right in protecting moral or material interests in that writing.*¹⁵⁷ For example, one might want one’s name

¹⁵⁴ Rebecca Tushnet, *Economies of Desire: Fair Use and Marketplace Assumptions*, 51 WM. & MARY L. REV. 513, 537 (2009)

¹⁵⁵ For the Dickensian image of the pauper with fingerless gloves, see SAMANTHA CAROL, MR. DICKENS AND HIS CAROL, 255 (New York: Flatiron Books, 2017).

¹⁵⁶ See M. ROSE., note 86 *supra*, at 34-35.

¹⁵⁷ Echoing the ICESCR, note 129 *supra*. See BEN SAUL, DAVID KINLEY AND JACQUELINE MOWBRAY, THE INTERNATIONAL COVENANT ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS, 1226-1229 (2014) (describing rights of authors as human rights, and human rights as fundamental, inalienable, and Universal entitlements”). *Id.* at 1226.

As of December 2018, the Covenant had 165 parties. The United States signed (but did not ratify) the Covenant in 1977. See United Nations, International Covenant on Economic, Social and Cultural Rights, Jan. 3, 1976, online: https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=IV-3&chapter=4&clang=en (accessed Dec. 5, 2018).

A human rights-based approach can inform parts of copyright law, but in the past two decades copyright law at the international level has been shaped more by trade agreements than human rights. See Daniel Gervais, *Human Rights and the Philosophical Foundations of Intellectual Property*, in RESEARCH HANDBOOK ON HUMAN RIGHTS AND INTELLECTUAL PROPERTY (Ch. Geiger, ed), 89, 90-93 (2015).

associated with the text, or have a right to prevent its misappropriation (such as republication under someone else's name) as a form of plagiarism or as copyright infringement (unauthorized copy) or both. This linkage between right and responsibility was actively pursued by author advocates, and reinforced by a freedom of expression argument. Following in the footsteps of Milton and Locke, British satirist Daniel Defoe argued that prepublication control was unnecessary; that copyright should be granted to all authors and that their content could be controlled by prosecuting "offenders" after publication; *ex post* control as opposed to *ex ante* licensing, in other words.¹⁵⁸ Defoe's argument rests on the *complementarity of responsibility and right, punishment and reward*.¹⁵⁹ The same can be found in Foucault's discussion of the persona of the author: He puts in parallel authorship and what he calls "penal appropriation," noting that "[t]exts, books, and discourses really began to have authors [...] to the extent that authors became subject to punishment, that is, to the extent that discourses could be transgressive."¹⁶⁰

This Article suggests that the *same doctrinal linkage* applies to machine productions: if it served as the normative underpinning justifying copyright for human authors, it should be applied to machine created productions, that is, to any other category of purported "author." This Article cannot, therefore, agree with the suggestion that copyright rights should be recognized in the outcome of deep learning processes that generate productions that *look like* copyrightable subject matter, at least not until and unless the machine, as purported "author" (as a matter of copyright law), can accept full responsibility for "its" creation.¹⁶¹ Furthermore, this conclusion can be anchored in the

¹⁵⁸ As he wrote: "Twould be unaccountably severe to make a Man answerable for the Miscarriages of as thing which he shall not reap the benefit of it well perform'd" Quoted in M. ROSE., *supra* note 86, at 35.

¹⁵⁹ *Id.*, at 35-36.

¹⁶⁰ Foucault, *supra* note 125, at 148.

¹⁶¹ The idea to create this type of second-degree incentive is not uncommon. See Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079 (2016) (arguing that inventions need not be made by humans to be patentable and extending the reasoning to copyrightable material).

well-established correlativity thesis (“no rights with responsibilities”) essential to rights theory.¹⁶²

Will liability by proxy fill this gap? Will programmers, owners or users of AI machines accept responsibility for all potential acts of the machines they program, own or use, including all literary and artistic outputs?¹⁶³ The Article suggests it is safer to answer in the negative. Yet, if programmers, owners, and users of AI machines claim rights in the productions made by those machines, those programmers, owners and users *must* accept responsibility for those productions, whether they amount to copyright infringement, libel or any other source of liability.¹⁶⁴ It does not matter whether it is likely that any liability might arise; what matters is answering this question: what if there was; would the owner or user be liable? This is a central normative point, anchored in copyright history: No copyright should be granted to an author who is not also responsible for the work’s meaning and content, whether it be libel or copyright infringement.

The reader may have noted that the previous paragraphs eschew a difficulty by referring to the programmer, owner or user.¹⁶⁵ Indeed, deciding which of them is the potential “author” is fact-dependent and thus no uniform answer can be provided. If human authorship of machine productions is recognized, then it should probably be to the

¹⁶² See Keith Abney, *Robotics, Ethical Theory, and Metaethics: A Guide for the Perplexed*, in Patrick Lin, Keith Abney and George A. Bekey (eds), *ROBOT ETHICS: THE ETHICAL AND SOCIAL IMPLICATIONS OF ROBOTICS*, 35, 38 (Cambridge, MA: The MIT Press, 2014).

¹⁶³ Recall, in addition, that there is no evidence to suggest that copyright in the output might be the best or even a good incentive for AI programmers. Presumably, meeting the needs of prospective buyers will work just as well, and possibly much better. See Wu, *supra* note 54, at 162-163.

¹⁶⁴ This scenario might arise even without an AI machine, as a simple example illuminates. Take a computer program generating random associations of words according to basic syntactic rules. It might produce a text that is libelous or infringing someone else’s copyright.

It has been said that computers (or monkeys) creating random texts would eventually produce a copy of a Shakespearean play they would most likely produce something libelous well before a copy of Hamlet. See Jesse Anderson, *A Few Million Monkeys Randomly Recreate Shakespeare*, JESSE ANDERSON BLOG (Sept. 23, 2011), <http://www.jesse-anderson.com/2011/09/a-few-million-monkeys-randomly-recreate-shakespeare/>. (accessed Dec. 18, 2018).

¹⁶⁵ This is of course a debate that must be had if a decision was made that non-human productions should be protected. For a discussion on possible allocation(s) of rights in that context, see Samuelson, *supra* note 36.

human proxy “author” who effectively operated or otherwise asked or allowed the machine to produce.¹⁶⁶ This assumes that we are past the binary paradigm described above, namely that the machine did not produce (a) only what it was programmed to produce, or (b) as a mere tool assisting an identifiable human author.¹⁶⁷ In other words, this assumes at least a significant part of autonomous creation by the machine.¹⁶⁸ Because this Article takes the view that, once the autonomy threshold has been crossed, there should be no copyright in the production, it is unnecessary to delve more deeply into which human proxy should be, by legal fiction, “selected” as the most appropriate right holder.¹⁶⁹

V. DOCTRINAL ARGUMENTS AGAINST PROTECTION

As noted in the Introduction, the humanness of authorship can be derived from both doctrinal and normative arguments. In this part, the Article considers two doctrinal arguments, namely the requirement of originality and the notion of derivative work.

Is the humanness of the creation of copyrighted works a *chasse gardée* of humans? In her analysis of the copyright laws of seven major jurisdictions, including the United States, Professor Jane Ginsburg concluded that an author was the “human being who exercises subjective judgment in composing the work and who controls the execution.”¹⁷⁰ The search for the manifestation of that subjective judgement is encapsulated in the originality doctrine to which the Article now turns its attention.

A. Originality

¹⁶⁶ *See id.*

¹⁶⁷ *See supra* note 69 and accompanying text.

¹⁶⁸ *See supra* note 65 and accompanying text.

¹⁶⁹ *See supra* note 15. To use the term in Ginsburg & Bunardjio, *supra* anote 15, the production is “authorless.”

¹⁷⁰ Jane C. Ginsburg, *The Concept Of Authorship In Comparative Copyright Law*, 52 DEPAUL L REV 1063, 1066 (2002-2003).

The only condition to obtain copyright, both in the United States and around the world, is that a work of authorship must be “original.”¹⁷¹ The requirement is, as the Supreme Court described it, the “*sine qua non* of copyright.”¹⁷² The question for our purposes is, how much humanness does this requirement presuppose?

1. Creative choices

The legislative history of the 1976 US Copyright Act shows that originality is required for a literary or artistic production to be protected by copyright.¹⁷³ Prior to 1976, originality was not explicitly mentioned in the Act but it was nonetheless required.¹⁷⁴ The question of the exact definition of the standard remained open, however. In 1991, the *Feist* court found that *creative choices* visible in *selection and arrangement* were necessary to generate sufficient originality to warrant copyright protection.¹⁷⁵ This

¹⁷¹ The Copyright Act grants protection only to “original works of authorship.” 17 U.S.C. § 102(a). The Supreme Court has held that originality is required by the constitutional provision (U.S. Const. art. I, § 8, cl. 8), which permits Congress to protect the “writings” of “authors.” See *Feist Publications, Inc. v. Rural Telephone Service Co.*, 499 U.S. 340, 346 (1991), following *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884) (stating that it was “unmistakably clear” that the terms “authors” and “writings” in the Constitution presuppose a degree of originality). In the United States the work must also be fixed in any tangible medium of expression now known or later developed. 17 U.S.C. §102(a).

As to the worldwide application, see Daniel Gervais, *Feist Goes Global: A Comparative Analysis of the Notion of Originality in Copyright Law*, 49:4 J. Copyright. Soc’y of the USA 949, 981 (2002) (“There thus seems to be emerging an international consensus that originality is not only copyright’s single ‘sieve’, but also, and more importantly, that the presence of creative choices in the making of the work is the only adequate test to determine whether the work is worthy of copyright protection.”)

¹⁷² *Feist*, 499 U.S., at 345.

¹⁷³ HR REP No 94-1476, (1976) reprinted in 1976 USCCAN 5659. The Act does not define originality and this omission was apparently deliberate. See William Patry, *Copyright in Collections of Facts: A Reply*, 6(5) COMMUNICATIONS & L. 11, 18 (1984).

¹⁷⁴ Julia Reytblat, *Is Originality in Copyright Law A “Question Of Law” Or A “Question Of Fact?”: The Fact Solution* (1999) 17 CARDOZO ARTS & ENT. L. J. 181, 183.

¹⁷⁵ *Feist* 499 U.S., at 348:

Factual compilations, on the other hand, may possess the requisite originality. The compilation author typically *chooses* which facts to include, in what order to place them, and how to arrange the collected data so that they may be used effectively by readers. These *choices* as to selection and arrangement, so long as they are made independently by the compiler and entail a minimal degree of creativity, are sufficiently original that Congress may protect such compilations through the copyright laws.

See also Alan L Durham, *Speaking of the World: Fact, Opinion and the Originality Standard of Copyright* 33 ARIZ. ST. L.J. 791, 794–95 (2001) (explaining the distinction between creative choices and “discovery” choices).

reasoning echoed earlier Supreme Court cases dealing with photographs.¹⁷⁶ In *Burrow-Giles*, for example, the court had to decide whether a photograph of Oscar Wilde was original.¹⁷⁷ In concluding that it was, the court noted the creative choices made by the photographer, including pose, costume, lighting, accessories, and the set itself.¹⁷⁸

The question before the *Feist* Court was basically to determine what copyright law should reward: work, investment, or creativity? The Court found that creativity was required by the Constitutional Clause, which states that Congress has jurisdiction over copyright (and patent) law to “Promote the Progress of Science and the Useful Arts [...] by securing for Limited Times to “Authors [...] Exclusive Rights [...] to their Writings.”¹⁷⁹

A few years earlier in *Sony*, the Court had explained that the benefits of copyright are “intended to motivate the creative activity of authors and inventors by the provision of a special reward, and allow the public access to the products of their genius.”¹⁸⁰ By requiring the mark of creativity, rather than looking at the work, time, or money invested in the creation process, the Supreme Court clarified the need for a creative consideration that society can expect from its bargain with the author, and explained that copyright is not an investment protection scheme.¹⁸¹

¹⁷⁶ *Burrow-Giles Lithographic Co v Sarony*, 111 US 53, 60 (1884); *Bleistein v Donaldson Lithographing Co*, 188 US 239, 250–51 (1903). Several lower courts have adopted a similar approach. *See, e.g., Falk v Brett Lithographing Co*, 48 F 678, 679 (SDNY 1891); *Gentieu v John Muller & Co*, 712 F Supp 740, 742–44 (WD Mo 1989); *see also* Patricia L Baade, *Photographer's Rights: Case for Sufficient Originality Test in Copyright Law*, 30 J. MARSH L. REV. 149, 150–53 (1996).

¹⁷⁷ *Burrow-Giles*, 111 US, at 58.

¹⁷⁸ *Burrow-Giles*, 111 U., at 60. *See also* *In re Trade-Mark Cases*, 100 US 82, 94 (1879) (finding that a work of authorship must evidence the “creative powers of the mind”); and Ysolde Gendreau, Axel Nordeemann, and Rainer Oesch (eds), *Copyright and Photographs: An International Survey* 305–6 (1999).

¹⁷⁹ *Feist*, 499 U.S., at 346. Though it requires some creativity, the originality threshold is low. *Feist*, 499 U.S., at 362 (“The standard of originality is low, but it does exist.”)

¹⁸⁰ *Sony Corp. of Am. v. Universal City Studios, Inc.* 464 U.S. 417, 429 (2014).

¹⁸¹ *Feist*, 499 U.S., at 357–8. For an interesting discussion of the relationship between the author and her work, and how the work is expressed, *see* Leslie A. Kurtz, *Speaking to the Ghost: Idea and Expression in Copyright* 47 U. MIAMI L. REV. 1221, 1248–50 (1993).

The notion of creative choices in *Feist* can be summarized as follows: a choice¹⁸² is *creative if made independently by the author and that is not dictated¹⁸³ by the function of the work,¹⁸⁴ the method¹⁸⁵ or technique used, or by applicable standards¹⁸⁶ or relevant*

¹⁸² The term “choice” is used here in the usual sense, namely an act or instance of choosing from among a number of available possibilities. See Oxford English Dictionary online, oed.com (defining “choice” as “[t]he act of choosing; preferential determination between things proposed.”) (accessed Dec. 15, 2018)

¹⁸³ This terminology was used in *CDN Inc v Kapes*, 197 F3d 1256, 1259 (9th Cir 1999), a case that interpreted *Feist* rather narrowly. It was also in the famous decision for *Computer Assocs Int’l, Inc v Altai, Inc*, 982 F2d 693, 707 (2d Cir 1992), but in a different context, namely the idea/expression dichotomy:

Professor Nimmer suggests, and we endorse, a ‘successive filtering method’ for separating protectable expression from non-protectable material. This process entails examining the structural components at each level of abstraction to determine whether their particular inclusion at that level was ‘idea’ or was dictated by considerations of efficiency, so as to be necessarily incidental to that idea; required by factors external to the program itself; or taken from the public domain and hence is nonprotectable expression.

¹⁸⁴ Similar to the numbering system that served as a shorthand description of the relevant characteristics of each fastener described in *Southco, Inc v Kanebridge Corp*, 258 F3d 148, 152 (3d Cir 2001):

Southco uses product numbers that convey specific properties of the products manufactured. The numbers are not assigned at random or in sequence; they are assigned based on the properties of the parts. The Numbering System is a complex code expressing numerous detailed features of Southco hardware products; each part number tells the story of a part's size, finish, and utility.

Under this system, each fastener was assigned a unique nine-digit number, with each digit describing a specific physical parameter of the fastener. The ‘market’ may, by extension, be considered as a ‘functional requirement’ if what is required is so clear as not to leave room for creativity. See, e.g., *Warren Publ’g* 1520 n. 31: ‘The mere discovery of an organizing principle which is dictated by the market is not sufficient to establish creativity’

¹⁸⁵ In the sense of the creation *method*. The creation of a method (e.g., to present facts) would be copyrightable. See *Eng’g Dynamics, Inc v Structural Software, Inc*, 26 F3d 1335, 1346 (5th Cir 1994), opinion supplemented on denial of rehearing, 46 F3d 408 (5th Cir 1995).

¹⁸⁶ Or “garden-variety” variations on a theme. *Feist*, 499 U.S., at 362. See also *Perma Greetings, Inc v Russ Berrie & Co, Inc*, 598 F Supp 445, 448: “Clichéd language, phrases and expressions conveying an idea that is typically expressed in a limited number of stereotypic fashions, [sic] are not subject to copyright protection.”

good practice.¹⁸⁷ Purely random, arbitrary or insignificant¹⁸⁸ selection is insufficient.¹⁸⁹ The exclusion of choices dictated by the function of the work is an expression of the test of “practical inevitability” found in *Feist*: if function dictates the course to be followed, there is no room for creativity. From a copyright standpoint, therefore, the result is indeed “inevitable.”¹⁹⁰

2. Application to Machine Productions

AI machines can undoubtedly *choose*; they make decisions.¹⁹¹ The (copyright) question that lies beneath this factual statement is whether those choices can be considered *creative*. The answer is in two parts, both stemming from *Feist*. First, to be creative, following *Feist*, choices must not be unduly constrained or dictated by consideration of efficiency, functionality, applicable standards and practices, which would seem to exclude many choices made by machines.¹⁹² Second, the role of the labor and time invested in the creation of a work, previously captured under the “sweat of the brow” test, was jettisoned in *Feist*.¹⁹³

¹⁸⁷ *Lalli v. Big Red Apple*, 936 F.2d, at 673:

In Lalli's charts, as Judge Glasser correctly found, he arranges factual data according to ‘purely functional grids that offer no opportunity for variation’. The format of the charts is a convention: Lalli exercises neither selectivity in what he reports nor creativity in how he reports it.

¹⁸⁸ *Donald v Zack Meyer's TV Sales & Serv*, 426 F.2d 1027, 1030 (5th Cir 1970), *cert denied* 91 S Ct 459 (1971). This case was blended in with *Feist* by the Fifth Circuit in *Eng'g Dynamics* (note 185 *supra*) at 1345:

[T]he input/output formats fail to satisfy the *Feist-Zack Meyer* originality test. In *Feist*, the Supreme Court held that an alphabetically arranged phone book lacks the creativity and originality necessary to sustain a copyright. In [the *Zack Meyer* case], this circuit held that boilerplate contractual language printed on a blank form was insufficiently original.

¹⁸⁹ *See, e.g., Mitel, Inc v Iqtel, Inc*, 124 F.3d 1366, 1373–74 (10th Cir 1997).

¹⁹⁰ *Feist*, 499 U.S., at 363.

¹⁹¹ *See supra* note 72.

¹⁹² In deciding that models of human torsos were devoid of protection, the Fourth Circuit used a reasoning that seems directly applicable to machines: “[T]he fact that the creator of the torsos was driven by utilitarian concerns [...] deprived the human torsos of copyright protection. This *process-oriented approach* [...]—focusing on the process of creating the object to determine whether it is entitled to copyright protection [...] reconciles the earlier case law.” *Pivot Point Intern., Inc. v. Charlene Products, Inc.*, 372 F.3d 913, 930 (7th Cir. 2004).

¹⁹³ Lower courts have used this two-part test regularly to deny protection to functionally designed objects. Two examples should suffice to illustrate the point. The Tenth Circuit refused copyright protection to 3D-printed models of Toyota cars even though the copies required a considerable investment of both

Applied to determine whether machine productions are creative because they *look like* they result from a creative process, the test leads to a negative answer.¹⁹⁴ Answering in the affirmative would amount to a “copyright Turing test,” such as the one designed by Ray Kurzweil to prove that human adults could tell the difference between human and machine authored poetry only 53% of the time, slightly better than the default (50/50) odds.¹⁹⁵ Poetry has a freer form and a broader range of expected outcomes than many forms of creation, however. One wonders if a short story or novel would get similar numbers.¹⁹⁶ It strikes this Article as poor normative grounding to say that a machine can, in some respects, “pass for creative”—copyright “passing off,” as it were—and that machine productions should, therefore, be protected.¹⁹⁷

time and money. *See* Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc., 528 F.3d 1258, 1268 (10th Cir. 2008), quoting with approval Mary Campbell Wojcik, *The Antithesis of Originality: Bridgeman, Image Licensors, and the Public Domain*, 30 HASTINGS COMM. & ENT L.J. 257, 267 (2008) (“This is not to say that [accurately reproducing an underlying image] requires no skill or effort; it simply means that such skill and effort does not suffice to invoke the highly advantageous legal monopoly granted under the Copyright Act.”) Conversely, in *Allen-Myland, Inc v IBM Corp.*, 770 F Supp 1004, 1011 (ED Pa 1991), Allen-Myland argued that portions of computer code that were added to an existing IBM program lacked originality because programming choices were dictated by earlier programming choices. The court found that there were creative choices because IBM’s programmers had to pick from several possibilities for both the structure and the data, and not just by following functionality considerations. *Id.*, at 1012.

¹⁹⁴ For a proposal along those lines *see* Edward Lee, *Digital Originality*, 14 VAND. J. ENT. & TECH. L. 919, 942-943 (2012). *See also* Samuelson, *supra* note 36, at 1196-7 (“If a machine does compose something, such as a piece of music, and it is impossible to tell by hearing music whether it was composed by a computer or by a human, one might wonder whether the notion of machine authorship ought to be accepted.”)

¹⁹⁵ *See* Bridy, *Coding*, *supra* note 3, at ¶37. The original Turing test was a set of questions asked via teletype on any subject whatsoever. Both the human being and the machine attempted to convince the questioner that it or she is the human and the other is not. *See* Solum, *supra* note 153, at 1236.

¹⁹⁶ The objective might be set lower, namely to “generate stories that would be regarded as creative, even if these stories are well below what a muse-inspired member of *Homo sapiens sapiens* can muster.” SELMER BRINGGJORD & DAVID A. FERRUCCI, *ARTIFICIAL INTELLIGENCE AND LITERARY CREATIVITY: INSIDE THE MIND OF BRUTUS 6* (Mahwah, NJ : Lawrence Erlbaum Associates, 2000).

¹⁹⁷ Bridy, *Coding*, *supra* note 3, at 32. As BRINGSJORD AND FERRUCCI, *id.*, at xxvi, noted “building machines that act in a way that *appear* to be creative would be a significant enough step.” [Emphasis in original]

Passing off is notion borrowed from trademark law defined as “when a producer misrepresents his or her own goods or services as those of another producer.” Laura Gasaway, *Origin of Goods in Trademark Law Does Not Mean Creator*; COPYRIGHT CORNER, SPECIAL LIBR. ASS’N INFO. OUTLOOK, Nov. 1, 2003, at 7. *See also* 15 U.S.C. §1125(a) (“palming off”); and *Dastar Corp. v. Twentieth Cent. Fox Film Corp.*, 539 U.S. 23, 28 n.1 (2003).

Professor Joseph Fishman has argued that the creation process matters, *inter alia* in infringement analyses, suggesting that laborious copying, for example in an art class setting, should not be treated in the same way as making a photocopy.¹⁹⁸ This Article agrees and argues, further, that a proper focus on process provides an important doctrinal clue to separate human and machine. It is not enough for a machine to pass itself off as human in one of its outputs to justify generating the same rights as human activity would; *the creation process must be human*.

In summary, the normative rationales to provide protection are essentially absent in the case of machine productions.¹⁹⁹ Copyright is a legal mechanism designed to help produce works that are the result of a human creative process; the incentive is for human to engage in the process not knowing whether the result will be a blank page or the Great American Novel. Moreover, the machine has no liability and should be granted no right in productions for which it cannot be held liable.²⁰⁰

In light of the above, the Article concludes that, doctrinally, machines cannot make *creative* choices as those were defined in *Feist*. They can certainly produce *new* material, but that is not relevant from a copyright perspective for copyright does not require novelty; it requires independent creation of works of authorship.²⁰¹ Novelty is no irrebuttable evidence of *Feistian* creativity.²⁰² A machine could only be considered the creator of a work of authorship if it was autonomous and made choices not

¹⁹⁸ See Joseph P. Fishman, *Creating Around Copyright*, 128 HARV. L. REV. 1333, 1337 (2015) [hereinafter Fishman, *Creating Around*] (“[New copyrighted] works are the product of a fundamental yet underappreciated fact about the creative process: it thrives best not under complete freedom, but rather under a moderate amount of restriction.”); and Joseph P. Fishman, *The Copy Process*, 91 N.Y.U.L. REV. 855, 860 (2016) (“Copyright doctrine ought to borrow a page from trade secrecy doctrine by factoring the defendant’s copying process into the infringement analysis”). See also *supra* note 192.

¹⁹⁹ See *supra* Part IV.

²⁰⁰ See *supra* Part III.B.

²⁰¹ *Feist*, 499 U.S., at 345 (“Original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity.”)

²⁰² *Id.* (“Originality does not signify novelty.”)

preprogrammed in its software and not entirely dictated by efficiency considerations, for that is, per *Feist*, what makes them creative.²⁰³

3. Works made for hire?

The work-for-hire analysis, according to which the machine might be analogized to an author “employed” to create, seems a simple and elegant solution to identify a proxy human author and sidestep the originality analysis.²⁰⁴ It flips the purpose of the doctrine on its head, however. The purpose of the doctrine is to grant a person (often a legal person) the rights in a work created by humans. Put differently, under the work-made-for-hire doctrine, a human creation is said to have been authored, by operation of a legal fiction, by another person, who need not be human.²⁰⁵ The prototypical example is a motion picture to the creation of which a scriptwriter, director, actors and many others have collaborated. If the film is a work made for hire, the studio (producer) is the author under US law.²⁰⁶ Attributing rights in a machine-created work to a human (or other person) is arguably exactly the opposite: it gives a non-human creation to a human (or other) person. In the case of works-made-for hire, in other words, creative choices are made by a *human* creator (an employee or commissioned author) even if the law considers a corporate entity as the “author.”²⁰⁷ If, in contrast, a machine owned by, say a film production company, produced scenes for a movie and no credible link to the

²⁰³ See Miriam Bitton, *Protection for Informational Works After Feist Publications, Inc. v. Rural Telephone Service Co.*, 21 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611, 640 (2011) (suggesting that after *Feist*, “courts approach the question of original arrangement and selection of a database with caution, suggesting that when the selection or arrangement is dictated by functional considerations or where the criteria for selection or organization are objective, copyright protection will be denied.”)

²⁰⁴ This is the model proposed by Yanisky-Ravid, note 8 *supra*, at 671, 708-716 (“I propose that AI systems should be seen as the creative employee or self-contractor creators working for or with the user—the firm, human, or other legal entity operating the AI system.”) See also Kalin Hristov, *Artificial Intelligence and the Copyright Dilemma*, 57 IDEA 431, 445-7 (2017).

²⁰⁵ See Bridy, *Coding*, *supra* note 3, at 63 (2012) (noting that using the work made for hire doctrine in this context “avoids the predicament of vesting rights in a machine.”)

²⁰⁶ 17 U.S.C. §201(b) provides that the hiring party is considered the “author” of a work made for hire.

²⁰⁷ See 17 U.S.C. §101 (defining works made for hire as those “prepared by an employee within the scope of his or her employment; or [those] specially ordered or commissioned [...]”)

creativity of a human (user or programmer) could be established, then the resulting production and its authorship would have no human connection.²⁰⁸

Moreover the traditional work made for hire scenario—as in the motion picture example in the previous paragraph—does not break the right and responsibility linkage.²⁰⁹ If an employee’s text or other copyrightable work, created in the scope of her employment, is considered to be authored by the employer, the employer would likely be liable if a court eventually found the work to be libelous for example.²¹⁰ The same is true outside a work-made-for-hire context: the author of a libelous text may have copyright in that text, but she is also liable for the tort, for copyright is no defense to libel.²¹¹

²⁰⁸ Some scholars have used psychology and neuroscience-based arguments to suggest that a machine cannot create in the same way as humans, or the opposite, namely that all creativity is algorithmic. *See e.g. supra* note 3. This Article takes the view that both arguments are unconvincing. The first is plainly circular: creativity is human, a machine isn’t human, therefore it cannot create. The second rest on an unprovable claim, namely that computers create using algorithms and humans use *something that can legally be analogized to algorithms*, therefore human and machine creativity are equal. Those debates strike this Article as interesting, but mostly misguided to determine whether copyright applies to AI machine productions.

Because creativity as no accepted normative definition, various logically valid answers can be offered to the proposition that machines are or are not, “creative.” The Article recognizes that research on creativity as a psychological phenomenon is valuable to guide policy makers in designing proper (human) incentives. *See Fishman, Creating Around, supra* note 198, at 1341 (“Because it has proven so difficult to show a causal link between intellectual property incentives and particular results on the ground, psychological research can at least inform policymakers about how to encourage creative thinking.”) *See also* Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 Nw. U. L. Rev. 1441 (2010); and Gregory N. Mandel, *Left-Brain Versus Right-Brain: Competing Conceptions of Creativity in Intellectual Property Law*, 44 U.C. Davis L. Rev. 283 (2010). *See also* Turner, *supra* note 18 at 122 (arguing that depending on the definition adopted, AI machines can be seen as more or less creative than humans.)

The point made here is straightforward: this research cannot answer conclusively as a matter of law whether machines are, or are not, capable of “creativity.”

²⁰⁹ *See* Part IV.B.

²¹⁰ *See McKinney v. County of Santa Clara*, 110 Cal. App. 3d 787, 797-98, 168 Cal. Rptr 89, 94 (Cal. Ct. App. 1980) (employer is liable for employee’s defamation); *Colonial Stores, Inc. v. Barrett*, 73 Ga. App. 839, 840, 38 S.E.2d 306, 308 (Ga. Ct. App. 1946) (employer liable for libel caused by injurious statements by employee); *Grist v. Upjohn Co.*, 168 N.W.2d 389, 405-406 (Mich. Ct. App. 1969) (same); *Lewis v. Equitable Life Assurance Soc’y of the United States*, 389 N.W.2d 876, 888 (Minn. 1986) (employer liable for injury caused by employee’s foreseeable republication of libelous statement). *See also* Charles S. Murray, Jr., *Compelled Self-Publication in the Employment Context: A Consistent Exception to the Defamation Requirement of Publication*, 45 WASH. & LEE L. REV. 295, 320 (1988).

²¹¹ For a list of available affirmative defenses to libel actions, *see* Charles Delafuente, *Affirmative Defenses in Libel Actions*, 22 AM. JUR. PROOF OF FACTS 3d 305 (Originally published in 1993).

Bringing this discussion to its logical end, the Article concludes that if an AI machine is programmed to “create,” it requires no *ex ante* legal incentive or *ex post* reward for doing so. The argument that the programmer(s), owner(s) or user(s) should get second-degree copyright (in the productions made by the machine) was rejected above.²¹² Moreover, the idea that incentives should be created by giving, say, programmers exclusive rights on the output—what is sometimes referred to as “indirect incentives”,—opens a dangerous door and extends exclusivity well beyond the normative reach of copyright law’s protection of an author’s original expression.²¹³

What remains is the possibility, in the distant future, that some sort of incentive might be required to get an AI machine with multiple abilities to spend more time creating as opposed to performing other tasks.²¹⁴ This is no doubt an interesting inquiry: would financial incentives such as those traditional associated with copyright succeed in modifying machine behavior?²¹⁵

B. Derivative Works

A reasoning that has been used to justify copyright protection for machine productions is that machines, like humans, derive their output from pre-existing copyrighted works, as exemplified by the musical composition and visual optimization algorithm modifying photographs mentioned in the introductory paragraph of this

²¹² See *supra* note 161.

²¹³ See Denicola, *supra* note 5, at 273 (“[A] work’s contribution to the public welfare does not seem dependent on the process that produced it [...] At least for now, the production of computer-generated works requires human beings to develop, improve, distribute, and use the computer technology and to disseminate the resulting output.”)

See also Alessio Chiabotto, *Intellectual Property Rights over Non-Human Generated Creations*, 13 (Feb. 28, 2017), available at <https://ssrn.com/abstract=3053772>:

[T]he fact that machines do not need incentives to generate output does not mean that no one needs incentive for products of computer-based artificial intelligence. Thus, even in the case that no direct incentive is needed, it could be necessary to give indirect incentives in order to reach the copyright policy goals.

²¹⁴ Andrew Wu has used the example of “Mr. Data from *Star Trek: The New Generation*, as a multifunctional android who might need to be encouraged “spend more time creating artistic works.” Wu, *supra* note 54, at 156.

²¹⁵ This seems to presuppose a fact pattern not yet at hand. As technology stands now, we can leave this question for another day.

Article.²¹⁶ In common parlance, authors “derive” when they base their work directly or indirectly on those of another, as in the aphorism that we all stand on the shoulders of giants.²¹⁷ Professor Bridy, for example, has argued along those lines “all cultural production is inherently derivative.”²¹⁸ This argument is flawed and, properly applied, the notion of derivative work argues against protection.

To say that creativity is derivative in a broad cultural sense—as with memes, for example—is not the same as saying that all productions resulting from the derivative creativity are derivative *works*.²¹⁹ The notion of *derivative works* is contained in the statute and must be used with caution.²²⁰ Many derivative works include a copy of the underlying work, and most cases finding that an infringement of the right to prepare a derivative work thus find that a parallel infringement of the right to reproduce the underlying work has also occurred.²²¹

After a detailed analysis of the right to prepare derivative works contained in the statute,²²² I concluded that what makes a work derivative for copyright purposes is that the creative reuser “takes the creative choices that made the primary work original.”²²³ For example, a translation of a novel may not contain a single word from the expression

²¹⁶ See *supra* notes 4 and 8.

²¹⁷ The original quote (“If I have seen further it is only by standing on the shoulders of giants”) is usually attributed to Sir Isaac Newton in a letter to Robert Hooke dated Feb. 5, 1676. It is cited, *inter alia*, in Suzanne Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*, 5 J. ECON. PERSP. 29, 29 (1991), though one author traced the aphorism to Bernard de Chartres in the twelfth century. See generally ROBERT K. MERTON, *ON THE SHOULDERS OF GIANTS: THE POST-ITALIANATE EDITION* (Chicago: Univ. of Chicago Press, 1993).

²¹⁸ Bridy, *Coding*, *supra* note 3, at 27.

²¹⁹ See Daniel Gervais, *Authors, Online*, 38 COLUM. J.L. & ARTS 385 (2015) (referring to the Internet as a “global meme factory.”)

²²⁰ 17 U.S.C. § 101 defines a “derivative work” as “a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted.” 17 U.S.C. §106(2) provides right holders in a work the exclusive right to “prepare a derivative work.”

²²¹ See Gervais, *supra* note 47, at 795 (explaining how courts tend to broaden the notion of non-literal copying instead of relying on the separate right to prepare derivative works.)

²²² 17 U.S.C. § 106(2).

²²³ Gervais, *supra* note 47, at 808.

in the original language, but it reflects and reuses most of the choices of the author of the original work (structure, flow, use of metaphors, style, etc.).²²⁴ A mashup, in contrast, reproduces elements from pre-existing works and is derivative in that it reuses creative choices of the author of the works it copies.²²⁵ The adaptation of a novel to the screen may reuse expression (dialogues) but mostly transfers and reuses creative choices from the novel, without taking the expression wholesale.²²⁶ In a deep learning context, the computer does not derive in that sense; instead it finds correlations and patterns to use as a matrix for its own production.²²⁷ Those productions are not, therefore derivative works.

A second crucial doctrinal point is that a *derivative work, if it is to be protected by copyright, must also be an original work of authorship*.²²⁸ This explains why the notion of derivative work provides an argument against, not for, protection.²²⁹ The author of the derivative work must “add original expression to each derivative work in order to qualify it for copyright protection of its own.”²³⁰ This takes us back to the original question, which was, can machines make creative choices and generate the originality required to obtain copyright protection? The answer to that question is, in this Article’s view, negative, and it remains so here. In sum, any doctrinal point based on the derivation by

²²⁴ See Karen L. Gulick, *Creative Control, Attribution and the Need for Disclosure: A Study of Incentives in the Motion Picture Industry*, 27 CONN. L. REV. 53, 83 (1994) (discussing how a good translation requires reflecting the author’s creative choices.)

²²⁵ See Michael Allyn Pote, *Mashed-Up in Between: The Delicate Balance of Artists’ Interests Lost Amidst the War on Copyright*, 88 N.C. L. REV. 639, 693 (2010) (“[M]ashup remixers are able to appropriately use the works of artists to advance the arts.”)

²²⁶ 17 U.S.C. § 101 (referring to a “motion picture version” in the definition of derivative works).

²²⁷ See *supra* note 24 and *infra* note 233 and accompanying text.

²²⁸ Under 17 U.S.C. § 103(b). See Clifford, *supra* note **Error! Bookmark not defined.**, at 1690 (“In order to be a derivative, the derived work must fully qualify for a copyright on its own.”⁹⁵ Thus, the § 102(a) requirements of originality must be met.”)

²²⁹ See Tal Vigderson, *Hamlet II: The Sequel? The Rights of Authors vs. Computer-Generated “Read-Alike” Works*, 28 LOY. L.A. L. REV. 401, 428 (1994) (“It is likely that Congress did not intend for computer-generated works to be protected as derivative works.”)

²³⁰ Paul Goldstein, *Derivative Rights and Derivative Works in Copyright*, 30 J. COPYRIGHT SOCY. U.S.A. 209 (1983).

machines based on preexisting works is misguided if used to justify copyright protection in derivative productions.²³¹

VI. THE PATH FORWARD

A. *Humans As Cause*

As discussed above, the binary paradigm according to which machines are either mere tools in the hands of human users or generators of either random output (therefore, non-original, as it does not result from creative choices) or entirely pre-programmed (as in the videogame audiovisual output example) is obsolete. Machines are capable of autonomous decision-making. The question to ask is, when do they reach the *threshold of autonomy* that separates or delinks their productions from the humans that programmed or used them?

Characteristics of autonomy include (a) the ability make independent decisions or draw conclusions to come to conclusions (2) derived from information gathered by the decision-maker.²³² AI machines can process “big data” corpora of literary and artistic works, for example, and produce their “own” art.²³³

Once the autonomy threshold has been crossed and a determination made that it is the *machine* that is making the relevant choices, two possible legal conclusions can be drawn. First, one might conclude that, because “all creativity is algorithmic” and machines are, therefore creative, autonomous machine productions are protected by copyright.²³⁴ Logically it can be expected that industries that increasingly rely on machines to “assist” in the creative process will adamantly defend this view. The next

²³¹ A related question is whether courts will be more lenient in allowing the machines to make “fair uses” of pre-existing works (which they would need to copy). This is a point that this Article need not belabor. For a discussion, see Grimmelmann, *supra* note 55.

²³² See Rebecca Crootof, *The Killer Robots Are Here: Legal and Policy Implications*, 36 CARDOZO L. REV. 1837, 1840-43, 1863-71, 1894-1901 (2015) (discussing autonomy in the context of AI systems used in combat and war).

²³³ See notes 5, 6 and 7, *supra*.

²³⁴ See Bridy, *Coding supra* note 3 **Error! Bookmark not defined.**, and Yanisky-Ravid, *supra* note 8.

step, if that path is chosen, is the search for the human proxy author must follow, because the title in the work must vest in *someone*.²³⁵ The Article argues the opposite, namely that machines make decisions and cross the autonomy threshold produce public domain material to which no copyright rights attach.²³⁶

The Article's suggestion is that a court deciding whether the autonomy threshold has been crossed should do what courts are often do in other contexts and look for causation, and in this case specifically, *the causation of originality*.²³⁷ Here, this means identifying the cause of the choices that “look like” they might be creative and thus generative of originality.

To draw an analogy with product liability law, the type of causation required is specific to the work at hand, not general.²³⁸ The question, in other words, is not whether a particular AI machine can *generally* cause creative “look-alikes” to be produced, but rather whether it caused the choices that make a *specific production* look like an original work of authorship. If choices embedded in the machine's output are those of human programmers or users and otherwise meet the *Feist* requirements (e.g. that they not be functional), then the choices are creative and the production is protected (at least in part as the Article explain below). If not, the production is beyond the autonomy threshold

²³⁵ See *supra* note 15.

²³⁶ Machines also interact with humans. Humans program at least the initial AI code (*see* note 10 *supra*). Humans also provide the data or point to the sources of data from which the machine is to learn (*see* note 19 *supra*). A series of users might interact with the machine in a variety of ways, to obtain information or help in decision-making, as tools to implement decisions, or by granting machines a much larger degree of autonomy. Take for example the AI systems that algorithmically filter content uploaded to YouTube using the ContentID system, which has the unenviable task of detecting copyright infringements in an area where fair use borders remain murky (*see* Emily Tate, *Youtube's ContentID Copyright Infringement Flagging System Using Its Corporate-Assuaging Origins in Viacom v. YouTube As A Jumping-Off Point for the Way It's Been Used and Altered over the Years*, 2017 B.C. INTELL. PROP. & TECH. FORUM 1, 10 (Feb. 6, 2017) (discussing the operation of the ContentID system).

²³⁷ For example, in criminal law (*see* Carl-Friedrich Stuckenberg, *Causation*, in THE OXFORD HANDBOOK OF CRIMINAL LAW 468, 471 (Markus D. Dubber & Tatjana Hörnle eds., 2014)); and, of course, tort law (*see* Mark A. Geistfeld, *The Doctrinal Unity of Alternative Liability and Market-Share Liability*, 155 U. PA. L. REV. 447 (2006) (discussing the “fundamental tort principle of causation.”)

²³⁸ See Joseph Sanders, *From Science to Evidence: The Testimony on Causation in the Bendectin Cases*, 46 STAN. L. REV. 1, 16 (1993) (discussing and comparing specific and general causation).

and the choices are not creative from the perspective of copyright law.²³⁹ Autonomous and ultimately unpredictable choices (even if some sort broad “range” of predictability can be established) made *by the machine*, in other words, do not cause or generate the type of originality required to obtain copyright protection.

B. Creative Choices as Watermarks of Originality

How does one establish originality causation? The test suggested in this Article allows a separation of the protectible creative expression of humans from the nonprotectible expression contained in machine productions. The Article suggests applying the test to distinguish cases where the programmer or user is the author of (at least part of) a production, and those where she is not. The implementation of the suggested approach is to *follow the creative choices*: Are the creative choices embedded in the code or the user’s instructions directly reflected in the production (machine output), the originality of which the court must decide upon?²⁴⁰ In the case of deep learning AI systems, the productions of AI systems are very unlikely to be predictably contained in the AI code or user’s instructions.²⁴¹ This suggested approach (following the creative choices) is not entirely novel: the jurisprudence concerning derivative works might be useful as those cases tend to consider (though rarely explicitly) whether the derivative author has reused the creative choices of the underlying work.²⁴²

²³⁹ It is also conceivable that the choices would be caused not (just) by programmers but by the human *users* of the machine.

²⁴⁰ As with videogames, the audiovisual output of which is generally predictably embedded in the code. *See supra* note 69.

²⁴¹ *See* Shlomit Yanisky Ravid & Xiaoqiong (Jackie) Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3a Era*, 39 *Cardozo L. Rev.* 2215, 2220 (2018) (“AI advanced systems are becoming capable of creating unpredictable, innovative outcomes independently, rather than merely by following digital orders.”)

²⁴² *See supra* notes 221 to 225 and accompanying text. For example, a translation of a novel may not contain a single word from the expression in the original language, but it reflects and reuses most of the choices of the author of the original work (structure, flow, use of metaphors, style, etc.). (*See* Karen L. Gulick, *Creative Control, Attribution and the Need for Disclosure: A Study of Incentives in the Motion Picture Industry*, 27 *CONN. L. REV.* 53, 83 (1994) (discussing how a good translation requires reflecting the author’s creative choices.) A mashup, in contrast, reproduces elements from pre-existing works and is derivative in that it reuses creative choices of the author of the works it copies. (*See* Michael Allyn Pote, *Mashed-Up in Between: The Delicate Balance of Artists’ Interests Lost Amidst the War on Copyright*,

To proceed with the proposed test, a court would first have to eliminate the situations covered in the “old” binary paradigm, namely those where the computer is a mere tool and does not itself contribute expression and cases where the machine produces an output that results from nonrelevant (e.g. functional or random) choices.²⁴³ The cases targeted by this Article’s test are those where facially copyright-relevant choices are made *by the AI machine* (i.e., those choices would generate originality *but for* the fact that their origin is a machine). In application of the originality causation principle suggested above, courts should identify machine-made choices and exclude them in determining whether a production is original.²⁴⁴ If *all* or almost all of the relevant choices were caused by a machine, the production is not protected by copyright at all.²⁴⁵ If a work results from choices made both by human *and* machine, that work should be treated as any other case where someone has reused material from the public domain to create a new work: The public domain material must be filtered out.²⁴⁶ Here, this means filtering out material that results from machine-made choices.²⁴⁷ This is fully consonant with the doctrine of joint authorship, according to which each coauthor must have made a copyrightable contribution.²⁴⁸

88 N.C. L. REV. 639, 693 (2010) (“[M]ashup remixers are able to appropriately use the works of artists to advance the arts.”)

²⁴³ An example of this would be the use of a randomized function to generate sequences of words or numbers. *See supra* Part IV.A.1.

²⁴⁴ *See supra* Part V.A.

²⁴⁵ *See supra* Part V.B.

²⁴⁶ If a work results from choices made by human *and* machine, this should be treated as any other case where someone has reused a work in the public domain: The public domain material must be filtered out from the Plaintiff’s work. This happens regularly in cases involving computer code, for example. *See Gates Rubber Co. v. Bando Chem. Industries, Ltd.*, 9 F.3d 823, 837-38 (10th Cir. 1993) (“[I]n determining copyright infringement, a court must filter out all unoriginal elements of a program, including those elements that are found in the public domain. [citing *inter alia* *Comprehensive Technologies International, Inc. v. Software Artisans, Inc.*, 3 F.3d 730, 736 (4th Cir.1993); *Altai*, 982 F.2d at 710; *Atari Games*, 975 F.2d at 839; and *Brown Bag Software v. Symantec Corp.*, 960 F.2d 1465, 1474–75 (9th Cir.1992), cert. denied, 506 U.S. 869, 113 S.Ct. 198, 121 L.Ed.2d 141 (1992)].

²⁴⁷ As courts have been able to filter out public domain material reused to create new works, the purported advantage of eliminating “the necessity of pursuing an elusive distinction between computer-assisted and computer-generated works” seems quite limited. Denicola, *supra* note __, 284.

²⁴⁸ *See, e.g.*, *Aalmuhammed v. Lee*, 202 F.3d at 1231; *Thomson v. Larson*, 147 F.3d 195, 200 (2d Cir. 1998); *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061 (7th Cir. 1994); *see also* *M.G.B. Homes, Inc. v.*

C. Legislation v Common Law

Should courts do (all) the work, or should the statute be amended?

Let us posit, first, that if a national law refers to humans as the origin of works protected by the statute, this is likely to guide a court's hand in the event of a dispute even if the statement was not made with AI machines in mind.²⁴⁹

A number of national legislators have taken the bull more directly by its doctrinal and normative horns, however, and legislated humanness in or out of authorship in respect of computer-generated (though not specifically AI-produced) works. In 1988, the United Kingdom introduced a definition of the term "computer-generated" in its Copyright Act and defined it as follows: "[I]n relation to a work, [computer-generated] means that the work is generated by computer in circumstances such that there is no human author of the work."²⁵⁰ The British Act then provides that the author of such a work "shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken" and that "copyright expires at the end of the period of 50 years from the end of the calendar year in which the work was made."²⁵¹ The Irish

Ameron Homes, Inc., 903 F.2d 1486, 1493 (11th Cir. 1990) (rejecting claim of co-authorship because, *inter alia*, architectural work client contributed only uncopyrightable ideas).

²⁴⁹ Many European national laws refer to "works of the mind" (or "spirit"), which one can assume refers to the human mind (or spirit). *See e.g.*, art. L111-1 of the Intellectual Property Code of France. Very few national laws that this Article has been able to identify mention human authorship directly. Lebanese law contains a rare example of legislative drafting that might have this effect. Lebanon, Law No. 75 of 1999 on the Protection of Literary and Artistic Property, art. 2 ("The protection of this Law shall apply to every production of the *human* spirit.").

²⁵⁰ Copyright, Designs and Patents Act, 1988, ch. 48, §178 (Eng.) [hereinafter CPDA]. *See also* Dana S. Rao, Neural Networks: Here, There, and Everywhere-an Examination of Available Intellectual Property Protection for Neural Networks in Europe and the United States, 30 GEO. WASH. J. INTL. L. & ECON. 509, 538 (1997) (observing that "U.K.'s copyright law offers protection for computer-generated works" and that this protection would apply to the production of neural networks and inhere to the "inventor" of the network in question).

²⁵¹ CPDA, *id.* §§ 9(3) and 12(7).

Copyright Act is to the same effect as the UK statute.²⁵² This position seems at odds with EU copyright law, which ostensibly requires human authorship.²⁵³

Australia's courts and its Copyright Law Review Committee see things differently.²⁵⁴ Indeed, its Copyright Act refers to protection of works "of which the author is a [qualified] *person*."²⁵⁵

Excluding machine productions wholesale from copyrightable subject matter by changing the text of the statute would solve the cases where the machine is the sole producer. Courts would still have to parse cases where a machine and a human produce jointly, and cases where the creative choices of the programmer (or possibly those of the user) are embedded in what seems to be a machine production in such a way that originality causation can be traced back to humans (the "follow the creative choices" test proposed above).²⁵⁶

The Article takes the view that a statutory exclusion of machine productions is unnecessary and that courts, on a proper analysis of the *current* statute, should exclude them by applying the normative or (more likely) the doctrinal arguments considered in Parts IV and V, or both.

D. Applications

²⁵² Irish Copyright and related Rights Act 2000, §2. For a discussion, see Paul Lambert, *Computer-Generated Works And Copyright: Selfies, Traps, Robots, AI And Machine Learning*, 39 EUR. INT. PROP. REV. 12, 17 (2017).

²⁵³ See Julia Dickenson, Alex Morgan & Birgit Clark, *Creative Machines: Ownership Of Copyright In Content Created By Artificial Intelligence Applications*, 39 EUR. INT. PROP. REV. 457, 460 (2017) "[U]nder current EU law there is likely to be little or no copyright protection afforded to AI-generated/created works and so additional national law provisions (such as those existing in the CPDA in UK) come into play."

²⁵⁴ See Sam Ricketson, *The Need For Human Authorship - Australian Developments: Telstra Corp Ltd V Phone Directories Co Pty Ltd*, 34 EUR. INT. PROP. REV. 54, 54 (2012) ("[I]n the case of original literary works, it is necessary for a successful plaintiff to identify the specific works for which protection is claimed, and the human authors of those works.") See also Alexandra George, *Reforming Australia's Copyright Law: An Opportunity to Address the Issues of Authorship and Originality*, 37 U. NEW SOUTH WALES L. J. 939 (2014) (Aus.).

²⁵⁵ Copyright Act 1968, as amended to December 22, 2017, §32(1) (Aus.).

²⁵⁶ See *supra* Part IV.A.1.

In this last section, the proposed principles and resulting test are applied to illustrate their practical impact.

1. Computer-created productions

The scenario that is most likely, in this Article's view, to land on a court's docket, is one in which protection by copyright of music, news releases, other texts or images produced by an AI machine is asserted by a plaintiff.²⁵⁷ Those productions "look like" copyrightable subject matter in that they will seem to be original and the product of creative choices.²⁵⁸

Because many current productions of AI machines are relatively low on the creativity ladder, a plaintiff would likely begin by arguing that the creativity threshold is low.²⁵⁹ This is correct, but the Article's suggestion is to avoid modifying the threshold by dissecting the exact nature of creativity. Instead, the Article suggests looking at the *causation* of the choices to see if they are creative under *Feist*. If the cause is the machine, then the choices, though they may appear creative (and indeed may well be "creative" in the vernacular), do not qualify for copyright protection.

In application of the test proposed in this Article (originality causation) and its implementation through the identification of creative choices, the task of a court would be to determine whether the choices that caused the apparent originality were embedded in (human-written) code in a way that the output was "caused" by the program, as in cases applying copyright protection to the output of audiovisual games.²⁶⁰ Choices too far removed from the code or the user's instructions, that is, those made autonomously by the machine, do not count towards copyright protection. This is the barrier that the Article terms the autonomy threshold.²⁶¹

2. AI Photography

²⁵⁷ See *supra* notes 5 to 8.

²⁵⁸ As those were defined above. See *supra* Part IV.A.1.

²⁵⁹ See *supra* note **Error! Bookmark not defined.**

²⁶⁰ See *supra* note 69.

²⁶¹ See *supra* note 214.

Photography is a quintessential type of creation when it comes to originality. The photographer's choices, such as those in the famous portrait of Oscar Wilde that made its way to the Supreme Court, include pose, light, and shade.²⁶² How would the analysis above apply to photographs taken by AI-equipped drones and other cameras?

In a famous British case, the last known photograph taken by a security camera of Diana, Princess of Wales, before her fatal car crash in Paris, was denied copyright protection based on a rather novel public interest defense.²⁶³ The case should have been decided on another, rather obvious grounds, namely that no creative choices had been made, as Judge Kaplan did (using both British and US law) in a case involving photographs of old masters' paintings.²⁶⁴ The camera had no autonomy and the angle and location were likely chosen for functional (security-related) considerations.

This reasoning can be applied to AI machines. Drones and other AI-capable systems can, in contrast to fixed security cameras, make autonomous or semi-autonomous decisions.²⁶⁵ Even basic digital cameras in "automatic" mode make most of the decisions other than where to point and shoot. Dark room "choices" are no longer being made as

²⁶² *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 60 (1884)

[P]laintiff made the same * * *entirely from his own original mental conception, to which he gave visible form by posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging the subject so as to present graceful outlines, arranging and disposing the light and shade [...] These findings, we think, show this photograph to be an original work of art, the product of plaintiff's intellectual invention, of which plaintiff is the author.

For a discussion, see Ginsburg & Budiarjo, *supra* note 15, at 13-16; and Eva E. Subotnik, *The Author Was Not an Author: The Copyright Interests of Photographic Subjects from Wilde to Garcia*, 39 COLUM. J.L. & ARTS 449, 449-452 (2016).

²⁶³ *Hyde Park Residence Ltd. v. Yelland et. al*, 97 (8) L.S.G. 35 (2000) (Eng.), available at 2000 WL 462.

²⁶⁴ *Bridgeman Art Library, Ltd. v. Corel Corp.*, 25 F.Supp.2d 421, 426-427 n.47 (S.D.N.Y. 1998); *Bridgeman Art Library, Ltd. v. Corel Corp.*, 36 F.Supp.2d 191, 197 (S.D.N.Y. 1999). See Mary Campbell Wojcik, *The Antithesis of Originality: Bridgeman, Image Licensors, and the Public Domain*, 30 HASTINGS COMMUN. & ENT L.J. 257, 261 (2008) (« the court explicitly held that a change in medium alone would not confer sufficient originality to entitle a work to copyright protection.»)

²⁶⁵ See William C. Marra & Sonia K. McNeil, *Understanding "The Loop": Regulating the Next Generation of War Machines*, 36 HARV. J.L. & PUB. POLICY 1139, 1141 (2013) ("The drones of tomorrow are expected to leap from automation to "autonomy." Tomorrow's sophisticated machines will have the ability to execute missions without guidance from a human operator."). See also Yaniksy-Ravid & Liu, *supra* note 241.

pictures are stored as digital files and printed on normal printers. In keeping with the test proposed in this Article (originality causation), only photographs with sufficient, demonstrable *human* creative choices directly influencing how the picture is taken matter in the determination of originality and, hence, the existence of copyright protection.

That said, one must take caution, in distinguishing a temporal gap from an absence of human creative choices. A photographer can make the type of choices necessary to generate originality but add a delay (or program the camera to take multiple pictures at a certain time interval) without breaking the originality causation link. It is not the time factor, in other words, but rather the *autonomy* of the machine that controls.

3. AI-aided (“joint”) works

As noted earlier, the binary paradigm according to which a machine is either a mere tool in the hands of the user, or produces outputs that were either predictably programmed into the machine or are random outputs in which no originality (as the term is defined in copyright law) is embedded, must be jettisoned.²⁶⁶ AI machines can make decisions, thus choices, and those choices may appear to be creative.²⁶⁷ The task of courts is to parse and exclude the machine’s contribution(s).

To do so, the proposed originality causation test should be applied. Creative choices embedded in a production in which copyright rights are claimed should be identified and their causation determined. Parsing the source of creative choices is not new. Courts have done so repeatedly in deciding whether authors of a work are joint authors, which includes a determination that each author has made a copyrightable (though not necessarily self-standing) contribution.²⁶⁸ The contributions need not be

²⁶⁶ See *supra* notes 66 and 65.

²⁶⁷ See *supra* notes 5 to 8.

²⁶⁸ Courts will not recognize someone who made non-copyrightable contribution (such as ideas or mere suggestions) as a joint author. See *e.g.*, *Aalmuhammed v. Lee*, 202 F.3d at 1231; *Thomson v. Larson*, 147 F.3d 195, 200 (2d Cir. 1998); *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061 (7th Cir. 1994); and *M.G.B. Homes, Inc. v. Ameron Homes, Inc.*, 903 F.2d 1486, 1493 (11th Cir. 1990). For a very interesting and thorough discussion of the application of the notion of joint author to productions made in whole or in part by AI machines, see Ginsburg and Budiarto, *supra* note 15, at 38-47.

equal, either qualitatively or quantitatively.²⁶⁹ An important indicium that a person the “contributor’s decision-making authority over what changes are made and what is included in a work.”²⁷⁰ Finally, a contribution must be more than de minimis to qualify for copyright protection.²⁷¹

VII. CONCLUSION

Algorithms can create material that seems to qualify as copyrightable subject matter. This Article reviewed the doctrinal and normative arguments that might justify granting copyright protection to those “machine productions,” and arguments against granting such protection. The Article rejected arguments in favor of protection of machine productions by copyright for several reasons, not the least of which is that machines need no legal or financial incentives to run their code.

Reviewing the history and normative basis for copyright law, the Article demonstrates that copyright is meant to promote human creativity and that creating incentives to have more productions in the literary and artistic field made by machines could in fact pose a threat to (human) progress. Machine productions should also be denied copyright because machines cannot be held liable for their work, and copyright (as in a right in one’s work) and responsibility for that work historically have gone hand in hand. In short, the law *should not* protect machine productions.

Copyright doctrine is similarly refractory to the protection of nonhuman productions. First among the doctrinal argument is that machines cannot make the creative choices

²⁶⁹ See *Greene v. Ablon*, 794 F.3d 133, 150-51 (1st Cir. 2015) (citing 1 MELVILLE NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 6.07[A][1] (2014)); and *Brownstein v. Lindsay*, 742 F.3d 55, 64 (3d Cir. 2014) (also citing NIMMER). See also UNITED STATES COPYRIGHT OFFICE, COMPENDIUM OF COPYRIGHT OFFICE PRACTICES (3d ed., 2017), § 505.2 (noting that someone “may be considered a joint author, even if his or her contribution to the work is smaller or less significant than the contributions made by another author.”).

²⁷⁰ *Thomson v. Larson*, 147 F.3d at 202-03.

²⁷¹ See *Erickson v. Trinity Theatre, Inc.*, 13 F.3d 1061, 1069 (7th Cir. 1994).

that are required to generate originality, and originality is a sine qua non of copyright. In short, current law does not protect machine productions.

To allow courts to apply the law as it is, and should be, the Article proposed a test known as originality causation. The test calls for a determination of the cause of the creative choices that make a production seem copyrightable. Causation is a well-known test in several areas of law; following creative choices is currently used to determine whether a work is derivative. This requires going beyond the old paradigm according to which machines are seen as mere tools in the hands of a human user, or producing outputs that are either preprogrammed by human programmers, or random and thus devoid of originality. AI machines can make choices and decisions, and thus cross what the Article refers to as the autonomy threshold. Productions made past that threshold are too far removed from the human programmer, owner or user for the law to consider the programmer, owner or user as author of the production. This means that, if all or almost all the choices embedded in a literary or artistic production are those of a machine, that production is not protected by copyright. If the choices were made by human and machine, the machine produced choices must be filtered out, as courts do in the case of works that reuse public domain materials, for example.

We will all read, watch and listen to more and more machine productions. This impacts the future in several ways, including for professional creators, and for all of us who rely on journalists and artists to understand our world, and engage with it as informed and educated members of a polity. There will no doubt be advantages to having machine productions in certain contexts, but it is humans who will lead humans towards progress. That much is certain, as is the fact that copyright law, as the Constitution directs, should promote, not hinder, human Progress.