
COMMENT

THE MACHINE AUTHOR: WHAT LEVEL OF COPYRIGHT PROTECTION IS APPROPRIATE FOR FULLY INDEPENDENT COMPUTER-GENERATED WORKS?

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U.S. copyright law is grounded in a utilitarian philosophy: authors are granted a limited monopoly to incentivize production of original expressive works for the benefit of society as a whole. This philosophy may need to be applied to non-human, machine authors in the very near future. Works of literature, music, and art are increasingly being generated through the execution of software programs, suggesting that these machine-authored works may become the norm rather than the exception. The burgeoning of computer-generated works raises novel and fascinating questions of copyrightability, but the existing literature neglects to address a basic question: does extending copyright protection to machine-authored works promote or hinder the purpose of copyright law?

This Comment makes several contributions to the scholarship on copyright law. First, it poses fundamental questions regarding how the existing copyright framework would be applied to the various players that contribute to machine-authored works and notes the problematic aspects of such application, particularly in identifying the

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legal author of the work. Second, it evaluates whether—in the case of machine-authored works—the human author should be allocated rights based on the economic incentive theory. It argues that inflexible application of copyright law creates a contribution/rights paradox because the party that contributed most to the creation of the work—its author—is not the party to whom we would like to allocate copyright protection. Finally, the Comment posits that because copyrights provide little economic incentive to the players involved in creating machine-authored works, it would be inappropriate from a social policy standpoint to extend protection to fully independent computer-generated works.

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INTRODUCTION

When a 2.7 magnitude earthquake hit Southern California on March 17, 2014, the *Los Angeles Times* published a news report on the natural disaster within three minutes.¹ How the *L.A. Times* managed to publish a report so quickly borders on science fiction. Moments after the quake, an algorithm

¹ Ken Schwencke, *Earthquake Aftershock: 2.7 Quake Strikes Near Westwood*, L.A. TIMES (Mar. 17, 2014), <http://articles.latimes.com/2014/mar/17/news/earthquake-27-quake-strikes-near-westwood-california-rdivor> [https://perma.cc/3E9M-HB5B].

called Quakebot scraped data from the United States Geological Survey reports, plugged the information into a coded template, and generated the actual text of the article.² By the time journalist and programmer Ken Schwencke had been woken by the quake and had walked to his computer, the text was already on the screen, ready for publication at the press of a button.³

While the *L.A. Times* article was revised and updated over the course of the morning by actual human writers, all of their work built off the foundation Quakebot constructed. And Quakebot is not the only program of its kind. From reports on homicide⁴ to college sports statistics,⁵ software that automatically generates news stories is becoming increasingly prevalent in journalism. Quakebot's article was not particularly sophisticated; it provided only the magnitude of the quake and its geographic location.⁶ But, however simple, banal, or nondescriptive they might be, machine-authored works like the article prepared by Quakebot are becoming indistinguishable from their human-authored counterparts.⁷

As defined by this Comment, a "machine-authored work" is a fully independent computer-generated work. The "machine author" is a software program, like Quakebot, designed to generate literary content on command. The "work" is the byproduct of executing the software programming. Machine-authored works distinctly differ from what might historically be considered "machine-aided" works. A movie edited in the video-editing software Final Cut Pro, for example, would be a machine-aided work but not a machine-authored work. Although the machine computed and created the final product, it was only able to do so at the creative direction of its human operator. Thus, the most notable difference between a machine-authored work and a machine-aided work is that in the case of a machine-authored work, there is no distinct human author driving the creative process through composition, arrangement, selection, or direction.

² Will Oremus, *The First News Report on the L.A. Earthquake Was Written by a Robot*, SLATE (Mar. 17, 2014, 5:30 PM), http://www.slate.com/blogs/future_tense/2014/03/17/quakebot_los_angeles_times_robot_journalist_writes_article_on_la_earthquake.html [<https://perma.cc/28Q6-C336>].

³ *Id.*

⁴ *Id.*

⁵ Clint Finley, *In the Future, Robots Will Write News That's All About You*, WIRED (Mar. 6, 2015, 12:06 PM), <http://www.wired.com/2015/03/future-news-robots-writing-audiences-one> [<https://perma.cc/JUH4-SYCK>].

⁶ Oremus, *supra* note 2.

⁷ See, e.g., Christer Clerwall, *Enter the Robot Journalist*, 8 JOURNALISM PRAC. 519 (2014) (finding, through an empirical study on software-generated content perception, that participants were not able to discern works generated by software from works written by a human author).

The burgeoning of machine-authored works raises novel and fascinating questions of copyrightability. Some questions are more intuitive than others.⁸ For example, legal scholars going as far back as the 1980s have expounded on the foundational question of whether machine-authored works are legally entitled to copyright protection.⁹ Applying the basic inquiries of originality and authorship, many legal scholars have concluded that machine-authored works should be entitled to full copyright protection.

Yet the existing literature neglects a far more fundamental question: does extending copyright protection to machine-authored works promote or hinder the purpose of copyright law? U.S. copyright law is grounded in a utilitarian philosophy: authors are granted a limited monopoly to incentivize production of original expressive works for the benefit of society as a whole.¹⁰ The rationale behind these measures has been intuitive and comprehensive—without such protection, authors would have less of an incentive to continue creating works and the public would suffer from this lack of creativity.¹¹ The economic incentive theory has gained greater traction as technological progress places authors at a significant disadvantage to potential imitators.¹² Particularly in the digital age, where the marginal costs and sometimes even the fixed costs of reproduction are effectively zero, imitators have a considerable advantage over creators.¹³ Consequently, content producers who bear significant fixed

⁸ Compare William T. Ralston, *Copyright in Computer-Composed Music: HAL Meets Handel*, 52 J. COPYRIGHT SOC'Y U.S.A. 281 (2005) (evaluating how copyright law might be applied to machine-authored musical works), with Jeffrey Malkan, *Rule-Based Expression in Copyright Law*, 57 BUFF. L. REV. 433 (2009) (analyzing whether copyright should be extended to works that create rules for creating other works, of which machine-authored works could possibly be a category).

⁹ See, e.g., Pamela Samuelson, *Allocating Ownership Rights in Computer-Generated Works*, 47 U. PITT. L. REV. 1185 (1986) (arguing that allocating rights to the licensed user of the program that generated the work is most compatible with traditional copyright law doctrine); Andrew J. Wu, *From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs*, 25 AIPLA Q.J. 133 (1997) (evaluating and generating guidelines for granting copyright to non-derivative, computer-generated works).

¹⁰ See, e.g., *Mazer v. Stein*, 347 U.S. 201, 219 (1954) (“The economic philosophy behind the [Copyright] [C]lause . . . is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors . . .”).

¹¹ See Peter S. Menell, *Envisioning Copyright Law's Digital Future*, 46 N.Y.L. SCH. L. REV. 63, 163 (2002–2003) (“Copyright law has traditionally centered on economic interests—assuring content creators and distributors means of appropriating sufficient return in the marketplace in order to promote investment in creative endeavors.”).

¹² See *id.* at 103 (“The ease with which digital technology enables anyone with a computer and an Internet connection to reproduce and make available for wide-scale distribution flawless reproductions of works of authorship has proven a far greater concern and more wrenching adjustment for copyright law . . .”).

¹³ See *id.* at 162–63 (“The rapid rise of peer-to-peer networks and the success of hackers in cracking and disseminating means of decrypting . . . demonstrate the vulnerability of the current network architecture to widespread unauthorized distribution and the relative impotence of existing legal protections.”).

costs in production and face uncertain payouts are placed in an even stronger position to demand enhanced copyright protection.¹⁴

Yet, even within the economic rationale framework, machine-authored works present notable differences to traditional works. For example, with machine-authored articles, both the fixed and variable costs of producing each copyrightable article are effectively zero, which allows producers to compete with imitators even absent legal protection. Additionally, unlike a human author, the software program that constructs the article cannot be legally or economically incentivized to produce more or fewer works. For example, if an online sports writer discovers that he can generate stable income through his copyrighted articles, he is economically incentivized to write more articles. A software program, on the other hand, will follow its programming and generate articles regardless of such economic rewards.

Two counterpoints might be offered to such an argument: first, that copyright protection is designed to motivate the software creator to create more software and, by extension, more creative works; and second, that copyright protection is designed to motivate users licensing the software to generate more creative works. However, these points are unpersuasive in the context of machine-authored news articles. As to the first, copyrightability can be extended to the software without being extended to the articles generated by the software. And as to the second, because control and profitability for modern electronic news depend on being first to market, copyrightability creates little incentive for the software end-user. Specifically, the value of electronic news peaks within the first six hours and then diminishes significantly.¹⁵ By the time copyright protection is secured, the residual value of the article is minimal.¹⁶

Consequently, stringently mapping the existing copyright framework onto machine-authored works would implicate much of the cost of copyright protection but little of the benefit. For example, under a regime in which machine-authored works are de facto copyrightable, a single individual could, absent any contractual workarounds, own an indefinite number of copyrights. Such an individual could easily behave in ways that would hinder rather than promote future creative efforts. Consider the extreme hypothetical example of media conglomerate ANS with a machine-authorship program. Finding that a startup, FastNews, which produces articles comparable to its machine-authored

¹⁴ See *id.* at 164 (“One of the key factors harmonizing [the social bargain between content producers and the public] has been the inherent limitations of analog technology platforms on unauthorized reproduction and distribution of works of authorship. . . . [D]igital technology platform[s] today . . . lack[] such constraints.”).

¹⁵ See *infra* note 80 and accompanying text (discussing how the value of electronic news is measured by its website traffic, which declines significantly six hours after it is posted).

¹⁶ See *infra* note 80 and accompanying text.

works, generates more traffic, ANS leverages several copyright infringement lawsuits at FastNews to shut it down. FastNews sells to ANS at a fraction of its valuation after being rendered illiquid by litigation expenses. A legal framework that permits a single party to aggregate a significant number of copyrights through minimal effort readily invites this type of anticompetitive behavior.

This Comment makes several contributions to the scholarship on copyright law. First, it poses fundamental questions regarding the application of the existing copyright framework to the various players involved in creating machine-authored works—particularly with respect to identifying the legal author of the work. Second, it evaluates whether, in the case of machine-authored works, the human author should be allocated rights based on the economic incentive theory. It argues that inflexible application of copyright law creates a contribution/rights paradox because the party that contributed to the creation of the work—its author—is not the party to whom we would like to allocate copyright protection. Finally, the Comment posits that because copyrights provide little economic incentive to the players involved in creating machine-authored works, it would be inappropriate from a social policy standpoint to extend protection to such fully independent computer-generated works.

Part I briefly discusses the purpose and basic requirements of copyright law, emphasizing the traditional stance that the incentives provided to the content producers are designed to purposefully, if indirectly, benefit the public. Part II discusses the legal nature and treatment of machine-authored works, specifically within the context of works that are fully and independently computer-generated.¹⁷ Part II also provides a brief overview of the technical components behind machine-authored works, distinguishes such works from subsequent human-authored derivative works, and highlights the legal treatment in jurisdictions that have addressed the issue. Part III discusses the numerous problems arising from affording full copyright protection to machine-authored works. This discussion, in part, reassesses how confident we should be that machine-authored works satisfy the legal requirements for copyright protection. Part IV concludes that applying the existing copyright framework would be inappropriate and discusses some alternative protection measures specifically targeting machine-authored works. It proposes three possible alternatives: (1) place machine-authored works immediately in the public domain; (2) assign a two-tier system of protection akin to quasi-property rights; or (3) assign the copyright to the programmer, but limit infringement to one-to-one identical copying.

¹⁷ An example of one such work is the original article that Quakebot authored. *See supra* text accompanying notes 1–3.

I. PURPOSE AND LEGAL REQUIREMENTS OF COPYRIGHT LAW

Courts have repeatedly stated that the primary purpose of copyright is to benefit the public.¹⁸ Article I, Section 8 of the U.S. Constitution empowered Congress to pass legislation to “promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their Respective Writings and Discoveries.”¹⁹ Indeed, the authority for Congress to pass the Copyright Act of 1909 and subsequent amendments came from this enumerated power of the U.S. Constitution.²⁰ Thus, as commentators have properly noted, copyright protection is premised on the benefit a creative author can give to the public and the necessity of a copyright to realize such a benefit.²¹ By extension, copyright protection cannot be justified where no public benefit is conferred.²²

As amended, the Copyright Act of 1976 imposes two major requirements for copyrightability. Under the Act, to receive copyright protection, a work must be (1) of original authorship and (2) fixed in a tangible medium.²³ Furthermore, the Supreme Court has read the first prong—originality—to also

¹⁸ See, e.g., *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975) (“The immediate effect of our copyright law is to secure a fair return for an ‘author’s’ creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good.”); see also *Harper & Row, Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 546 (1985) (“It is evident that the monopoly granted by copyright actively served its intended purpose of inducing the creation of new material of potential historical value.”).

¹⁹ U.S. CONST. art. I, § 8, cl. 8.

²⁰ *Id.*

²¹ See 1 MELVILLE B. NIMMER & DAVID NIMMER, *NIMMER ON COPYRIGHT* § 1.03[A], at 1-88.18 (2011) [hereinafter *NIMMER ON COPYRIGHT*] (“[T]he authorization to grant to individual authors the limited monopoly of copyright is predicated upon the dual premises that the public benefits from the creative activities of authors, and that the copyright monopoly is a necessary condition to the full realization of such creative activities.” (footnote omitted)); William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 326 (1989) (“A distinguishing characteristic of intellectual property is its ‘public good’ aspect. . . . For copyright law to promote economic efficiency, its principal legal doctrines must, at least approximately, maximize the benefits from creating additional works minus both the losses from limiting access and the costs of administering copyright protection.”); see also Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281 (1970) (arguing that the only defensible justification of copyright is the economic balance between maximizing distribution and encouraging production of creative works).

²² See *NIMMER ON COPYRIGHT*, *supra* note 21, § 1.03[A], at 1-88.18 (“Implicit in this [copyright] rationale is the assumption that in the absence of such public benefit, the grant of a copyright monopoly to individuals would be unjustified.”); *Hutchinson Tel. Co. v. Fronteer Directory Co.*, 586 F. Supp. 911, 913 (D. Minn. 1984) (quoting and citing *Nimmer on Copyright* with approval), *rev’d*, 770 F.2d 128 (8th Cir. 1985).

²³ 17 U.S.C. § 102(a) (1976).

require at least a modicum of creativity.²⁴ I consider each of these requirements, original authorship and fixation in a tangible medium, in turn.

While not defined in the statute, the term “original” has been subject to both congressional explanation and judicial interpretation. Notably, a House report explains that Congress purposefully left the phrase “original works of authorship” undefined to adopt the standard established by the courts at the time the legislation was passed.²⁵ Courts, in turn, have adopted several rules to establish originality. Chief among them are two distinctions: (1) creative versus factual or “sweat-of-brow” works, and (2) works with attributed authorship versus works without attribution. First, courts are willing to uphold copyright protection for works with even the smallest amount of creativity²⁶ but are unwilling to extend protection to facts, even if their discovery or compilation requires significant “sweat-of-brow” effort.²⁷ Second, courts will grant copyright protection only to individuals who can prove that they independently generated the protectable elements of their work.²⁸ For example, the plaintiff in *Acuff-Rose Music, Inc. v. Jostens, Inc.* tried to copyright the phrase “You’ve got to stand for something, or you’ll fall for anything.”²⁹ The U.S. Court of Appeals for the Second Circuit, however, affirmed the district court’s decision that the phrase lacked originality, since it had been used by Ginger Rogers, Martin Luther King, and even Abraham Lincoln.³⁰ The court held that it was reasonable for the district court to conclude that “the prior usage of the saying

24 See *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 346 (1991) (discussing the holding in the *Trade-Mark Cases*, 100 U.S. 82 (1879), in which the Court determined that “originality requires independent creation plus a modicum of creativity”).

25 See NIMMER ON COPYRIGHT, *supra* note 21, § 2.01, at 2-5 to 2-6 (stating that “originality” was left undefined to incorporate changing standards); see also *Durham Indus., Inc. v. Tomy Corp.*, 630 F.2d 905, 910 (2d Cir. 1980) (“[T]he one pervading element prerequisite to copyright protection regardless of the form of the work is the requirement of originality—that the work be the original product of the claimant.” (internal quotation marks omitted) (quoting *L. Batlin & Son, Inc. v. Snyder*, 536 F.2d 486, 489-90 (2d Cir. 1976))).

26 See, e.g., *Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, 191 F.2d 99, 102-03 (2d Cir. 1951) (“All that is needed to satisfy both the Constitution and the statute [requiring originality] is that the ‘author’ contributed something more than a ‘merely trivial’ variation, something recognizably ‘his own.’ Originality in this context ‘means little more than a prohibition of actual copying.’” (footnotes omitted)).

27 See *Miller v. Universal City Studios, Inc.*, 650 F.2d 1365, 1372 (5th Cir. 1981) (refusing to grant copyright protection to a journalist’s research that Universal appropriated for its movie on the grounds that research is discovery of fact, which is not copyrightable); see also *Feist Publ’ns, Inc.*, 499 U.S. at 363-64 (refusing to award copyright protection to a telephone book because there was no creativity in the arrangement of the work).

28 See, e.g., *Acuff-Rose Music, Inc. v. Jostens, Inc.*, 155 F.3d 140, 143 (2d Cir. 1998) (declining to grant copyright protection over certain song lyrics because the phrase at issue had been attributed to multiple other songs and the plaintiff did not establish that it independently created the phrase).

29 *Id.* at 141.

30 *Id.* at 143.

was sufficiently widespread as to make it exceedingly unlikely . . . that [the plaintiff] had, in fact, independently created the phrase.”³¹

The next requirement, fixation, demands that the work be embodied in a physical object recorded by or under the authority of the author and be sufficiently permanent to be perceived or reproduced with the aid of a machine.³² The embodiment can be digital, even if it is temporarily stored in a computer’s memory.³³ Thus, the digital nature of a machine-authored work does not bar the work from being copyrightable on the grounds that it has not been properly fixed in a tangible medium.

The historical context of the Copyright Act and its nuanced legal requirements establish a useful foundation for analyzing machine-authored works. First, the principal beneficiary of copyright protection is the public, not the author. Therefore, in determining whether a work should be copyrighted, the primary consideration should be the expected public benefit. Second, copyrightability depends on the creative nature of the work, not its labor intensiveness. Third, only the author is eligible for copyright protection; therefore, only the author’s filing for copyright protection can satisfy the first prong of the Copyright Act—works of original authorship.³⁴ As such, when analyzing whether a novel type of work should be protected, the Copyright Office and courts should consider whether the copyrights are “the fruits of intellectual labor”³⁵ that have been “founded in the creative powers of the mind”³⁶ and would generate future benefit for the public good.

II. MACHINE-AUTHORED WORKS

A. *Machine-Authored Works Defined*

Historically, courts have grappled with the issue of emerging technology and copyright protection. The iconic case of *Burrow-Giles Lithographic Co. v. Sarony*, for example, assessed whether a photograph could be copyrighted

³¹ *Id.* at 144.

³² See 17 U.S.C. § 102(a) (2012) (providing that material to be copyrighted must be “fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device”).

³³ See, e.g., *Midway Mfg. Co. v. Artic Int’l, Inc.*, 547 F. Supp. 999, 1007-08 (N.D. Ill. 1982) (finding that the fixation requirement was satisfied where the audiovisual elements of the plaintiff’s video games were written into storage even though some components of gameplay were only written in the machine’s random access, and thus, temporary, memory), *aff’d*, 704 F.2d 1009 (7th Cir. 1983).

³⁴ See, e.g., *Gladys Music, Inc. v. Arch Music Co.*, 62 Civ. 1594, 1966 WL 7634, at *6 (S.D.N.Y. June 15, 1966) (finding that the plaintiff had secured exclusive rights and privileges to a song when he filed a certificate of registration).

³⁵ *Trade-Mark Cases*, 100 U.S. 82, 94 (1879) (emphasis omitted).

³⁶ *Id.*

even though a camera, not a person, had physically created the work.³⁷ *Burrow-Giles* perfectly highlights the emerging tension between technology and copyright protection because photographs were a novel technology at the time of the case and had not been previously contemplated by the Copyright Act of 1802.³⁸ The *Burrow-Giles* Court found that the human behind the camera was the true author, and thus entitled to the “exclusive right to use, publish and sell” the photograph, because he was the one who composed the image.³⁹ Writing for a unanimous Court, Justice Miller found that by posing Oscar Wilde in a particular way, in a certain costume, and under particular lighting, Sarony exercised sufficient control over the photographic product for it to constitute an original work of art.⁴⁰ In this case, the camera was merely a tool that helped facilitate the fixation of the author’s creativity.⁴¹

This reasoning has continued to hold even in cases where a machine does the bulk of the work.⁴² A modern example can be found in *Stern Electronics, Inc. v. Kaufman*, in which the Second Circuit held that video games were copyrightable even though computer programs generated the audiovisual displays.⁴³ Breaking down the analysis by element, the court stated,

Someone first conceived what the audiovisual display would look like and sound like. Originality occurred at that point. Then the program was written. Finally, the program was imprinted into the memory devices so that, in operation with the components of the game, the sights and sounds could be seen and heard. The resulting display satisfies the requirement of an original work.⁴⁴

In some ways, a machine-authored work appears to be the next logical stepping stone. But machine-authored works are unique in at least one important respect: there is *no* human input in the generation of the work in question. The software itself generates content through a natural language system, a style of coding (rather than a language itself) that focuses on

³⁷ 111 U.S. 53 (1884).

³⁸ *See id.* at 58 (“The only reason why photographs were not included in the extended list in the act of 1802 is probably that they did not exist, as photography as an art was then unknown . . .”).

³⁹ *See id.* at 54-60 (noting that the plaintiff made the photograph “entirely from his own original mental conception, . . . arranging the subject so as to present graceful outlines, arranging and disposing the light and shade” and holding that these findings “show this photograph to be an original work of art”).

⁴⁰ *Id.* at 60.

⁴¹ *See id.* at 60-61 (recognizing that this is a case of first impression, but finding persuasive the reasoning in *Nottage v. Jackson*, [1883] 11 QB 627 (Eng.), that “‘author’ involves originating, making, producing, as the inventive or master mind, the thing which is to be protected”).

⁴² *See, e.g.*, *Midway Mfg. Co. v. Artic Int’l, Inc.*, 547 F. Supp. 999, 1014 (1982) (upholding copyright protection for video games, which are primarily machine-operated).

⁴³ 669 F.2d 852, 856 (2d Cir. 1982).

⁴⁴ *Id.* at 856-57.

decisionmaking.⁴⁵ At every step of the creation process, it makes choices as to content, format and organization, style, packaging, and syntax. Ostensibly sophisticated, the process can be broken down into two core steps: text planning and sentence planning. In the first step, the program determines what information to communicate and how to structure the information into coherent text. In the second step, the program parses through possible lexical choices and makes decisions about what structures to use. In many ways, when creating a work, the program thinks much as a human brain would.

To make concrete the abstract legal relationships involved in generating a machined-authored work, consider the creation of a machine-authored work from beginning to end. For simplicity, assume that a single person, Adam, wrote a program named “Bot” on his computer. Bot takes statistics from NFL.com and combines them with a natural language algorithm, which Adam coded, to generate a news article that recaps the score and notable plays of any football game. Adam then licenses Bot to Charles, who publishes a dozen articles on football games that Bot generated in the past week.

Existing jurisprudence will allow Adam to copyright his source code for Bot. Following the reasoning in *Burrow-Giles*, Adam is the author, as he used a machine—his computer—to channel his creative energies to generate a protectable work—a software program—that is fixed in a tangible medium on his hard drive.⁴⁶ As the author and owner, Adam is entitled to license his program out to Charles to use.⁴⁷ The questions left unanswered by current jurisprudence concern the copyrightability of the dozen articles that Bot generated for Charles: Would Charles be considered the author of these works since he was the one who commanded Bot to generate the articles? Would these works be considered derivative works of the original Bot program, making Adam the author? Might Charles and Adam be joint authors? Could Bot itself be an author?

B. Copyrightability of Machine-Authored Works

When the issue of machine-authored works was first contemplated, the Register of Copyrights did not determine whether these works would be copyrightable.⁴⁸ Rather, the Register stated, “The crucial question appears to

⁴⁵ See generally EHUD REITER & ROBERT DALE, BUILDING NATURAL LANGUAGE GENERATION SYSTEMS (2000) (discussing the various aspects and technical features of creating a natural language generation system).

⁴⁶ See *supra* notes 37–41 and accompanying text.

⁴⁷ See 17 U.S.C. § 102(a) (2012) (noting that Copyright protection subsists “in original works of authorship fixed in any tangible medium of expression . . . from which they can be perceived, reproduced, or otherwise communicated”).

⁴⁸ See COPYRIGHT OFFICE, SIXTY-EIGHTH ANNUAL REPORT OF THE REGISTER OF COPYRIGHTS 1, 5 (1966) (recognizing the need for change in copyright law and electing to begin

be whether the 'work' is basically one of human authorship, with the computer merely being an assisting instrument, or whether the traditional elements of authorship . . . were actually conceived and executed not by a man but by a machine."⁴⁹ Official reports by the National Commission on New Technological Uses of Copyrighted Works (CONTU) and the United States Congress Office of Technology Assessment elected not to resolve the issue, noting that machine-authored works were too far in the future to address and that there were too many ambiguities to resolve at that time.⁵⁰

This governmental hesitance has not stopped legal commentators from analyzing how machine-authored works should be treated. Indeed, as one commentator noted, the existing copyright framework can be readily applied to the context of machine-authored works.⁵¹ After all, whether works are composed by humans or machines, the same fundamental requirements of originality, fixation, and modicum of creativity apply.

In analyzing originality, it is important to recall that courts have repeatedly refused to determine what is or is not "original enough" to warrant copyright protection, emphasizing that it is not the court's role to judge the artistic merits of the work.⁵² That said, the elementary and somewhat factual nature of machine-authored works may be irrelevant to establishing originality, especially since many of these works are indistinguishable from their human-created counterparts. Consequently, many commentators have concluded that the particular expression of the facts by the machine-author is sufficient to establish originality.⁵³

Extending from originality is the requirement for a modicum of creativity. In some jurisdictions, even the slightest amount of creativity, including "[a] copyist's bad eyesight or defective musculature, or a shock caused by a clap of

considering technological differences rather than applying the traditional copyright framework to all works irrespective of technology).

⁴⁹ *Id.* at 5.

⁵⁰ See Arthur R. Miller, *Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?*, 106 HARV. L. REV. 977, 1044-45 (1993) ("CONTU concluded unanimously that the artificial intelligence Register Kaminstein had envisioned eight years earlier had not yet been developed and was not immediately foreseeable.").

⁵¹ See *id.* at 1054 ("[T]echnological developments have not outstripped the capacity of our current copyright law to adapt to the creative opportunities offered by new technologies.").

⁵² See *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 251 (1903) ("It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits."); *Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, 191 F.2d 99, 102 (2d Cir. 1951) ("[T]he courts have not undertaken to assume the functions of critics, or to measure carefully the degree of originality, or literary skill or training involved.").

⁵³ See Miller, *supra* note 50, at 1049 (arguing that the existing copyright framework can apply to machine-authored works); Samuelson, *supra* note 9, at 1195-96 (concluding that machine-authored works can be original enough to be copyrighted); Wu, *supra* note 9, at 148-49 (discussing to whom to award the copyright based on a multifactor test analyzing contributions to the originality).

thunder, may yield sufficiently distinguishable variations.”⁵⁴ Given that a computer program uses natural language algorithms to generate unique expressions of the same set of facts, courts are very likely to find the minimal level of creativity necessary for copyright protection.

While the fixation element would readily be satisfied, there is a question of who fixed the work. While most cases suggest that the user fixed the work by initiating the program,⁵⁵ there is also a possible claim that the computer programmer is the one who fixed the work.⁵⁶

III. PROBLEMS OF APPLYING TRADITIONAL COPYRIGHT FRAMEWORK

The issue of fixation segues into the larger and more hotly contested issue of authorship. Authorship presents significant problems for applying the traditional copyright framework to machine-authored works. Different scholars have proposed that the machine author, programmer, end-user, and joint variants (programmer and machine, end-user and machine, programmer and end-user) be considered the author who should receive copyright protection.⁵⁷ Each proposal has an intuitive reasoning seemingly grounded in traditional copyright doctrine. But, on closer inspection, each is inconsistent with copyright policy.

A. Authorship and Ownership

1. Machine as Author

One possibility is for the machine or software program to be awarded authorship. Such an allocation would be consistent with the court’s historical approach of awarding authorship to the entity that is the actual creative force

⁵⁴ *Alfred Bell*, 191 F.2d at 105; see also *Wu*, *supra* note 9, at 152-53 (quoting *Alfred Bell*, 191 F.2d at 105); cf. *Durham Indus., Inc. v. Tomy Corp.*, 630 F.2d 905, 909 (2d Cir. 1980) (rejecting a copyright claim in licensed plastic toys based on Mickey Mouse and holding that originality for the derivative work must (1) be nontrivial and (2) reflect the degree to which it relies on preexisting material and not affect the copyright scope of that preexisting material); *L. Batlin & Son, Inc. v. Snyder*, 536 F.2d 486, 493-94 (2d Cir. 1976) (rejecting for copyrightability a derivative Uncle Sam Mechanical Bank, holding that the author must contribute substantial, not merely trivial, originality).

⁵⁵ See, e.g., *Stern Elecs., Inc. v. Kaufman*, 669 F.2d 852, 856 (2d Cir. 1982) (finding the fixation element satisfied in Stern’s video game *Scrabble* because the same sequence appears numerous times whenever a player starts a match).

⁵⁶ See, e.g., *Williams Elecs., Inc. v. Artic Int’l, Inc.*, 685 F.2d 870, 874 (3d Cir. 1982) (holding that the fixation requirement is met in Williams’s video game *Defender* even though “new” images are generated between play mode and attract mode).

⁵⁷ See generally *Samuelson*, *supra* note 9 (discussing at length the possible permutations of rights that could be assigned to various players that contribute to the creation of a machine-authored work).

behind the copyrightable work.⁵⁸ However, while the machine is unequivocally the entity that generated the actual end product, assigning ownership to the machine raises a significant legal issue, as software and machinery have no legal personhood.⁵⁹ Despite the logical rationale behind such allocation, it is unlikely that courts will grant a copyright to an entity with no legal personhood.

2. Programmer as Author

The programmer has undoubtedly made the largest contribution to the originality and creativity of the machine-authored work. The programmer conceived of how he could create a software program that generates literary works, crafted a plan to build that program, generated the necessary coding, and troubleshoots all of the bugs preventing the program from executing properly. Consequently, one might argue that any machine-authored work product is enabled only through the ingenuity of the programmer. Following this intuition, it would be reasonable to allocate the copyright of the machine-authored work to the programmer. However, because the work was ultimately created independent of any direct input from the programmer, it is unclear whether the programmer should be entitled to any statutory claim on anything beyond the original software.

Of course, one could argue that the works created by the software are derivative works based off of the original programming.⁶⁰ However, the traditional application of derivative works requires that the work not just satisfy the intuitive definition of “based on” (i.e., but-for causation), but that the work be predicated upon, or built off of, the previous work.⁶¹ As such, legally classifying machine-authored works as derivative works would be inaccurate because the works are not based on a “recognizable block of expression from the program.”⁶²

⁵⁸ See *supra* note 28 and accompanying text.

⁵⁹ See Samuelson, *supra* note 9, at 1199 (“Despite the fact that the statute does not *require* that one be human to qualify as an author, is it still fair to say that it was not within Congress’ contemplation to grant intellectual property rights to machines. In the long history of the copyright system, rights have been allocated only to humans.”).

⁶⁰ See 17 U.S.C. § 101 (2012) (defining a “derivative work” as “a work based upon one or more preexisting works”).

⁶¹ *Id.*; see also, e.g., *Durham Indus., Inc. v. Tomy Corp.*, 630 F.2d 905, 909 (2d Cir. 1980) (“First, to support a copyright the original aspects of a derivative work must be more than trivial. Second, the scope of protection afforded a derivative work must reflect the degree to which it relies on preexisting material and must not in any way affect the scope of any copyright protection in that preexisting material.”).

⁶² Darin Glasser, *Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?*, 2001 DUKE L. & TECH. REV. 24, ¶ 18; see also *Berkic v. Crichton*, 761 F.2d 1289, 1292 (9th Cir. 1985) (explaining that one prong of copyright’s “substantial similarity” test “is used to determine whether two works are substantially similar in their ‘forms of expression’”); *Litchfield v. Spielberg*, 736 F.2d 1352, 1357 (9th Cir. 1984) (holding that to “constitute a violation of section 106(2) the infringing work

3. End-User as Author

Allocating rights to the end-user seems to make the most economic sense. Indeed, CONTU favored this allocation in its assessment when it stated, “[The] obvious answer [to the question of who is the author of a computer-generated work] is that the author is [the] one who employs the computer.”⁶³ Notably, this assessment was predicated upon the perception that the user would have a substantial contribution in shaping the output.⁶⁴ As such, this position becomes difficult to defend when the role of the user is close to nonexistent since anyone claiming authorship rights must have tinkered with the subject matter to make the work indisputably his own.⁶⁵

Because the user has to engage the program for it to produce an output (e.g., typing “start” or clicking a button), one could make a tenuous argument that such action constitutes the level of contribution necessary to warrant protection. We might think of the program as similar to a camera or other mechanical device, and users of these devices are often considered the authors of the creative works produced.⁶⁶ However, this argument fails to address that the creative decision made when generating machine-authored works is much more limited than the creative decision made when producing a work with a camera or recording device. Unlike the lithographer in *Burrow-Giles*, the end-user of a computer program makes no real decision as to composition or arrangement. Consequently, it is difficult to argue that the program is assisting in human creativity.

4. Joint Authorship

Assigning joint authorship (in any permutation) appears, at first glance, to nicely avoid the question of who is the primary author of the work. After all, each author has played a role in the creation of the final product, so it seems to make sense that copyright protection be afforded to all contributors.

must incorporate in some form a portion of the copyrighted work”); NIMMER ON COPYRIGHT, *supra* note 21, § 3.06, at 3-34.29 (“All works are composed of pre-existing elements—whether words, paints or shapes, musical notes, or otherwise. But it does not follow that all works are therefore derivative or collective.”).

⁶³ Miller, *supra* note 50, at 1056 (internal quotation marks omitted) (quoting NAT’L COMM’N ON NEW TECH. USES OF COPYRIGHTED WORKS, FINAL REPORT ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS 45 (1979)).

⁶⁴ See *id.* at 1045 (viewing the computer as “a tool to assist a human author”).

⁶⁵ See NIMMER ON COPYRIGHT, *supra* note 21, § 2.01[A], at 2-9 (explaining the meaning of originality in the copyright sense, and stating that a work is original if it is “a product of the independent efforts of its author”).

⁶⁶ See Samuelson, *supra* note 9, at 1202 (explaining that, under copyright law, someone who tape-records a live musical performance is considered the author of the sound recording produced, even though the user’s creative input consisted only of pressing the “record” button).

However, joint authorship allocation raises more problems than it solves. The primary problem is the existing legal standard for “joint work,” which requires (1) that each individual’s contribution be independently copyrightable⁶⁷ and (2) that each individual prepared his contribution with the intent that the works would be joined together into an inseparable and unitary whole.⁶⁸

The machine-authored work would likely fail both components of the legal test for a joint work. On the first component, it is unclear what the programmer contributed to the machine-authored work. His contribution could be the software programming, but, because his code can be copyrighted separately, such an arrangement would allow for double dipping. If the code cannot be considered his contribution, the programmer would have contributed nothing to the scheme. Additionally, the end-user’s contribution of button pressing or word typing is unlikely to be independently copyrightable because the act of pressing a button or typing a word is unlikely to be original or contain a modicum of creativity as a matter of law. On the second component, it is difficult to argue that the programmer intended for all of his licensees to collaborate with him on a joint venture because the parties who will later use the software were not identified at the time the program was created. The standard for joint works, which requires that both parties intended at the time of initial bargaining that their works be combined,⁶⁹ is therefore unlikely to be satisfied. Thus, while assigning joint authorship might seem attractive at first, it is a relatively untenable solution.

B. *The Contribution/Rights Paradox*

Let us assume that copyright contributions of the individual human entities leading to the creation of the machine-authored work created assignable authorship rights. The second problem that arises is that no variation of copyright attribution and ownership allocation both satisfies the elements of the statute as construed by court precedent and remains consistent with public policy.

Accepting for the present that the actual software is not a legal entity capable of owning a copyright, we will consider awarding the protection to one of the two parties remaining: the programmer and the end-user. On the one hand, copyright law is predicated on incentivizing the creative author. In

⁶⁷ See *Childress v. Taylor*, 945 F.2d 500, 507 (2d Cir. 1991) (holding that, for a work to meet the statutory definition of “joint work,” the contribution of each joint author must be copyrightable).

⁶⁸ See *Comty. for Creative Non-Violence v. Reid*, 490 U.S. 730, 731-32 (1989) (finding that the parties could be joint authors in a sculpture work if they “prepared the work ‘with the intention that their contributions be merged into inseparable or interdependent parts of a unitary whole’” (quoting 17 U.S.C. § 101 (1988))).

⁶⁹ *Id.*

the case of machine-authored works, the programmer has contributed the most creative effort to the resulting work and could presumably secure the copyright. Applying the traditional copyright law framework, we can readily conclude that the programmer should be granted copyright protection on all machine-authored works. On the other hand, allowing the programmer to copyright not only his software but also any subsequent outputs over-rewards him for his efforts⁷⁰ and invites copyright stockpiling. A program like Quakebot might produce only a few dozen articles per year because its work is constrained to natural disasters, but a machine-author that writes on breaking news could produce a few dozen articles per day, each with copyright protection assigned to the programmer. While it is possible for other creators to write on the underlying facts through their own expression, this allocation regime would result in further copyright infringement litigation that would not be to the benefit of a public already inundated with copyright takedown notifications and DMCA claims.⁷¹

Allocating the copyright to the end-user ostensibly makes more sense from both social policy and economic standpoints. Because the end-user is ultimately the one who determines whether a machine-authored work is produced, economic incentives should align the interests of the end-user with the interests of the general public because the end-user determines the volume and quality of articles that fill the market. The programmer is incentivized to create the software independently of economic incentives to generate machine-authored works because his or her code is already entitled to copyright protection. If we are concerned with incentivizing the production of more creative works, it seems better to award copyright protection to the end-user, who is far more likely to play a meaningful role in generating works

⁷⁰ See JOHN HAUGELAND, *ARTIFICIAL INTELLIGENCE: THE VERY IDEA* 12 (1985) (noting that since the products created by the program are not predicted by the original programmer, the programmer should not be rewarded for those works).

⁷¹ See, e.g., Chris Welch, *Google Received over 75 Million Copyright Takedown Requests in February*, VERGE (Mar. 7, 2016, 11:02 AM), <http://www.theverge.com/2016/3/7/11172516/google-takedown-requests-75-million> [<https://perma.cc/WBP5-4K9D>] (highlighting Google's receipt of 75 million requests to take down copyright-infringing URLs in March 2016, and noting that the majority of the notices are legitimate); see also Andy, *Google DMCA Notice Record Smashed Again – But Why?*, TORRENTFREAK (Sept. 6, 2015), <https://torrentfreak.com/google-dmca-notice-record-smashed-again-but-why-150906> [<https://perma.cc/5WRG-4E8T>] (discussing how websites are using multiple domains to circumvent blocking efforts, leading to a vicious cycle of increasing takedowns); Andy Smith, *YouTube Taking Steps to Improve False Copyright Claims*, TUBULARINSIGHTS (Feb. 29, 2016), <http://www.tubularinsights.com/youtube-false-copyright-claims> [<https://perma.cc/28GK-KUJ8>] (discussing YouTube's efforts to combat takedown abusers who report videos that actually did not infringe copyright).

than the programmer.⁷² In news production, for example, an end-user, like the *L.A. Times*, plays a larger role in pushing news into the public sphere than would the software company that created the machine author because it determines what news articles are publication-worthy and what nuances should be emphasized within a given article. However, under traditional copyright doctrine, it would be difficult for the end-user to secure a copyright because he has contributed very little to the creative process and holds the weakest claim to any copyrightable contribution.⁷³ The mere action of pressing a button would likely not satisfy the modicum of creativity standard established in *Feist*.

Thus, the contribution/rights paradox exists because the party that can secure the copyright is not the party that merits copyright protection. One way to avoid this paradox would be to consider the creative contribution of the programmer in determining whether to grant copyright protection, but to allocate the right to the machine-authored work to the end-user once the copyright is granted. While this would be desirable from a social policy standpoint and still satisfy the legal requirements for copyrightability, such a framework contravenes the language of the Copyright Act. Specifically, 17 U.S.C. § 106 states that the exclusive rights in copyrighted works are conferred to the “owner,” referring to the “author” of the copyrightable work. To qualify as an author, a party must have contributed to the copyrightable work.⁷⁴ A framework that assesses copyrightability based on the contribution of the programmer but grants protection to the end-user would end up granting protection to a non-author as defined by § 106. Absent the work-product doctrine, it would be illogical and legally impermissible for a court to determine that an individual’s original and creative contribution *de facto* gives rise to copyright protection for another individual. This holds true despite the fact that the programmer may have licensed his software to the end-user.⁷⁵

⁷² See Samuelson, *supra* note 9, at 1203-04 (discussing the economic factors and technical expertise that place the end-user of a generator program in a superior position to evaluate a machine-authored work).

⁷³ *Id.* at 1201-02.

⁷⁴ See, e.g., *Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, 191 F.2d 99, 102-03 (2d Cir. 1951) (“All that is needed to satisfy both the Constitution and the statute is that the ‘author’ contributed something more than a ‘merely trivial’ variation, something recognizably ‘his own.’”).

⁷⁵ See, e.g., *Vernor v. Autodesk, Inc.*, 621 F.3d 1102, 1111 (9th Cir. 2010) (holding that because a company was a licensee of the defendant’s software, it was not an owner, was not entitled to the rights of an owner, and was not entitled to invoke copyright defenses such as the first sale doctrine).

The contribution/rights paradox is succinctly illustrated in the table below:

		Copyright Protection Allocation	
		Programmer	End-User
Copyrightability Contribution	Programmer	Pros <ul style="list-style-type: none"> • Best balances creative contribution and right to authorship in a manner consistent with the statute Cons <ul style="list-style-type: none"> • Over-rewards the programmer by creating a monopoly over copyrightable works 	Pros <ul style="list-style-type: none"> • Best evaluation of copyrightability contribution • Assigned rights do not create a monopoly Cons <ul style="list-style-type: none"> • Grants copyright protection to a non-author in violation of 17 U.S.C. § 106. Person evaluated as author for copyrightability is not the one who receives rights
	End-User	Pros <ul style="list-style-type: none"> • None Cons <ul style="list-style-type: none"> • Copyrightability evaluated on the party that contributed the least, rights allocation leads to monopoly. Grants copyright protection to a non-author in violation of § 106 	Pros <ul style="list-style-type: none"> • Assigned rights do not create a monopoly • Assignee has economic and technical expertise to determine value of copyrightable work Cons <ul style="list-style-type: none"> • Difficult to make argument that the contributions were original and creative

C. Social Policy Arguments for Not Protecting Machine-Authored Works

The broader issue that remains unaddressed is whether machine-authored works require copyright protection at all. Recall that creative works are provided copyright protection for public benefit; the temporary grant of an intellectual property monopoly serves as an economic incentive for producers to create works for the public. I consider now whether copyright allocation for the programmer or the end-user within the context of machine-authored works would fulfill the Copyright Act's intended purpose of benefitting the public.

Even at first cut, it is unclear how allowing the programmer to copyright works produced by its software would further the purpose of copyright law. In terms of economic incentives, the programmer is incentivized to produce works through the copyright protection that is afforded to his code. It is

difficult to construct a cogent argument for how granting additional protection would further incentivize this creative behavior. Such additional protection does not exist in other areas of intellectual property.⁷⁶ One possible argument concerns derivative works, but, as previously discussed, the machine-authored work does not predicate on the coding in the same way that, for example, a movie might be made using a copyrighted character (e.g., Mickey Mouse). A better analogy might be to a person who buys a digital camera and then takes some pictures. The software coding that enables the camera to function might be copyrighted, but that does not entitle the copyright holder to stake a claim on the pictures created by the photographer. At best, allocating the copyright to the programmer would create few additional incentives for other programmers to code programs that generate machine-authored works. At worst, such a regime would enable widespread monopolization of all future works generated by a single software program, skewing the law disproportionately in favor of content producers to the detriment of the public.

A slightly more reasonable argument is that copyright protection may incentivize the end-user to produce more creative works. But, in the economic calculus, giving copyright protection to machine-authored works should, in theory, neither add nor remove incentives for the end-user. The cost of production for the end-user is, after all, zero. The end-user must license the software from the programmer and would need to pay that cost, but it can hardly be said that the cost is recouped through the copyright protection granted to the articles generated. In fact, in the digital market, high demand for immediately consumable media creates a powerful first-to-market economic incentive that exists independently of any copyright protection.⁷⁷ Because most websites generate revenue through advertisement, website traffic—the total number of visitors to a website—becomes the primary metric of economic success.⁷⁸ In the area of online news, increasing traffic

⁷⁶ For example, in patent law, an inventor is entitled to patent his own work but is not de facto entitled to a patent on any work based on his patent. See *Price v. Symsek*, 988 F.2d 1187, 1190 (Fed. Cir. 1993) (“To prove derivation in a[] [patent] interference proceeding, the person attacking the patent must establish prior conception of the claimed subject matter and communication of the conception to the adverse claimant.”). See generally 1 DONALD S. CHISUM, CHISUM ON PATENTS (2008).

⁷⁷ See, e.g., Aydin Çelen, Tarkan Erdoğan & Erol Taymaz, *Fast Moving Consumer Goods: Competitive Conditions and Policies* 32-33 (Econ. Research Ctr., Working Paper in Economics 05/13, 2005) (finding, through an empirical study on Turkey’s market, that fast-moving goods are competitive and, therefore, that regulation may be unnecessary so its implementation should be considered with care).

⁷⁸ See Shaun Quarton, *7 Key Metrics to Track the Success of Your Website*, TORQUE (Mar. 5, 2015), <http://torquemag.io/2015/03/7-key-website-metrics-track> [<https://perma.cc/58DV-N74D>] (noting that traffic volume is fundamentally important because it tracks growth and thus revenue).

means getting new information to publication as quickly as possible.⁷⁹ The time it would take for the Copyright Office to grant copyright protection for a given article would likely exceed the useful lifespan of the article many times over.⁸⁰ Thus, there is no real additional social benefit to granting the end-user copyright protection.

The first-mover economic incentive in digital media exists regardless of whether the work receives copyright protection. Since none of the traditional benefits of copyright protection hold in the case of machine-authored works, copyright makes an end-user no more or less likely to produce. Because the copyright protection process for online media moves too slowly to meaningfully provide a public economic benefit, it would not make sense from a social policy standpoint to extend such protection.

IV. PROTECTION PROPOSALS DESIGNED FOR MACHINE-AUTHORED WORKS

Given how machine-authored works fit in the existing jurisprudence, an alternative protection scheme should be devised to support beneficial social policy. This Part contemplates three potential schemes and examines their respective shortcomings.

A. *Immediate Entry into the Public Domain*

One possible treatment would be for all machine-authored works to enter into the public domain immediately. On its face, this proposition seems extreme—it appears to deprive the theoretical legal author of rights that would traditionally have been allocated to him. Upon scrutiny, however, this treatment offers several practical benefits and has relatively few drawbacks.

Under this treatment, the true “author” of the machine-authored work is in fact the software. Because the software is not a legal entity, this treatment would not deprive it of any rights, as it has no legal rights to begin with. Further, the programmer would receive adequate compensation and legal protection through the copyrightability of her code. And the end-user, while deprived of the opportunity to copyright the original machine-authored work, could nevertheless copyright any derivative works that she creates using the machine-authored work as a springboard. Indeed, in the case of the *Los*

⁷⁹ See, e.g., MARK BRIGGS, JOURNALISM NEXT: A PRACTICAL GUIDE TO DIGITAL REPORTING AND PUBLISHING 57 (3d ed. 2016) (discussing how Twitter’s reporting simplicity allowed it to acquire a first-mover advantage).

⁸⁰ See Carlos Castillo, Mohammad El-Haddad, Jürgen Pfeffer & Matt Stempeck, *Characterizing the Life Cycle of Online News Stories Using Social Media Reactions*, PROC. 17TH ACM CONF. ON COMPUTER SUPPORTED COOPERATIVE WORK & SOC. COMPUTING 211, 214-15 (2014) (finding a steep drop in the number of visitors six hours after an article has been published).

Angeles Times and Quakebot, the revised and finalized article published on the *L.A. Times*'s website would likely remain copyrightable under this framework. Assuming that the work of the journalists and editors in fleshing out the article was sufficient to satisfy the standards of originality and creativity, the works of human creativity built on the foundation of machine authors would retain their entitlement to copyright protection. In one sense, then, placing all machine-authored works in the public domain would promote the public's interest in access to creative works without unduly stifling creative incentives to the content producers.

The strongest criticism of this framework is the practical difficulty in execution. Given how difficult it can be to distinguish human works and machine-authored works, demonstrating to the Copyright Office that the work is human-generated rather than machine-created will prove increasingly more complex. Currently, machine authors produce only relatively simple articles composed primarily of facts and statistics. However, it is plausible to imagine, in the not-so-distant future, a much more sophisticated machine author that can compose eloquent novels. A potential solution would be to direct programmers to embed some kind of watermark in the machine-authored output, but there would of course be practical workarounds.

Notably, however, this criticism neglects to recognize the dual nature of copyright protection. A copyright must be enforced to have teeth: if such a framework were adopted, alleged infringers would have to establish through evidence that the work in question was machine-authored and that the copyright protection is invalid. Thus, this public domain framework would have the practical effect of increasing the difficulty of enforcing false copyrights and deterring litigation.

B. *End-User: The Quasi-Property Treatment*

If copyright protection must be given to the end-user in some manner, one possible allocation would be a quasi-property right that affords the end-user full rights against direct competitors within the industry but not against members of the general public. An excellent example of such a quasi-property right can be found in *International News Services v. Associated Press*.⁸¹ In this case, the two parties were competing news services that reported during

⁸¹ See 248 U.S. 215, 230 (1918) ("The right of the purchaser of a single newspaper to spread knowledge of its contents gratuitously, for any legitimate purpose not unreasonably interfering with complainant's right to make merchandise of it, may be admitted; but to transmit that news for commercial use, in competition with complainant—which is what defendant has done and seeks to justify—is a very different matter.").

World War I.⁸² While the Associated Press (AP) reported directly from the front, the Allied Powers had effectively banned International News Services (INS) from reporting on the news.⁸³ As a workaround, INS accessed AP news through the AP news bulletin, rewrote the news, and published it as their own hours later in the West.⁸⁴ Consequently, AP filed a lawsuit against INS. INS contended that the underlying facts in AP's news articles were unprotected and that their rewritings did not infringe on the particular expression of AP's copyrighted works.⁸⁵ The Supreme Court held that a quasi-property right could be created against INS because AP created the material as a result of the expenditure of labor, skill, and money.⁸⁶ In effect, INS's actions constituted misappropriation that deprived AP of the full benefits of its labor.⁸⁷

The holding of *INS v. AP* has been weakened in many ways since 1918. After *Erie Railroad v. Tompkins*, the case carries little authority because it relies on federal common law.⁸⁸ Further, later courts have held that "sweat of brow" work is unprotected.⁸⁹ Some courts have created narrow exceptions for "hot news," where the information is generated at a cost and is time sensitive.⁹⁰

⁸² See *id.* at 230 ("The parties are in the keenest competition between themselves in the distribution of news throughout the United States . . .").

⁸³ *News Pirating Case in Supreme Court*, N.Y. TIMES, May 3, 1918, at 14.

⁸⁴ See *Associated Press v. Int'l News Servs.*, 240 F. 983, 986 (S.D.N.Y. 1917) (discussing how INS paid individuals with access to the AP bulletin to furnish news such as the German raid on the east coast of England).

⁸⁵ *INS*, 248 U.S. at 233.

⁸⁶ See *id.* at 236 ("[A]lthough we may and do assume that neither party has any remaining property interest as against the public in uncopyrighted news matter after the moment of its first publication, it by no means follows that there is no remaining property interest in it as between [INS and AP]. For . . . news matter . . . is stock in trade, to be gathered at the cost of enterprise, organization, skill, labor, and money, and . . . we hardly can fail to recognize that for this purpose, and as between [the parties], it must be regarded as *quasi* property, irrespective of the rights of either as against the public.").

⁸⁷ See *id.* at 240 ("But in a court of equity, where the question is one of unfair competition, if that which complainant has acquired fairly at substantial cost may be sold fairly at substantial profit, a competitor who is misappropriating it for the purpose of disposing of it to his own profit and to the disadvantage of complainant cannot be heard to say that it is too fugitive or evanescent to be regarded as property.").

⁸⁸ See 304 U.S. 64, 78 (1938) (holding that there is no "federal general common law" and mandating that federal courts apply substantive state law to resolving claims under state law); see also Paul Goldstein, *Federal System Ordering of the Copyright Interest*, 69 COLUM. L. REV. 49, 49 ("It has been suggested that the credence due the *International News Service* case today is minimal: that subsequent decisions have restricted its doctrine to the news context and that, in any event, it is but a derelict of the federal common law, untenable after *Erie R.R. v. Tompkins*.").

⁸⁹ See *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 353 (1991) ("Decisions of this Court applying the 1909 Act make clear that the statute did not permit the 'sweat of the brow' approach.").

⁹⁰ See, e.g., *NBA v. Motorola, Inc.*, 105 F.3d 841, 852-53 (2d Cir. 1997) (holding that "hot news" misappropriation claims were permitted on the grounds that, without protection of property rights in this information, there would not be an incentive to collect and distribute time-sensitive news and the public would suffer accordingly).

Even then, the Copyright Act of 1976 may preempt the misappropriation claim.⁹¹ Machine-authored works are an excellent fit for a “hot-news” exception. The immediacy of the news being reported is the precise reason for using a machine author, and, if it becomes necessary to allocate rights to the end-user, limiting the scope of those rights to competition within the industry strikes a better balance for advancing the public interest. An end-user would be protected from potential competitors capitalizing on the timeliness of the end-user’s information, which is the fundamental value proposition of the machine-author software. At the same time, the public would not be prevented from using the works. The end-user would have no rightful claim against the public because allowing these claims would be detrimental to the public interest.

Granted, applying a quasi-property framework within the context of machine-authored works may require more nuance with machine-authored works than was required with their predecessors. One might argue that the quasi-property right effectively raises a first-to-market issue, allowing the fastest party to secure the quasi-property right and rendering everyone else an infringer. This would be problematic in the machine-author context, as the same software could be licensed out to multiple parties to generate works simultaneously, potentially rendering it impossible to determine who should hold the right. Furthermore, machines will always operate faster than humans, and a quasi-property treatment might render most journalism to be infringing.

Notably, in *INS*, the two parties did not independently generate works based on the same set of underlying facts. Rather, one party clearly misappropriated the efforts of the other. Thus, it could easily be the case that quasi-property rights are assigned to anyone who has created a work through her own efforts, with no liability in the absence of misappropriation. Such treatment would protect a content producer by continuing to punish infringers who obtain an unfair advantage through misappropriation while neatly circumventing the potential technical issues that could arise.

C. *Programmer Allocation: One-for-One Matching*

If copyright protection is granted directly to the programmer, the scope of protection should be very narrow in light of the potential for copyright stockpiling. For instance, the right of the programmer could be reduced to only protect against one-to-one copying of the underlying source, where infringement occurs only if an ordinary person applying contemporaneous

⁹¹ See *Barclays Capital Inc. v. Theflyonthewall.com, Inc.*, 650 F.3d 876, 878 (2d Cir. 2011) (finding that the plaintiffs’ “hot news” misappropriation claim was preempted by federal copyright law). *But see NBA*, 105 F.3d at 852 (concluding that “only a narrow ‘hot-news’ misappropriation claim survives preemption for actions concerning material within the realm of copyright”).

standards would find the work to be a direct copy. While this may raise some concerns of judicial activism, a standard with room for judicial discretion is not novel.⁹² Allowing courts to find infringement through a reasonable person test would empower victims of bona fide infringement to bring cases while deterring frivolous litigation.

Any stronger treatment, especially a broad general grant of copyright protection such as that which has historically been found in other media, would give the programmer far too much bargaining power, akin to a monopoly. This is especially true because, in practice, the programmer is likely to be a corporation.⁹³ With far more resources than any one individual, these entities are much more likely to protect their intellectual property through litigation. The hazards of affording copyright protection to a single programmer are thus greatly exacerbated by the for-profit nature of coders in application, making it all the more important that the copyright—should it be afforded to the programmer—be as thin as possible.

CONCLUSION

When the Crown of England first found it necessary to incentivize creativity, it passed the Statute of Anne 1710.⁹⁴ When Congress found a similar need in the United States, it passed the Copyright Act of 1790.⁹⁵ Since then, every amendment⁹⁶ and extension has been passed on the claim that it would promote creativity and benefit the public good.⁹⁷ Now, not for the first

⁹² For example, the Supreme Court had, in the context of obscenity, considered an “I know it when I see it” rule. *See* *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (“I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it, and the motion picture involved in this case is not that.”); *see also* *Miller v. California*, 413 U.S. 15, 30-34 (1973) (establishing a reasonable person test to determine obscenity).

⁹³ For a list of natural language processing startups with an average valuation of \$5.1 million a piece, *see* *Natural Language Processing Startups*, ANGELLIST <https://angel.co/natural-language-processing> [<https://perma.cc/V3E2-4S98>].

⁹⁴ 8 Anne c. 19 (Eng.).

⁹⁵ Act of May 31, 1790, 1 Stat. 124.

⁹⁶ For example, the subject category was expanded in 1909 from maps, charts, and books to all works of an author, and again in 1976 to an open list with eight major categories. *See* An Act to Amend and Consolidate the Acts Respecting Copyright, Pub. L. No. 60-349, 35 Stat. 1075 (1909); *see also* Copyright Act of 1976, Pub. L. No. 94-553, 90 Stat. 2541.

⁹⁷ *See, e.g.*, S. REP. NO. 104-315, at 3 (1996) (“[The Copyright Term Extension Act] will provide significant trade benefits . . . while ensuring fair compensation for American creators who deserve to benefit fully from the exploitation of their works. Moreover, by stimulating the creation of new works and providing enhanced economic incentives to preserve existing works, such an extension will enhance the long-term volume, vitality and accessibility of the public domain.”). Although this is the underlying policy argument, often in practice the amendments or extensions have had the opposite effect. *See, e.g.*, Steve Schlackman, *How Mickey Mouse Keeps Changing Copyright Law*, ART L.J. (Feb. 15, 2014), <http://artlawjournal.com/mickey-mouse-keeps-changing-copyright-law> [<https://>

time, we face the question of whether extending copyright protection to a new class of works—those created by machine authors—is to the benefit of the general public.

Journalism is only one application of machine-authorship. Similar programs are being created in fields as diverse as fractal analysis and music composition. As these machine-made programs become a common form of creative expression, the law must adapt to new technology if it is to fulfill its commitment to advancing the public interest.

Given the technological nature of the products and the incentive structure of the various parties, there are serious questions to consider before affording copyright protection to machine-authored works. On the one hand, the programmer can already copyright her software. It is not clear that allowing her to copyright the output of these programs would further incentivize her to write programs without severely handicapping public access. On the other hand, the end-user has commercial interests, which, in the digital age, incentivize using programs to publish news articles regardless of whether these articles are copyrightable. In light of these incentive structures, a strong argument can be made that, as a matter of public policy, machine-authored works should not be afforded any copyright protection. While these works would likely satisfy the established legal requirements of the Copyright Act and subsequent interpretations, there remain fundamental questions of authorship, allocation, and public benefit.

This generation of mechanical authors needs no legal motivation to generate creative works. Financial motivations and legal reasoning do not incentivize the machine author of the future. Although machine authorship is protected by existing copyright law, it would occur with or without additional legal protection. Regardless of whether or not the law grants copyright protection, programs will continue to work away with each passing moment, processing, computing, and creating. It would be meaningless and, indeed, against public policy to try to fit machine-authored works into current copyright law.

perma.cc/FJB3-EMRX] (discussing how Disney has lobbied to extend the copyright term every time Mickey Mouse was on the verge of entering the public domain).