COPYRIGHT IN THE ARTIFICIALLY INTELLIGENT AUTHOR: A CONSTITUTIONAL APPROACH USING PHILIP BOBBITT'S MODALITIES OF INTERPRETATION

Brian Golger[*]

INTRODUCTION

"It is often said that the greatest artists in the history of humanity are those who create art in an era of scarcity. In an age of abundance, artificial intelligence has the potential to be equally revolutionary in the world of art."

—OpenAI, GPT-2[1]

In October 2018, the sale of a portrait captured the imagination of art critics and science fiction fans alike. The painting, *Edmond de Belamy*, from *La Famille de Belamy* sold for $432,500 in an auction by Christie's.[2] The creator of this painting was not a famous French impressionist but rather a French art collective named Obvious—or more precisely, an algorithm created by Obvious.[3] The minds behind Obvious used a type of machine learning algorithm, a Generative Adversarial Network ("GAN"),[4] to enable artificial

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[1] This quote was generated using OpenAI's GPT-2 text generation system. The artificial intelligence of GPT-2 was trained on a dataset of eight million web pages with the objective of predicting the next word, given all of the previous words within some text. It is now capable of generating full paragraphs of coherent language. For example, a user can feed GPT-2 a fake headline and it will generate a story, or they can provide the first line of a poem and it will supply a whole verse. Alec Radford et al., *Better Language Models and Their Implications*, OPENAI (Feb. 14, 2019), https://openai.com/blog/better-language-models/; *see also* James Vincent, *OpenAI Has Published the Text-Generating AI It Said Was Too Dangerous to Share*, VERGE (Nov. 7, 2019), https://www.theverge.com/2019/11/7/20953040/openai-text-generation-ai-gpt-2-full-model-release-1-5b-parameters. The quote used here was generated from the input: "Who is the author of a piece of art generated by artificial intelligence?"

[2] Gabe Cohn, *AI Art at Christie's Sells for $432,500*, N.Y. TIMES (Oct. 25, 2018), https://www.nytimes.com/2018/10/25/arts/design/ai-art-sold-christies.html.

[3] *Id.*

[4] *See* Ian J. Goodfellow et al., *Generative Adversarial Nets* (Neural Info. Processing Sys. Conference Paper, 2014), *available at* https://arxiv.org/pdf/1406.2661.pdf; *see also* Thalles Silva, *An Intuitive Introduction to Generative Adversarial Networks (GANs)*, FREECODECAMP (Jan. 7, 2018), https://www.freecodeca

intelligence to create the painting.[5] Whereas great artists of the past would have honed their craft by practicing under the apprenticeship of master artists, Obvious's algorithm was fed with a data set of 15,000 portraits painted between the fourteenth and twentieth centuries that it used to "teach" itself what a portrait looks like.[6] The end result was a masterpiece that easily outsold the Warhol and Lichtenstein prints it hung across from, prompting Christie's to declare "the arrival of AI art on the world auction stage."[7]

In March 2019, Sotheby's joined the fray, becoming the second major auction house to auction off a piece of art generated by artificial intelligence.[8] That work, entitled *Memories of Passersby I*, was created by Mario Klingemann—a German artist and pioneer in the field of artificial intelligence art—and sold for £40,000.[9] Klingemann's work consists of a machine and two framed screens that work in real time to display portraits of male and female faces onto the screens.[10] Using a database of portraits from the seventeenth to nineteenth centuries, the work uses GANs to generate a portrait every few seconds.[11] The result is an endless stream of images, no two the same, that allows viewers to witness the artificial intelligence at work.[12]

While the price the paintings fetched is remarkable, the reality is machine authored works are nothing new. In the past few years, artificial intelligence

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mp.org/news/an-intuitive-introduction-to-generative-adversarial-networks-gans-7a2264a81394/ (explaining GANs consist of two different neural networks locked in a game, where the generator tries to reproduce data from a training set and the discriminator acts as a judge to decide whether the input comes from the generator or the true training set).

5   Cohn, *supra* note 2.

6   *Is Artificial Intelligence Set to Become Art's Next Medium?*, CHRISTIE'S (Dec. 12, 2018), https://www.christies.com/features/A-collaboration-between-two-artists-one-human-one-a-mac hine-9332-1.aspx.

7   *Id*.

8   James Vincent, *A Never-Ending Stream of AI Art Goes Up for Auction*, VERGE (Mar. 5, 2019), https://www.theverge.com/2019/3/5/18251267/ai-art-gans-mario-klingemann-auction-sotheby s-technology.

9   *Contemporary Art Day Auction*, SOTHEBY'S (Mar. 6, 2019), http://www.sothebys.com/en/auc tions/ecatalogue/2019/contemporary-art-day-auction-l19021/lot.109.html. While this price may be disappointing in comparison to Obvious's *Edmond de Belamy*, the sale does show a continuing viability of artificial-intelligence art.

10   Naomi Rea, *Sotheby's Is Entering the AI Art Fray, Selling a Surreal Artwork by One of the Movement's Pioneers This Spring*, ARTNET (Feb. 8, 2019), https://news.artnet.com/art-world/sothebys-artificial-intelligence-1460332.

11   Vincent, *supra* note 8.

12   *Id.*

has co-authored a short novel that almost won a literary prize,[13] reported an earthquake within three minutes of it occurring,[14] and generated a video game world featuring over eighteen quintillion planets.[15] Recently, teenage coder Robbie Barrat used artificial intelligence to generate a song in the style of Kanye West by feeding the algorithm six thousand of the rapper's lyrics.[16] While originally only capable of rearranging existing lyrics, the algorithm is now capable of writing its own songs entirely.[17] There are many artists in the budding field of artificial intelligence art who work with GANs and other types of machine learning to develop breathtaking works of art.[18] The artificial intelligence movement's use of open-source code allows many new entrants[19] and there is nothing to suggest this progress will slow down any time soon, considering the projected growth of artificial intelligence.[20]

The buzz surrounding the artificial intelligence art "revolution" has been shared by the legal world, as well. In the last five years, there have been a number of law review articles grappling with the implications machine authorship has on copyright law. So far, however, most of these articles have focused on whether there should be copyright in works generated by artificial

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13   Chloe Olewitz, *A Japanese AI Program Just Wrote a Short Novel, and It Almost Won a Literary Prize*, DIGITAL TRENDS (Mar. 23, 2016), https://www.digitaltrends.com/cool-tech/japanese-ai-writes-novel-passes-first-round-nationanl-literary-prize/.

14   Will Oremus, *The First News Report on the L.A. Earthquake Was Written by a Robot*, SLATE (Mar. 17, 2014), https://slate.com/technology/2014/03/quakebot-los-angeles-times-robot-journalist-writes -article-on-la-earthquake.html.

15   Simon Parkin, *No Man's Sky: The Game Where You Can Explore 18 Quintillion Planets*, GUARDIAN (July 12, 2015, 4:00 PM), https://www.theguardian.com/technology/2015/jul/12/no-mans-sky-18-quintillion-planets-hello-games.

16   ROBBIE BARRAT, NETWORKS WITH ATTITUDE (SoundCloud Mar. 1 2017), *available at* https://soundcloud.com/robbiebarrat/networks-with-attitude; Dave Gershgorn, *A West Virginia Teen Taught Himself How to Build a Rapping AI Using Kayne West Lyrics*, QUARTZ (Mar. 17, 2017), https://qz.com/920091/a-west-virginia-teen-taught-himself-how-to-build-a-rapping-ai-using-kan ye-west-lyrics/.

17   *Id.*

18   Naomi Rea, *Has Artificial Intelligence Brought Us the Next Great Art Movement? Here are 9 Pioneering Artists Who Are Exploring AI's Creative Potential*, ARTNET (Nov. 6, 2018), https://news.artnet.com/market/9-artists-artificial-intelligence-1384207.

19   *See* Tom Simonite, *We Made Our Own Artificial Intelligence Art, and So Can You*, WIRED (Nov. 20, 2018), https://www.wired.com/story/we-made-artificial-intelligence-art-so-can-you/ (detailing the author's efforts to create his own artificial intelligence art using existing code on GitHub).

20   *See Artificial Intelligence Market Size is Projected to be Around US$ 191 Billion by 2024*, MARKETWATCH (Aug. 8, 2018), https://www.marketwatch.com/press-release/artificial-intelligence-market-size-is-projected-to-be-around-us-191-billion-by-2024-2018-08-08 (projecting the artificial intelligence market to exceed $191 billion by 2024).

intelligence[21] or who should own the copyright in such works,[22] the implicit assumption being that copyright does in fact exist.[23] These articles all consider the question within the current framework of the Copyright Act without seriously considering the limitations imposed by the Constitution. Instead of framing the question as whether there *should* be copyright, an inquiry into whether there constitutionally *could* be copyright in works generated by artificial intelligence allows us to push on the basic premise that the impressive outputs generated by these algorithms can qualify for legal protection.

The Copyright Act draws its authority from the Constitution, and so any analysis of the copyrightability of a work of art must begin with our founding document. In Article I, Section 8, Clause 8 ("IP Clause"), the Constitution gives Congress the power "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."[24] The algorithms' outputs are works of art that are oftentimes indistinguishable from human works, so it may seem intuitive that a work by artificial intelligence can be protected by copyright. If an algorithm's painting is so similar to a human work of art as to pass the Turing Test,[25] why should it not be protected from unauthorized copying?

Congress's power under the IP Clause is not plenary. A proper reading of the IP Clause shows that Congress's authority is defined by five boundaries, none of which Congress may overreach.[26] One of these

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21 *See, e.g.*, Raquel Acosta, *Artificial Intelligence and Authorship Rights*, HARV. J. L. & TECH. DIGEST (Feb. 17, 2012), https://jolt.law.harvard.edu/digest/artificial-intelligence-and-authorship-rights ("If allowing AI developers to claim copyrights in their machine's output incentivizes more creative production, legislators should codify this copyright grant in the law."); *see also* Bruce Boyden, *Emergent Works*, 39 COLUM. J.L. & ARTS 377, 379 (2016) (offering a test for whether a person should be considered the author of a given work).

22 *See, e.g.*, Robert Yu, Comment, *The Machine Author: What Level of Copyright Protection is Appropriate for Fully Independent Computer-Generated Works?* 165 U. PA. L. REV. 1245, 1257–60 (2017) (considering the implications of finding the machine, programmer, or end-user as the author).

23 *See* Annemarie Bridy, *Coding Creativity: Copyright and the Artificially Intelligent Author*, 2012 STAN. TECH. L. REV. 5, 21 (2012) (assuming that the statutory definition could be amended to cover works where there is no human author).

24 U.S. CONST. art. I, § 8, cl. 8. Congress acted swiftly in exercising this power, passing the first Copyright Act in 1790. Act of May 31, 1790, ch. 15, 1 Stat. 124.

25 Developed by Alan Turing in 1950, a computer passes the Turing Test when it convinces a sufficient number of interrogators into believing that it is not a machine but rather is a human. *The Turing Test*, STAN. ENCYCL. OF PHIL. (Feb. 8, 2016), https://plato.stanford.edu/entries/turing-test/.

26 Dotan Oliar, The Origins and Meaning of the Intellectual Property Clause 50–51 (Sept. 15, 2004) (unpublished manuscript), *available at* https://cyber.harvard.edu/ip/oliar_ipclause.pdf. The five

limitations on congressional power is that protection under the clause is restricted to "authors and inventors."[27] Current copyright law has codified this limitation by requiring "works of authorship."[28] As Professor Annemarie Bridy notes, "who or what can be an author for purposes of the Copyright Act is ultimately a constitutional question."[29] In considering whether a work created by artificial intelligence can by copyrighted, the question then becomes whether a constitutionally acceptable "author" exists at all.

It should be noted that this Comment is not concerned with weak artificial intelligence, where humans control a predictable output.[30] In such a circumstance, the author would be the creative force who designed the program code with a specific outcome in mind.[31] The artificial intelligence would be more akin to an artist's paintbrush than the artist himself. There is also no question that programmers have a strong copyright in the code they write.[32] Rather, the analysis here focuses on the outputs of a strong type of artificial intelligence where the final product is emergent and difficult to foresee.[33]

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constitutional limitations are: copyrights can be granted only 1) "to promote the progress of science and useful arts"; 2) for "limited times"; 3) to "authors and inventors"; 4) to secure an "exclusive right"; 5) for "writings and discoveries." *Id.*

27   *See id.* (noting that "protection under the Clause is restricted to authors and inventors"); *see also* Ralph D. Clifford, *Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?*, 71 TULANE L. REV. 1675, 1700 (1997) (stating that the Constitution requires copyrights be extended only to "authors").

28   17 U.S.C. § 102(a) (2018).

29   Annemarie Bridy, *The Evolution of Authorship: Work Made by Code*, 39 COLUM. J.L. & ARTS 395, 398 (2016).

30   *See* Acosta, *supra* note 21 (differentiating weak artificial intelligence, which merely creates a program tailored to the narrow function, from strong artificial intelligence, which entails randomness, autonomy, and machine learning, so the human connection is much more attenuated).

31   For example, consider The Next Rembrandt, the artificial intelligence that digitized the painting method of Rembrandt. *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, 663–64 (2017). The algorithm there was designed with the explicit purpose to create works of art in the style of Rembrandt. Thus, there is a human programmer controlling the creative direction and output of the program who would probably qualify as the author.

32   *See* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1249 (3d Cir. 1983) (holding that a computer program, whether in object code or source code, is protected by copyright law).

33   *See* Boyden, *supra* note 21, at 378–79 (defining "emergent works" as "works that consist largely of creative elements that have emerged unbidden from the operation of the program" and cannot be traced directly to a human source). *But 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, 414–15 (2016) (arguing that we should think of computer "authored" works as computer "generated" because current artificial intelligence is not yet responsive to incentives or unpredictable enough, and that these computer-generated works are no different than other works).

As of now, the Copyright Office has taken the position that works by machines that operate randomly without any creative input from a human author, such as a mechanical weaving process that randomly produces irregular shapes in fabric without any discernable pattern, do not qualify as a work of human authorship.[34] However, as the popularity and value of artificial intelligence continues to grow, Congress may want to protect these works, and thus it is important to understand the constitutional limitations placed on Congress in expanding copyright protection.

Using a step-by-step method of constitutional interpretation, this Comment seeks to answer the question of whether the term "author" can be properly understood to encompass the creators of the algorithm, the algorithm itself, or whether there is no author, in which case it would be constitutionally impermissible to grant copyright to machine authored works.[35] Employing Professor Philip Bobbitt's modalities of constitutional interpretation, Part I seeks to analyze the different constitutional arguments Congress could make for extending copyright protection to works generated by artificial intelligence. Part II then reconciles the modalities to draw a conclusion regarding the constitutionality of extending copyright protection. This Comment concludes that a proper reading of the Constitution suggests that the programmer of the algorithm can be considered an "author," and thus Congress can extend copyright protection to works of artificial intelligence, even though the programmer may not fit the conventional definition of "author."

I. ANALYSIS

Over the course of three evenings in April 1979, Professor Philip Bobbitt shared with students and colleagues at the University of Texas School of Law what would become a revolutionary approach to constitutional interpretation. These lectures, recorded in a now famous law review article,[36] provided the groundwork for his later innovative works,

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34 *See* U.S. COPYRIGHT OFFICE, COMPENDIUM OF COPYRIGHT OFFICE PRACTICES § 313.2 (3d ed. 2017) (stating the Copyright Office "will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author").

35 *See* Yu, *supra* note 22, at 1265–66 (considering the consequences of immediate entry into the public domain because of lack of a legal author).

36 Philip Bobbitt, *Constitutional Fate*, 58 TEX. L. REV. 695 (1980).

Constitutional Fate[37] and *Constitutional Interpretation*,[38] where he lays out six modalities for understanding the meaning of the Constitution. Bobbitt's modalities have since become a dominant method to interpreting our founding document and have been influential in law classrooms around the country.[39]

As defined by Bobbitt, a modality is "the way . . . we characterize a form of expression as true."[40] In a constitutional sense, we can use modalities to characterize certain legal propositions as true.[41] The six modalities that Bobbitt lays out are as follows: historical, textual, structural, doctrinal, prudential, and ethical,[42] and "[t]here is no constitutional legal argument outside these modalities."[43] By employing the modalities to interpret the text of the IP Clause, and more specifically the term "author," this Comment concludes that Congress has strong arguments that the programmer of an artificially intelligent algorithm can constitutionally be considered the "author" for purposes of extending copyright protection to the algorithm's output, despite not fitting a conventional definition of author.

A. History

The first modality we use to interpret the meaning of the Constitution is history. A historical argument "rel[ies] on the intentions of the [F]ramers and [R]atifiers of the Constitution"[44] and "on a determination of the original understanding of the constitutional provision to be construed."[45] This may seem like a fruitless exercise—the Framers and Ratifiers could not have dreamed of a world where machines were creating their own works of art. If this technology did not exist at the time the Constitution was created, then

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37   PHILIP BOBBITT, CONSTITUTIONAL FATE: THEORY OF THE CONSTITUTION (1982).

38   PHILIP BOBBITT, CONSTITUTIONAL INTERPRETATION (1991).

39   *See, e.g.*, Akhil Reed Amar, *In Praise of Bobbitt*, 72 TEX. L. REV. 1703, 1703–04 (1994) (lauding Bobbitt's *Constitutional Fate* as "one of a handful of truly towering works of constitutional theory in the last half-century" and stating, "in every class I teach, and in everything I write, Bobbitt's book is in my mind, influencing and inspiring me").

40   BOBBITT, *supra* note 38, at 11.

41   *Id*. at 12.

42   *Id*. at 12–13.

43   *Id*. at 22.

44   *Id*. at 12; *see also, e.g.*, Marsh v. Chambers, 463 U.S. 783, 787–92 (1983) (tracing the long history of chaplains in Congress to find that prayer in the Nebraska legislature did not violate the Establishment clause); Dred Scott v. Sandford, 60 U.S. (19 How.) 393, 475 (1857) (relying on history to argue African Americans are not considered citizens for purposes of Article III diversity jurisdiction).

45   Bobbitt, *supra* note 36, at 700.

how could the Framers' intentions have any relevance? While the Framers undoubtedly did not anticipate the technology we have today, their understanding of the word "author" and their interpretation of the IP Clause can provide insight into whether machine-authored works can qualify for copyright.

A common method for determining the original meaning of the Constitution is to look at dictionaries that existed during the Founding Era.[46] This technique allows us to discover the meaning of the Constitution's words as they were commonly used and understood.[47] Most of these period dictionaries define "author" as some variant of, "[t]he first mover of any thing . . . the efficient cause of any thing."[48] Other definitions have included the phrase, "[t]he first beginner . . . of any thing"[49] or, "[t]he prime or first cause of a thing."[50] In Noah Webster's dictionary, "author" was defined as "one who produces, creates or brings into being; as, God is the author of the Universe."[51] What all these definitions have in common is some sense of a creator that brings something into being or is the cause. While some of these definitions provide the example of a writer of a book as a common use of "author,"[52] the definition is in no way restricted to such interpretation.

Using this objective approach to the word "author," it is conceivable that the programmer is the author of the program's outputs. Obvious's *Edmond de Belamy* portrait could not have been created without the code developed by programmers, and so programmers can be understood to be the "first mover" of the painting. Similarly, using the Copyright Office's example of

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46   Gregory E. Maggs, *A Concise Guide to Using Dictionaries from the Founding Era to Determine the Original Meaning of the Constitution*, 82 GEO. WASH. L. REV. 358, 365 (2014) (citing to Justice Scalia for frequently using period dictionaries to determine the "original meaning" of the text).

47   *Id*. at 364–65.

48   *See, e.g.*, *Author*, 1 JOHN ASH, THE NEW AND COMPLETE DICTIONARY OF THE ENGLISH LANGUAGE (1775), *available at* http://books.google.com/books?id=LDNAAAAAYAAJ; *see also Author*, 1 NATHAN BAILEY, THE NEW UNIVERSAL ETYMOLOGICAL ENGLISH DICTIONARY (4th ed. 1756), *available at* http://books.google.com/books/?id=HXQSAAAAIAAJ.

49   *See Author*, SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE (10th ed. 1792) [hereinafter Samuel Johnson Dictionary], *available at* http://books.google.com/books?id=j-UIAAAAQAAJ. Professor Maggs has declared the Samuel Johnson Dictionary as "one of the most authoritative eighteenth-century dictionaries." Maggs, *supra* note 46, at 359; *see also* Eldred v. Ashcroft, 537 U.S. 186, 199 (2003) (relying on the Samuel Johnson Dictionary to interpret the word "limited" in the IP Clause).

50   *See Author*, THOMAS DYCHE & WILLIAM PARDON, A NEW GENERAL ENGLISH DICTIONARY (18th ed. 1781), *available at* http://books.google.com/books?id=xOcIAAAAQAAJ.

51   *See Author*, 1 NOAH WEBSTER, AN AMERICAN DICTIONARY OF THE ENGLISH LANGUAGE (1828), *available at* https://archive.org/stream/americandictiona01websrich#page/n7/mode/2up.

52   *Id*.

a mechanical weaving process that randomly produces irregular shapes,[53] the machine's creator is also the "first mover." As God created the universe, so too does the programmer create the algorithm. Surely one can "create" or "cause" or "begin" some work of art without knowing what the outcome will look like. The programmer is the "prime" of the work of art because she is the first in a chain of events that leads to the painting's creation.

The definitional case for the program as the author is also plausible. In many of the definitions, there is no use of a pronoun to limit the author to a human individual. The common use of God as an author is an example of how the word was used beyond the context of human individuals.[54] Intuitively, it makes sense that Obvious's algorithm and the weaving machine produced or created their works of art, and according to these period definitions, the act of creation need not be limited to humans.[55] While creativity is a limitation in today's copyright laws,[56] these period definitions contain no mention of a creativity requirement or any kind of mental process, which would limit the understanding of the algorithm as an author.

However, to get a full picture of the Framers' intentions, we need to look beyond basic definitions.[57] The Federalist Papers were written in the fall of 1787 and spring of 1788 by Alexander Hamilton, James Madison, and John Jay, urging ratification of the Constitution.[58] This collection of eighty-five essays gives modern scholars an invaluable look into the Constitution as understood by the Framers, Ratifiers, and the public. As Professor Gregory Maggs has noted, "academic writers and jurists have cited the Federalist Papers as evidence of the original meaning of the Constitution more than any other historical source except the text of the Constitution itself."[59] Any

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53   U.S. COPYRIGHT OFFICE, *supra* note 34.

54   *See* Oliar, *supra* note 26, at 85 (citing to the *Journals of the Continental Congress* for evidence that God was commonly referred to as "the author of man").

55   *But see* Naruto v. Slater, No. 15-cv-04324, 2016 WL 362231, at *3 (N.D. Cal. Jan. 28, 2016) ("[T]he Copyright Act does not 'plainly' extend the concept of authorship or statutory standing to animals."), *aff'd on other grounds,* 888 F.3d 418 (9th Cir. 2018).

56   *See* Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 362 (1991) (denying copyright protection to a work for being "devoid of even the slightest trace of creativity"); s*ee also* Bridy, *supra* note 23, at 27–28 (concluding that a machine's "creativity" is "something other than (but owing to) the human creativity of its coder").

57   *See* Maggs, *supra* note 46, at 364 (stating that dictionaries are usually only used as evidence of "objective" meaning).

58   Gregory E. Maggs, *A Concise Guide to the Federalist Papers as a Source of the Original Meaning of the United States Constitution*, 87 B.U. L. REV. 801, 802 (2007).

59   *Id.*; *see also, e.g.*, Printz v. United States, 521 U.S. 898 (1997) (invoking the Federalist Papers throughout the opinion as evidence of original intent).

historical interpretation of the Constitution would be incomplete without an examination of the Federalist Papers.

The only Federalist Paper which refers to the IP Clause is Federalist 43, written by James Madison, which makes short work of the clause, declaring, "[t]he utility of this power will scarcely be questioned."[60] However, Madison does state that the "public good [of copyrights] coincides . . . with the claims of individuals."[61] Thus, we can understand the public good of copyright law as stemming from the individual creators. A programmer could fit into this understanding, but an algorithm in this sense is not an individual that can lay a claim to its creation.

Federalist 43 also makes clear that the American idea of copyright stems from British common law.[62] As stated by Lord Mansfield, the source of common law for copyright is "that an author should reap the pecuniary profits of his own ingenuity and labor."[63] This same emphasis on natural rights as the foundation for copyright is also expressed in some colonial statutes.[64] In the colonial period, a committee including James Madison was formed to consider the best way to protect and promote the useful arts.[65] On May 2, 1783 the committee concluded that "nothing is more properly a man's own than the fruit of his study, and that the protection and security of literary property would greatly tend to encourage genius."[66]

The algorithm does not produce works that are the labor of its mind, nor does it need any kind of encouragement or incentive to create. The algorithm does not have a natural right to anything. Thus, while the Ratifiers

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[60]   THE FEDERALIST NO. 43, at 222 (James Madison) (Gideon ed., 2001).

[61]   *Id.*

[62]   *See id.* ("The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law.").

[63]   1 WILLIAM F. PATRY, COPYRIGHT LAW AND PRACTICE 3–14 & n.6 (1994) (citing Millar v. Taylor (1769) 98 Eng. Rep. 201, 252); *see also* Bridy, *supra* note 23, at 4 (finding that the Framers used England's Statute of Anne as a model, in which the notion of the author as originator merged with Locke's theory of possessive individualism).

[64]   For example, New Hampshire's colonial copyright statute stated that "the legal security of the fruits of [an ingenious person's] study and industry . . . is one of the natural rights of all men, there being no property more peculiarly a man's own than that which is produced by the labor of his mind." U.S. COPYRIGHT OFFICE, BULL. NO. 3, COPYRIGHT ENACTMENTS: LAWS PASSED IN THE UNITED STATES SINCE 1783 RELATING TO COPYRIGHT 8 (1973), *available at* https://www.copyright.gov/history/Copyright_Enactments_1783-1973.pdf.

[65]   PATRY, *supra* note 63, at 14–22.

[66]   *Id.* (citing 24 JOURNALS OF THE CONTINENTAL CONGRESS 211 (1783)). The committee's sentiments also seem to invoke Hegel's personality theory, which regards "property as playing a central role in defining every person's distinct personality." Christopher S. Yoo, *Rethinking Copyright and Personhood*, 2019 U. ILL. L. REV. 1039, 1050 (2019).

could not even begin to comprehend the artificial intelligence revolution, their understanding of "author" would likely not include an algorithm.

It is less clear whether the programmer can be considered the author in a situation of strong artificial intelligence. A piece of strong artificial intelligence, like a mechanical weaving process that randomly produces irregular shapes, creates outputs that are unforeseen by the programmer. There is no way for the programmer to know what his program will produce. The programmer's code is unquestionably the "fruit of his study" and is the "profit of his ingenuity," but as mentioned earlier, the copyright in his code is not at issue here. The final output is not necessarily a "product of his mind" as much as it is a product of the algorithm's "mind." It is a stretch to say that the Framers' understanding of "author" would include either the programmer or algorithm. Thus, while Congress could argue for a broad definitional interpretation of "author," the historical understanding of the term suggests that neither the programmer nor algorithm can constitutionally be considered an author.

B. Text

The next modality of constitutional interpretation looks at the plain text of the Constitution.[67] A textual argument "look[s] to the meaning of the words of the Constitution alone, as they would be interpreted by the average contemporary 'man on the street.'"[68] This method is contained to the text and does not consider anything outside the scope of the words of the Constitution. Our understanding of the text can change over time, though.[69]

In this case, the plain text reads, "[t]he Congress shall have Power . . . 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."[70] The crux of this analysis turns on the word "author" because the Constitution does not permit copyright in any work of art that comes into existence, but only those created by authors. However, there is nothing in the Constitution that describes who or what an author is.

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67 BOBBITT, *supra* note 38, at 12.

68 *Id*.

69 *Compare* Olmstead v. United States, 277 U.S. 438, 464 (1928) (finding that wiretapping *does not* fit the definition of "search and seizure" since there is no physical taking of evidence or entry into the home) *with* Katz v. United States, 389 U.S. 347, 353 (1967) (finding that wiretapping *does* fit within the meaning of "search and seizure" of the Fourth Amendment and that the electronic device did not physically penetrate the wall of the telephone booth was of "no constitutional significance").

70 U.S. CONST. art. I, § 8, cl. 8.

The most common understanding of an author is probably a human individual who writes a book, but "author" can also plainly be understood to mean "one that originates or creates something."[71]

There is enough room here for Congress to argue that, strictly based on the text of the Constitution, the programmer could be interpreted as the "originator" of a piece of work created by his code. A broader reading of the Constitution could also be made to include an algorithm as an author because the algorithm could properly be understood by a person on the street as "creating" the work of art. The text of the Constitution is broad enough to support arguments for copyright protection.

This is not the end of our analysis, however, as a strong textual argument will also look at the clause's location within the text of the Constitution and its relationship with the rest of the document. An example of this type of "intratextual" argument can be seen in Chief Justice Marshall's canonical[72] opinion in *McCulloch v. Maryland*.[73] The argument is clearly presented by Professor Akhil Amar.[74] In *McCulloch*, the state of Maryland claimed that the Necessary and Proper Clause, "though in terms of a grant of power, is not so in effect; but is really restrictive."[75] Looking to the text, Chief Justice Marshall rejected this argument, reasoning that had the clause been designed to restrict rather than grant power, its text would have been worded differently.[76] The Necessary and Proper Clause is located in Article I, Section 8 of the Constitution—a part of the Constitution that grants Congress power.[77] If the clause was meant to be restrictive, it would have been negatively written "in terms resembling these[:] . . . 'no laws shall be passed but such as are necessary and proper.' Had the intention been to make this clause restrictive, it would unquestionably have been so in [grammatical and syntactical] form as well as in effect."[78]

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71 *See Author*, MERRIAM-WEBSTER DICTIONARY, https://www.merriam-webster.com/dictionary/author (defining "author" as "the writer of a literary work (such as a book)" or "one that originates or creates something").

72 *See* AKHIL REED AMAR, AMERICA'S UNWRITTEN CONSTITUTION 22 (2012) ("[T]o read *McCulloch* is to behold the art of constitutional interpretation at its acme").

73 17 U.S. (4 Wheat.) 316 (1819).

74 Akhil Reed Amar, *Intratextualism*, 112 HARV. L. REV. 747, 750–51 (1999).

75 *McCulloch*, 17 U.S. (4 Wheat.) at 412.

76 *Id.* at 420.

77 *See* U.S. CONST. art. I, § 8, cl. 18. ("The Congress shall have Power . . . To make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the Government of the United States, or in any Department or Officer thereof.").

78 Amar, *supra* note 74, at 751 (quoting *McCulloch*, 17 U.S. (4 Wheat.) at 420).

Just like the Necessary and Proper Clause, the IP Clause is located in Article I, Section 8 granting power to Congress. The IP Clause, properly considered within the text of the Constitution, should be understood not as a restriction of power but expansion of congressional authority. Following Chief Justice Marshall's logic in *McCulloch*, if the clause was meant to be restrictive it would have been written negatively like this: "no rights shall be secured except for those by authors to their respective writings." The clause is not written this way, however, and is located in a section of the Constitution explicitly granting Congress power. Thus, while the "man on the street's" definition of "author" may be too ambiguous to be helpful, a strong textual argument can be made that Congress does have the authority to extend copyright protection to the work of a programmer or even an algorithm that does not fit the conventional definition of "author."

C. Structure

The structural modality of constitutional interpretation is less intuitive than a historical or textual argument, but just as important. Tracing its origins back to *McCulloch v. Maryland*,[79] this modality relies on the relationships created by the Constitution among the structures it sets up.[80] A structural argument first sets out an uncontroversial statement about a constitutional structure, then infers a relationship from this structure, followed by a factual assertion about the world, and finally a conclusion is drawn.[81]

Here, the chain of logic is as follows: 1) the Constitution, through the IP Clause, grants Congress the power to assign exclusive rights to authors to "promote the progress of science and useful arts"; 2) we can then infer that this power gives rise to congressional authority to structure copyright law in a way that achieves this goal; 3) if works by artificial intelligence are not eligible for copyright protection, this goal is not achieved; 4) therefore, Congress can expand the meaning of "author" to include the programmer or the program, thus extending copyright protection to works created by artificial intelligence.

Step one is undisputed and step two flows naturally from step one. If Congress has the power to promote the progress of science and the useful

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79   *See McCulloch*, 17 U.S. (4 Wheat.) at 327–28 (making a structural argument that a state, whose officials are elected by the state's constituency, cannot tax the federal government and thus tax a nationwide constituency).

80   BOBBITT, *supra* note 38, at 12–13.

81   *Id*. at 16.

arts, then it must be able to structure copyright law in a way that achieves this. The Constitution does not describe how copyright law should look, nor does it define "author," but rather defers to Congress to iron out the details. The potentially problematic assumption is step three. Because Congress has the power to assign rights to promote the progress of science and useful arts and has deference to structure copyright law in a way to achieve this goal, in order to assign rights to machine-authored works in a constitutionally permissible way, the use of copyright law must promote the progress of science and useful arts.[82]

The best argument that artificial intelligence needs copyright protection relies on an incentive theory. The idea is that copyright law is trying to advance a social goal—the promotion of science and the useful arts—but there is an inherent under-production problem, also known as a lighthouse problem.[83] This under-production is caused by non-rivalrous consumption and non-excludability of benefits—non-rivalrous because the consumption of intellectual property is not diminished by others and non-excludable because even those who do not pay can enjoy the works. This country's solution to incentivize creation of intellectual property is not to give money to authors but rather to give them legal exclusivity.

Here, the problem is that without protection, there would be no way for programmers to control who uses their algorithms' artistic creations. It would be much more expensive for programmers to create works than for copyists to reproduce, and thus there would be insufficient incentive to create algorithms that produce useful works. The capability of artificial intelligence will only continue to grow and is surely valuable in promoting science and the useful arts. Because fewer useful algorithms, and therefore fewer works, would be produced without legal protection, Congress is permitted to extend copyright protection to works created by artificial intelligence, even if neither

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82 *See Copyright and Technological Change: Hearings Before the Subcomm. on Courts, Civil Liberties, and the Admin. of Justice of the House Comm. on the Judiciary,* 98th Cong. 130–31 (1983) (statement of Richard H. Stern) (testifying that Congress only has the power to legislate copyright law in ways that will promote science and the useful arts, not to "create private fortunes" without benefiting the public).

83 The Lighthouse is commonly used to illustrate the economic issues associated with non-exclusivity and lack of rivalry. A lighthouse cannot provide its light to paying boats without also providing light to non-paying boats. The consumption of the light by one boat does not diminish the amount of light available to other boats. Thus, the revenue generated by the lighthouse will fall short of the social value it creates, resulting in an under-production of lighthouses. *See* John Stuart Mill, *Principles of Political Economy*, *in* 3 COLLECTED WORKS OF JOHN STUART MILL 968 (J.M. Robson ed., 1965) (describing the lighthouse example).

the programmer nor the program fits under the conventional understanding of an "author."

The incentive theory is not without its critics. One criticism is that as humans we do not need incentive to be creative. There is some inner drive in humans that compels us to create, even if there is not legal protection for our creations. For example, Obvious, the art collective that recently sold its *Edmond de Belamy* painting for over $400,000, seems to have motivations that are not purely monetary. Obvious strives to "explain and democratize [advances in artificial intelligence and machine learning] through [their] artworks."[84] When asked why they created an algorithm that produces paintings, the Obvious coders responded, "we found that portraits provided the best way to illustrate our point, which is that algorithms are able to emulate creativity."[85] The intellectual curiosity that motivates coders to create artificial intelligence in the first place may not need the legal protection of copyright. Additionally, the artificial intelligence itself does not have any motives or desires, and thus needs no incentive to create works.

Another criticism is that we do not want to make it difficult to access works, and copyrights inherently make it more difficult for the public to access the works. If copyrights were extended to artificial intelligence, there would be an extra cost on society to access the works, which would run against the "public good."[86] In a possible near future where artificial intelligence becomes even more efficient at producing high-quality works of art, it may be in the public's best interest to have open access to these works.

Despite these criticisms, however, the incentive theory is still dominant in the realm of copyright law.[87] Notwithstanding a textual or historical argument, Congress could make a plausible structural argument that it has the power to extend copyright protection to machine authored works as long as doing so promotes the progress of science and the useful arts, even if

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84 *About Us*, OBVIOUS ART, http://obvious-art.com/about-us.html (last visited Jan. 18, 2020).

85 Jimmy Im, *This Portrait Made by A.I. Just Sold for $432,000—That's 40 Times the Original Estimate*, CNBC (Oct. 25, 2018, 2:40 PM), https://www.cnbc.com/2018/10/25/portrait-made-by-artificial-intelligence-sold-for-432k-at-christies.html.

86 THE FEDERALIST NO. 43, at 222 (James Madison) (Gideon ed., 2001).

87 *See* Mazer v. Stein, 347 U.S. 201, 219 (1954) ("The economic philosophy behind the [IP Clause] 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 in 'Science and useful Arts.'"); *see also* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 584 (1994) (quoting JAMES BOSWELL, 3 LIFE OF SAMUEL JOHNSON 19 (G. Hill ed., 1934) (1791) ("No man but a blockhead ever wrote, except for money.")).

neither the programmer nor the program fit under an intuitive understanding of "author."

D. Doctrine

A doctrinal argument applies rules generated by precedent.[88] This modality looks at principles generated from caselaw that construes the Constitution and interprets it accordingly.[89] It should be noted, however, that this modality's "operation is not confined to the application of stare decisis . . . . The Court is entitled, indeed obligated, to overrule itself when it is persuaded that a particular precedent was wrongly decided and should not be applied."[90] Thus, doctrine can guide us on how to interpret the Constitution, but a particular court ruling is not the end of the analysis.

There has never been a case squarely addressing copyright in artificial intelligence, but there have been a number of cases regarding who can be considered an author.[91] For the purposes of this Comment, the most direct case is *Burrow-Giles Lithographic Co. v. Sarony*.[92] Set in the 1880s, the Court tackled the controversy surrounding the cutting-edge technology of its day: whether "congress had and has the constitutional right to protect photographs and negatives thereof by copyright."[93] The petitioners made the argument that a photograph is not the production of an author, and therefore cannot qualify for copyright protection.[94] Acknowledging the constitutional nature of this question, Justice Miller went on to define an "author" as "he to whom anything owes its origin; originator; maker; one who completes a work of science or literature."[95]

The Court ultimately found that the Constitution was "broad enough to cover an act authorizing copyright of photographs, so far as they are representatives of original intellectual conceptions of the author."[96] While a camera uses a mechanical process to create a photograph, the author is ultimately the one who selects and arranges the photo shoot entirely from

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88 BOBBITT, *supra* note 38, at 13.

89 *Id*. at 18.

90 *Id*. at 20.

91 *See, e.g.*, Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 345–46 (1991) (stating that "author" presupposes a degree of originality, requiring independent creation and a minimal degree of creativity).

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

93 *Id*. at 55.

94 *Id*. at 56.

95 *Id*. at 57–58.

96 *Id*. at 58.

"his own original mental conception."[97] The Court suggested that it is the artist's "intellectual invention" that makes him the author and cited the English case *Nottage v. Jackson* for support.[98]

If analyzed in a vacuum, this case seems to show that there is no author in a work generated by artificial intelligence. The algorithm certainly does not have a mental conception and in a truly emergent or unforeseen work, such as the weaving machine that produces random designs, the patterns cannot fairly be considered the programmer's intellectual invention.

However, our conception of "author" does not exist in a vacuum but has evolved over the years. One striking example is that employers were not recognized as authors.[99] The Copyright Act of 1909 was the first statute to state that the employer was the "author" in the case of "works made for hire."[100] In *Picture Music, Inc. v. Bourne*, the Second Circuit found that Walt Disney and Irving Berlin were the authors of a song, even though it was actually written by the plaintiff and one of Irving's employees.[101] The court found that Disney and Berlin were the "motivating factors" in the composition of the new song, and having taken the initiative to hire the plaintiff, they had the power to "accept, reject, or modify her work."[102] Professor Peter Jaszi has found the effect of this decision was that the Romantic conception of "authorship" was "disaggregated from the associated component of intellectual and physical labor."[103]

In the case of works authored by artificial intelligence, the algorithm or machine can be viewed as an "employee" and the programmers as the employers, and ultimately the authors. Even though the algorithm is undertaking the actual labor of producing the works, it is the programmer who takes the initiative to create and instruct the algorithm. Whatever the algorithm creates, the programmers have the ultimate decision to accept, reject, or modify the work. Authorship is no longer thought of in the strictly individualistic sense from the nineteenth century and can instead be

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97   *Id.* at 60.

98   *Id.*; *see also* Nottage v. Jackson [1883] 52 QB 760 at 769 (Eng.) ("In my opinion, 'author' involves originating, making, producing, as the inventive or mastermind, the thing which is to be protected, whether it be a drawing or a painting or a photograph.").

99   *See, e.g.*, *Nottage*, 52 QB at 767 (explaining that a person who employs someone to paint a picture of a lady "with a dog at her feet, and in one hand holding a flower" is not the author just because he has the idea).

100   Peter Jaszi, *Toward a Theory of Copyright: The Metamorphoses of "Authorship,"* 1991 DUKE L.J. 455, 487 (1991).

101   Picture Music, Inc. v. Bourne, Inc., 457 F.2d 1213, 1217 (2d Cir. 1972).

102   *Id.*

103   Jaszi, *supra* note 100, at 489.

understood as the party who is the "inspiration" of the work, which in this case belongs to the programmers. While Professor Bridy has noted that works of artificial intelligence cannot be considered works made for hire under current copyright law,[104] this analogy shows that the Court's understanding of authorship is flexible and has changed over time.

Recent precedent also suggests that Congress has broad discretion in expanding copyright law and courts will generally find congressional changes in copyright law to be consistent with the Constitution. In *Eldred v. Ashcroft*, the plaintiff challenged the 1998 Copyright Term Extensions Act, arguing that it violated the "limited Times" restriction in the IP Clause.[105] Specifically, the plaintiff's argument was that extending copyright protection to existing works meant the work is protected indefinitely, not for a limited time.[106] Writing for the majority, Justice Ginsburg rejected this argument in part by pointing to a number of instances where the courts deferred to Congress's decisions regarding copyright law.[107] While acknowledging that the IP Clause's primary objective is to "promote the progress of science and useful arts," she wrote, "[w]e have also stressed, however, that it is generally for Congress, not the courts, to decide how best to pursue the Copyright Clause's objectives."[108] The Court went on to hold that "[t]he Copyright Clause . . . empowers Congress to *define* the scope of the substantive right."[109]

While it may not be obvious or intuitive that a programmer or algorithm is an "author" of the work generated by the artificial intelligence, the courts will defer to Congress in deciding who qualifies as an author and thus the scope of copyright protection. If Congress can show an enactment extending copyright protection to works of artificial intelligence is "rational," judges will defer.[110] If we interpret the *Eldred* decision as evidence of judicial deference to congressional legislation of copyright law, then we should expect that a court would find congressional expansion of copyrights to artificial intelligence to be constitutionally sound.

The historical practice regarding copyright law mirrors both the doctrinal development of a liberal interpretation of "author" and a deference

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104   Bridy, *supra* note 23, at 27.

105   Eldred v. Ashcroft, 537 U.S. 186, 193 (2003).

106   *Id.* at 193–94.

107   *Id.* at 212–13.

108   *Id.* at 212–13, 215.

109   *Id.* at 218 (emphasis in original).

110   *See id.* at 208 (finding that the Act's extension of protection is "rational" and holding that "we are not at liberty to second-guess congressional determinations and policy judgments of this order, however debatable or arguably unwise they may be.").

to Congress. The reality is that copyright law has moved exclusively toward more protection.[111]	Every new technology has been granted more protection, not less. For example, the Statute of Anne, the first copyright act in England, protected only printed books,[112] but the American Copyright Act of 1790 covered maps, charts, and books.[113] Today copyright law protects an open list of works, including: literary works; musical works; dramatic works; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; and architectural works.[114] While there may be constitutional limits to extending copyright protection, Congress has consistently found the best way to encourage progress is by expanding copyright protection.

E. Prudence

A prudential argument breaks from the previous modalities by considering the practical effects of an outcome and "seeking to balance the costs and benefits of a particular rule."[115] No constitutional decision exists in a theoretical bubble, and the practical effects of a particular rule should be analyzed.	These costs and benefits depend on political or economic realities.[116] Professor Bobbitt makes clear that a prudential argument cannot be the sole basis of a constitutional decision but can establish a predicate for the action.[117]

Here, we must consider the pros and cons of providing copyright protection to works of artificial intelligence. One of the main benefits of providing copyright protection is the creation of more useful artificial intelligence technology. The United States Government wants to incentivize programmers to create more algorithms that produce beautiful and useful works, and extending copyright law is a way to do this. If we buy into the notion that there needs to be an incentive structure to create more artificial intelligence, then this is a strong prudential argument for protecting machine-authored works.

111	This type of argument proved powerful in *Eldred*, where Justice Ginsburg relied on the history of congressional practice of extending the terms of copyright. *Id.* at 200–01.

112	Statute of Anne, 8 Ann., c. 19 (1710) (Eng.).

113	Act of May 31, 1790, ch. 15, 1 Stat. 124 (1790).

114	17 U.S.C. § 102(a) (2018).

115	BOBBITT, *supra* note 38, at 13.

116	*Id*. at 17; *see also, e.g.*, Home Bldg. & Loan Ass'n v. Blaisdell, 290 U.S. 398, 444 (1934) (finding that the Minnesota state government properly exercised "the reserved power of the State to protect the vital interests of the community" in responding to an emergency).

117	BOBBITT, *supra* note 38, at 16.

Another benefit of protecting artificial intelligence works is simply the availability of more works to the public. Copyright law does not get into the business of evaluating the quality of a work of art,[118] but the production of more works of art is good for society. With artificial intelligence, society will have more books, faster news reports, and more paintings. Without a legal structure that incentivizes the creation of artificial intelligence, society would miss out on these potential benefits.

There are also costs associated with extending copyright protection, however. For one, there is the issue of copyright ownership. A complicated piece of code requires many different programmers and often involves open source code. Can a programmer who was involved with just a section of the code really lay legal claim to a painting produced by the completed algorithm? For example, Obvious was criticized for using a piece of code created by a teenager on GitHub, an open source software development platform, in creating its *Edmond de Belamy* painting.[119] Should the teenager receive a copyright for the output of Obvious's algorithm? The issue of copyright ownership may also require Congress to delve into the existential question of whether the artificial intelligence can qualify for legal personhood.[120] This Comment does not probe the issue of ownership, but it must be considered when weighing the costs and benefits of extending copyright protection.

Another important issue is the cost to the public of a world with more copyrights. Copyright law acts as an incentive for authors to produce more works but can lead to supracompetitive pricing as a result of a legal monopoly on the work. In a possibly not-so-distant future where artificial intelligence is producing a large amount of the art and literature we consume, the copyright owners can charge a high price for their algorithms' outputs. Especially in a scenario where just a few corporations dominate the field of artificial intelligence,[121] a legal monopoly over the output of the artificial

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118   *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.").

119   Tom Simonite, *How a Teenager's Code Spawned a $432,500 Piece of Art*, WIRED (Nov. 20, 2018), https://www.wired.com/story/teenagers-code-spawned-dollar-432500-piece-of-art/.

120   *See* Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231 (1992) (asking whether an artificial intelligence can become a legal person).

121   *See* Tiernan Ray, *Google Has the All-Important AI Edge Over Microsoft*, THESTREET (Dec. 28, 2018), https://www.thestreet.com/investing/stocks/google-ai-edge-over-microsoft-14821147 (describing the dominance of Google and Microsoft in the market of machine learning).

intelligence could mean a shift of costs to the public and less public access to these works.

Congress should also be aware of the distributional effects of replacing human authors with artificially intelligent ones. As artificial intelligence grows in efficiency, human artists that cannot compete will be displaced. Of course, many jobs are already in danger of "computerisation," and occupations requiring creativity, like authors or fine artists, are not currently at high risk of displacement.[122] Extending copyright protection to works of artificial intelligence, however, would likely exacerbate displacement by allowing creators of the algorithms to monetize their programs' outputs. This may also favor large corporations who have the resources to create innovative algorithms at the expense of individual artists.

In addition to the increased administrative and litigation costs that come with expanding copyright law, extending copyright protection could lead to a chilling effect on future creativity. We are currently living in a "remix age" where creativity depends on existing works. By providing copyright to the works of artificial intelligence, Congress may be giving too much protection to the original creators and stifling the creativity of those who are inspired to create derivative works. Thus, as artificial intelligence is able to create more works faster, the costs imposed on society by an expansive copyright scheme may outweigh the benefits to the owners of the copyrighted works. As noted earlier, however, incentive theory drives much of the policy behind copyright law, and thus Congress still has a powerful prudential argument to extend copyright protection.

F. Ethos

An ethical argument "deriv[es] rules from those moral commitments of the American ethos that are reflected in the Constitution."[123] The idea is that the American people have a distinct national identity with certain traditions and beliefs that are embedded in the Constitution.[124] Professor

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122 Carl Benedikt Frey & Michael A. Osborne, *The Future of Employment: How Susceptible are Jobs to Computerisation?*, 114 TECH. FORECASTING & SOC. CHANGE 254, 270–71 (ranking "fine artists, including painters, sculptors, and illustrators" and "writers and authors" as at a relatively low risk of "computerisation," around the same as lawyers).

123 BOBBITT, *supra* note 38, at 13.

124 BRANDON J. MURRILL, CONG. RESEARCH SERV., R45129, MODES OF CONSTITUTIONAL INTERPRETATION 20 (2018), *available at* https://fas.org/sgp/crs/misc/R45129.pdf; *see also, e.g.*, Moore v. City of East Cleveland, Ohio, 431 U.S. 494, 503–04 (1977) (plurality opinion) (striking down an Ohio zoning ordinance that limited occupancy of a dwelling unit to members of a single

Bobbitt found this type of argument covered the "patch[es] of uncolored text," where a judicial opinion "contains expressions of considerable passions and conviction" not seen in the other modalities.[125] It is important to note, however, that this modality is not a moral argument generally.[126] Thus, we are not concerned with moral implications for considering a programmer or program as the author, but rather the American tradition and moral commitments reflected in the Constitution.

Limited government is a fundamental American constitutional ethos, and here, the Constitution limits congressional power to extend copyright protection only to works of authors.[127] This limitation and others, such as "for limited times" and "to promote science and useful arts," are important in recognizing the American ethos of limited government. The Framers were simultaneously providing Congress powers but also limiting its authority to prevent any potential for abuse. One example of copyright abuse is the creation of monopolies. Copyright law effectively grants a legal monopoly to the holder of the copyright. The Framers were fundamentally opposed to monopolies,[128] and while James Madison's arguments for the necessity of the IP Clause ultimately won, he also wrote that monopolies must be "guarded with strictness agst [sic] abuse."[129] In a potential future where many works are generated by artificial intelligence, extending copyright protection could give the corporations that create the algorithms a huge control over the public. Congress should not be able to blur the boundaries of the IP Clause to interpret "author" in such a way that would harm the public by giving monopolistic power to corporations in the business of artificial intelligence.

Next to limited government in the pantheon of American values is free speech but extending copyright protection to works created by artificial intelligence could also negatively impact the public's freedom of speech. As Professor Dotan Oliar argues, "[c]opyright law hampers free speech because it prevents people from writing, copying, publishing, disseminating, or performing forms of speech that would have been otherwise permissible."[130]

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family because "the institution of the family is deeply rooted in this Nation's history and tradition" and is "deserving of constitutional recognition").

125   Bobbitt, *supra* note 36, at 727.

126   BOBBITT, *supra* note 38, at 21.

127   *Id.*

128   *See* Oliar, *supra* note 26, at 65 (writing that Jefferson thought it would be better to prohibit all monopolies than to allow an exception for intellectual property rights).

129   James Madison, *Monopolies. Perpetuities. Corporations. Ecclesiastical Endowments.*, *in* Elizabeth Fleet, *Madison's "Detached Memoranda*,*"* 3 WM. & MARY Q. 534, 551 (1946).

130   Oliar, *supra* note 26, at 65.

Considering the program or programmer as the author would extend copyright protection to machine-authored works and thus expand the reaches of copyright law. Freedom of speech is a cornerstone of the American national identity and would caution against any expansion of copyright law that infringes on it.

While these are strong arguments against the expansion of governmental power, the Constitution was also heavily influenced by the Enlightenment.[131] This American ethos of progress and promotion of human ingenuity is powerful.[132] The United States became a world leader in science and engineering by investing heavily in research and development, producing the most advanced degrees in science and engineering, and publishing high-impact scientific publications.[133] Americans believe that the Federal Government should continue to provide funds for scientific research to ensure America remains competitive globally.[134] If a broad interpretation of "author" promotes the progress of science and the useful arts, then Congress would be in line with American ethos in expanding copyright law.

II. RECONCILING THE MODALITIES

So, is it constitutionally permissible to consider the programmer or the algorithm as an "author," and is Congress therefore able to extend copyright protection to works created by artificial intelligence? We have considered the question from six different constitutional perspectives, but we still need to reconcile each perspective's outcome. A historical argument shows that objectively, the programmer or algorithm could fit under a period dictionary's definition of "author," but probably not under the Framers' understanding of an "author." Under the textual modality, a contemporary "man on the street" would have a more liberal understanding of "author" and we see that the location of the IP Clause in the Constitution and the sentence structure grants a broad discretionary power to Congress. Structurally, the IP Clause grants Congress authority as long as the extension of copyright protection to works of artificial intelligence would promote "science and useful arts." Turning to the doctrine, works generated by

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131   *See generally* Harold J. Berman, *The Impact of the Enlightenment on American Constitutional Law*, 4 YALE J.L. & HUMAN. 311 (1992) (arguing that the philosophical ideas of the Enlightenment had a significant influence on the development of the American Constitution).

132   *See* THE FEDERALIST NO. 43, at 222 (James Madison) (Gideon ed., 2001) (stating that the "utility" of a power "to promote the progress of science and useful arts . . . will scarcely be questioned").

133   *U.S. Science and Technology Leadership Increasingly Challenged by Advances in Asia*, NAT'L SCI. FOUND. (Jan. 19, 2016), https://www.nsf.gov/news/news_summ.jsp?cntn_id=137394.

134   *Id.*

artificial intelligence may not have an author under a strict reading of *Burrow-Giles*, but by deferring to Congress, an acceptable scheme of copyright protection could be argued by analogizing to *Picture Music, Inc.* and the "work made for hire" doctrine. *Eldred* and a consistent historical practice towards expanding copyright protection also support a broad interpretation of the IP Clause. Prudentially, copyright law may be the best way to encourage the production of more artificial intelligence, but it would be difficult to construct an acceptable legal framework for assigning rights and society may bear the costs of more copyrights. From an ethical perspective, the Constitution stands for limiting the power of government and protecting free speech, but also celebrates scientific progress.

There is no hierarchy among these modalities and to rank them would delegitimize the procedure of constitutional interpretation.[135] Indeed, constitutional interpretation is not simply a mathematical equation where one plugs in the modalities and receives the correct outcome—even within the modalities there are conflicting arguments.[136] What this constitutional analysis provides us, then, is not a single correct answer to the problem, but rather a sound process to explore the strong constitutional arguments on both sides.

Of course, the decision of whether it is constitutional to extend copyright to works of artificial intelligence will ultimately come down to a judge's individual decision, guided by his or her sensibilities.[137] This does not mean, however, that we cannot use the modalities to accurately interpret the IP Clause. By viewing each modality not as an end but as a means towards a holistic understanding of the Constitution, we can conclude that it would be constitutionally permissible for Congress to pass a law extending copyright protection to works of artificial intelligence by considering the programmer as the author, even if the programmer does not fit the conventional definition.

This Comment's analysis demonstrates that the algorithm itself cannot be considered an "author" under the Constitution. Intratextualism, constitutional structure, and historical practice show that Congress is given a wide degree of discretion in extending copyright, but for the clause to have any meaning, there must be some limits. The original understanding of "author" and the purpose behind the IP Clause suggest an algorithm that possesses no creative thought and no personhood to lay claim to its outputs

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135   BOBBITT, *supra* note 38, at 155–56.

136   *Id.* at 155.

137   *Id.* at 168, 177.

is not an author. While our understanding of the term is broad, it would be a stretch even today to find that an algorithm fits the definition of "author," and is more akin to an artist's paintbrush than the artist herself. The algorithm needs no incentive to produce, which undermines the structural and prudential arguments, and while we may no longer have a romantic conception of "authorship," there still appears to be a requirement of "inspiration" or "creativity" in copyright law doctrine.

At the same time, a world where works of artificial intelligence receive no copyright protection is undesirable. If we accept the premise that there is an inherent under-production problem for works of artificial intelligence, then without copyright we would have many fewer works and algorithms capable of creating these works. Works of artificial intelligence have proven to be useful, valuable, and promising for future developments in artificial intelligence. Intuitively, something so important to the future of American innovation should be protected.

If Congress wants to find a way to extend copyright protection to works of strong artificial intelligence, it would be constitutionally permissible do so by considering the programmers as the authors. The programmer is a human individual with creativity, satisfying an originalist and contemporary understanding of "author." While the programmer may not know exactly what the algorithm will produce, by analogizing to the work-for-hire doctrine, we can view the programmer as the "inspiration" for the work and the algorithm as the employee. In light of the textual and structural power given to Congress, and the American ethos and prudence to encourage scientific innovation, a judge would likely follow the *Eldred* reasoning and defer to a congressional act extending copyright protection to artificial intelligence.

CONCLUSION

In a world where works like Obvious Art's *Edmond de Belamy* become more pervasive and valuable, Congress may rethink the Copyright Office's stance that works of strong artificial intelligence are not works of authorship. Congress may want to expand the reach of copyright protection to works created by artificial intelligence by amending the Copyright Act, and if it does, it is crucial to understand the constitutional limitations it would face. Employing Professor Bobbitt's modalities of constitutional interpretation, this analysis considers the Constitution holistically and allows us to properly understand the IP Clause. By looking to the Constitution, this Comment concludes that Congress can constitutionally consider the programmer as the

"author," and therefore an act expanding copyright protection to works of artificial intelligence would be constitutionally sound.