COPYRIGHT FOR ROBOTS?

HENRY H. PERRITT, JR.*

I. TWO AI STORIES

A. Human Generated

Braden Langley just received his MBA from Harvard Business School, after earning his engineering degree from MIT. He is enamored by the interrelationship of technology, creativity, and the demand for entertainment. While an undergraduate, he pursued these interests with research projects at MIT's Media Lab.

Now, Braden is eager to compete with his Harvard Business School classmates in starting up successful new enterprises.

He believes that generative artificial intelligence (AI) technology has reached the point where he can provide storylines to a computer program called discourseCPR (creative practical robot),[1] take the story generated by this program, and import it into another software product, animationCPR, that will generate animated videos depicting the story.[2]

Using these generative-AI tools, Braden intends to automate the writing, casting, and animation of a series of adventure and romance movies.

He takes his time writing up his idea, explaining each aspect of the concept carefully so that a layperson can understand it only generally familiar with the public excitement over generative AI. He formats the write-up in the form of a business plan intended for submission to potential investors.

He laughs to himself that he is unwilling to entrust the writing of the business plan to his authorial robot.

He knows a number of venture capitalists who haunt the halls of both MIT's Media Lab and the Harvard Business School and are always on the lookout for smart, young entrepreneurs like himself.

He contacts some of them and pitches his idea and business plan. None of the venture-capital firms can get past questions about copyright. Who would own the

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1. The hypothetical discourseCPR is modelled on ChatGPT. *See Introducing ChatGPT*, OPEN AI, https://openai.com/blog/chatgpt [https://perma.cc/X23R-QJJ7] (last visited May 25, 2023).

2. This part of the hypothetical imagines animation-creation technology that goes beyond what is currently available. *See AI Animation: Pushing the Bounds of Creativity*, AIWS, https://aiworldschool.com/research/ai-arts-3/ [https://perma.cc/A82L-63CN] (last visited May 25, 2023) (summarizing capability of products currently available).

material generated by the robots?[3] Who is the legal author of the final product, both the written textual "script" for the videos and the videos themselves?

B. Robot Generated

The author asked ChatGPT[4] to "tell me a story about a young male MIT and Harvard Business School graduate who starts a business based on generative AI and needs copyright protection to raise capital."

This is what the system came up with:

> *Once upon a time, there was a young man named Adam who had graduated from both MIT and Harvard Business School. With his unique background in both technology and business, he had always dreamed of starting his own company.*
>
> *One day, Adam had an idea for a business that would leverage the power of generative AI to create unique and personalized content for individuals and businesses. He knew that his idea had the potential to disrupt the market, but he also knew that he needed to protect his intellectual property in order to raise the capital necessary to make his dream a reality.*
>
> *Adam began by doing extensive research on copyright law, consulting with lawyers and experts in the field. He learned that copyright protection would be crucial for his business, as it would enable him to prevent others from copying his ideas and using his proprietary technology without permission.*
>
> *With this knowledge in hand, Adam went ahead and filed for copyright protection for his technology, algorithms, and other creative works. He made sure to follow all the legal procedures and requirements to ensure that his copyright protection was solid.*
>
> *With his intellectual property secured, Adam was able to raise the necessary capital from investors who were impressed by his innovative ideas and commitment to protecting his intellectual property. He used the funds to build his business and create a suite of products and services that leveraged the power of generative AI to help his clients achieve their goals.*
>
> *Thanks to his careful attention to copyright protection, Adam's business thrived and became a leader in its field, offering cutting-edge solutions*

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3. The author wrote this hypothetical story as an introduction to this Article before asking ChatGPT to try its hand.

4. *See* openAI.com [https://perma.cc/FFQ3-R5RF] (last visited May 25, 2023). GPT stands for generative pre-trained transformer. *Id*.

> *that were both effective and unique. Adam continued to innovate and develop new products, always mindful of the importance of protecting his intellectual property and maintaining his competitive advantage.*
>
> *In the end, Adam's hard work and dedication paid off, as his business grew and expanded, creating jobs and opportunities for many people. His story became an inspiration to others who sought to follow their dreams and build successful businesses, all while protecting their intellectual property and ensuring their long-term success.*[5]

C. The Issue

Whether Braden, aka Adam, is able to provide assurances to his potential investors depends on whether his creative products, generated by discourseCPR and its companion program, animationCPR, qualify for copyright and on whether he qualifies as the author of those products. The answer to those two questions depends on the interpretation of the language of the Copyright Act.[6] The United States Copyright Office has taken the position that computer-generated works that involve no human authorship are not entitled to copyright, but that a human author whose work satisfies the originality requirements of the statute is not disqualified from holding a copyright by his use of computer aids to his creative effort.[7]

Commentators and federal courts generally agree that human authors may earn copyrights even with substantial help from robots,[8] as long as the work product satisfies the requirement of originality articulated by the Supreme Court of the United States in the case of *Feist Publications, Inc. v. Rural Telephone Service Co., Inc*.[9] They disagree, however, on whether a work generated by a computer program with little more than a prompt or two represents an "original" expression by the user of the program.[10] Most of the authorities bend over backward to find that copyright protection is available for such works, exploring the vesting of authorship in the user of the program, in the designer and programmer of the program, or in the program itself.[11]

This Article concludes that the concern about copyright protection for computer-generated works, however, is considerably overblown. For the foreseeable future, generative-AI systems will not be able to produce useful expression without considerable guidance from their human users in the form of prompts or specifications that satisfy the relatively low standard for originality

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5. *See id*.; ChatGPT session April 2, 2023, 1:08 PM EDT.

6. 17 U.S.C. §§ 101-603.

7. *See* discussion *infra* Part III.B.3.

8. This Article uses the terms "generative-AI program," "computer-generated," "machine," and "robot" interchangeably.

9. Feist Publ'n, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 345-46 (1991).

10. *Id.*

11. *See* discussion *infra* Part(s) V.A.-D.

under the Supreme Court's decision in *Feist*.[12]

When the technology reaches the point that it can generate expression meeting the requirements of originality with user instructions that do not satisfy the requirements for originality, the best solution is to leave the machine's[13] output authorless—unprotected by copyright. No copyright protection for purely computer-generated[14] works is appropriate because the likelihood of free-riding on the substantial effort by the user of the program is *de minimis*, and therefore the justification for copyright's grant of monopoly is absent.[15] The need to afford copyright protection to machine-generated output to deter free riding is not apparent, and other means for protecting an entrepreneur's investment in systems that aid creativity are sufficient.

D. Scope of Article

The Article begins, after this introduction, with a description of "generative AI," the technology that has excited so much public interest and which makes exploration of the issue of copyrightability of the output of the technology important for people like the hypothetical Braden/Adam.[16] It then reviews the law pertinent to the question, explaining how the Constitution's "Patents and Copyrights Clause," and the copyright statute have been interpreted, including the report of a major federal commission on copyright for computer software,[17] a seminal law-review article by Harvard Law Professor Arthur Miller,[18] subsequent law-review articles,[19] a handful of cases,[20] and several decisions by the U.S. Copyright Office.[21] It then synthesizes from these authorities and evaluates the possibilities for authorship,[22] and applies law-and-economics evaluation to the justification for copyright protection.[23] It briefly considers possibilities for other kinds of protection of computer-generated expression and concludes by revisiting the hypothetical Braden/Adam's business model.

This Article does not consider claims that generative AI systems may infringe the copyright of others: the authors of the pre-existing content that the systems

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12. *See* discussion *infra* Part III.A.

13. This Article uses the terms "generative-AI program," "computer-generated," "machine," and "robot" interchangeably.

14. This Article uses the terms "generative-AI program," "computer-generated," "machine," and "robot" interchangeably.

15. Copyright's monopoly is incomplete, compared to patent's, because it does not bar independent creation.

16. *See* discussion *infra* Part II.

17. *See* discussion *infra* Part III.

18. *See* discussion *infra* Part IV.B.

19. *See* discussion *infra* Part IV.D.

20. *See* discussion *infra* Part IV.D.

21. *See* discussion *infra* Part IV.C.

22. *See* discussion *infra* Part V.

23. *See* discussion *infra* Part VI.A. & B.

synthesize.[24] It also does not consider the question of who may be liable and according to what standards if a generative AI system engages in defamation, commits an invasion of privacy, or causes actionable emotional distress,[25] the form that regulation of AI might take,[26] or the impact of generative AI on job markets.[27]

II. THE TECHNOLOGY

Generative AI technologies involve the application of sophisticated natural-language and image-recognition processing to enormous databases constructed from information available on the Internet's Web and elsewhere.[28] The natural-language models are more search engines like Google on steroids.[29] Google retrieves particular information artifacts whose language seems to match the language of simple subject-matter queries.[30] Inputting "Battle of Guadalcanal" into the search window of Google produces a list of books, articles, and web postings about the Battle of Guadalcanal. The basic Google search engine relies on massive web crawlers[31] which ingest information published on the web and

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24. The author explores that possibility in a forthcoming article, Henry H. Perritt, Jr., *Robots as Pirates, 73* CATHOLIC U. L. REV. ___ (2023). Getty Images, a group of visual artists and computer code has filed lawsuits claiming that Midjourney, Stability AI, and ChatGPT developer Open AI, among others have infringed their copyrights. *See* Getty Images (US) Inc. v. Stability AI Inc, No. 1:23-cv-00135 (D. Del. Feb. 3, 2023).

25. The author considers that subject in Henry H. Perritt, Jr., *Robot Slanderers*, 46 U.A.L.R. L. REV. ___ (2023); *See also* Henry H. Perritt, Jr., *Who Pays When Drones Crash?*, 21 UCLA J. L. & TECH. 1 (2017) (applying negligence law to mishaps involving robots).

26. See Henry H. Perritt, Jr., *Robot Regulations,* 75 S.C. L. REV. ___ (2023).

27. See Henry H. Perritt, Jr., *Robot Job Destroyer,* 84, LA. L. REV. ___ (2023).

28. Angie Lee, *What Are Large Language Models Used For?* NVIDIA (Jan. 26, 2023) https://blogs.nvidia.com/blog/2023/01/26/what-are-large-language-models-used-for/ [https://perma.cc/RF5K-ZX6P] (" large language models are typically trained on datasets large enough to include nearly everything that has been written on the internet over a large span of time.").

29. *See* Christopher Mims, *The Secret History of AI, and a Hint at What's Next*, WALL ST. J. (Apr. 22, 2023, 12:00 AM) https://www.wsj.com/articles/the-secret-history-of-ai-and-a-hint-at-whats-next-428905de [https://perma.cc/M24K-ELVM] (last visited May 25, 2023) ("ChatGPT has no mind. It has more in common with a search engine than even the most primitive of brains . . . . [W]e must remember that [its abilities] are a product not of its intelligence, but its scale."); Henry H. Perritt, Jr., *Defending Face-Recognition Technology (And Defending Against It)*, 25 FLA. J. TECH. L. & POL'Y 42, 46 (2020) (explaining machine learning); Jane C. Ginsburg & Luke Ali Budiardjo, *Authors and Machines*, 34 BERKELEY TECH. L.J. 343, 401-403 (2019) (explaining how machine learning differs from expert systems).

30. Google, *In-Depth Guide To How Google Search Works*, https://developers.google.com/search/docs/fundamentals/how-search-works [https://perma.cc/T42H-FEHM].

31. Web crawlers systematically work their way through all the sites accessible through the World Wide Web, indexing the information presented on them. *Id*. at "Crawling," https://developers.google.com/search/docs/fundamentals/how-search-works#:~:text=Crawling

use inverted indexes,[32] natural-language processing, and pattern-matching algorithms to select items correlating with the search query. It presents its search results in the form of brief extracts of the material it found.[33] Google summarizes or synthesizes the resources it identifies.[34]

Machine learning for generative AI goes further. It engages in Google-like retrieval, and then it asks, "what comes next?" in order to construct literate sentences and conceptual relationships.[35]

Pattern matching is used in voice recognition, natural language processing, text-to-speech conversion, auto-correction in word processing programs, face recognition, and many video and audio compression algorithms.[36]

Most of these types of pattern-matching benefit from the use of machine learning techniques.[37] The quality of what the machines learn depends on the size and representativeness of the exemplars fed into the machines during the learning process through a *training database*.[38] The accuracy of the production system, through which the system generates output, depends on the robustness of the statistical algorithms used to extract the distinguishing features.[39]

In machine learning, a very large number of samples are processed by a digital computer.[40] In image recognition systems, for example, some of the samples contain the target image, and others contain something else.[41] Thus, a robocowboy might be trained to recognize cattle by presenting hundreds of thousands of images of different kinds of animals, tagging only those that represent cows, bulls, steers, and calves.[42] A computer system uses statistical

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[https://perma.cc/AJZ8-KYN3].

32. An inverted index maps words or phrases to their location in documents. A free-text search engine uses such an index to find documents, and the location in documents, where word and phrases appear. It can construct searches from phrases because the inverted index tells it where words appear adjacent to, or near, each other. *Id*. at "Indexing," https://developers.google.com/search/docs/fundamentals/how-search-works#:~:text=Indexing [https://perma.cc/KQ6G-N5HW].

33. "Guadalcanal was the last major naval battle in the Pacific War for the next one-and-a-half years, until the Battle of the Philippine Sea. It was one of the . . . ." Item on Google response query, "Battle of Guadalcanal," performed by the author, 29 July 2023.

34. *Id*.

35. *See* text and accompanying footnotes 64-75.

36. *See* Henry H. Perritt, Jr., *Defending Face-Recognition Technology (And Defending Against It)*, 25 FLA. J. TECH. L. & POL'Y 42, 46 (2020) (explaining machine learning).

37. *Id.*

38. *Id.*

39. *Id.*

40. *See* U.S. Patent No. 20,140,105,467 A1, at paras. 0017-0026 (filed Sept. 8, 2009) (identifying preceding face recognition patents).

41. The Article explains machine learning by reference to image recognition rather than natural-language processing because image recognition is easier to understand. *See* Henry H. Perritt, Jr., *The 21st Century Cowboy: Robots on the Range*, 43 U. ARK. LITTLE ROCK L. REV. 149, 153 (2020).

42. *See id.* at 153 (exploring feasibility of robot cowboy who herds cattle; describing machine

analysis implemented through neural networks to evaluate which images match the tagged exemplars.[43] A model converges on a set of quantitative templates that represent cattle.[44] Machine-learning techniques accommodate challenges associated with recognizing the target image despite different orientations, different lighting conditions, and different backgrounds.[45] Machine learning works at multiple layers in image-matching applications.[46] It learns what a bovine is; it learns how to reorient an image so that it more easily can compare it with others; it learns what features uniquely define a particular animal; it refines algorithms and templates so that it can apply these steps to an arbitrary set of images in production systems.[47]

In image recognition, the techniques work by scanning the lines of an image, much as a laser printer or office scanner does, and looking for discontinuities in brightness and color.[48] A model of an image can be constructed by identifying the locations of those discontinuities.[49] Then, a complex hierarchy of neural networks implementing statistical algorithms, can compare the location of different types of discontinuities between images, and thus identify images that are most similar.[50] The indicia of similarity are the particular features that discriminate a cow from a wolf—or one bull from another.[51]

The "machine-learning" label applies to the process of identifying the distinguishing features, as many as have statistical significance.[52] There is nothing

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learned aimed at recognition of cattle).

43. *Id.* at 165.

44. *Id.*

45. *See id.* This involves the second step in most typologies: *alignment*.

46. *See id.* at 166.

47. *See id.* at 167-68.

48. *See id.* at 163-64.

49. *See id.* A line connecting the discontinuities represents an "edge" in the image, such as the edge of a cheek in a human face. *Id*.

50. *See* Divyanish Dwivedi, *Face Recognition for Beginners*, TOWARDS DATA SCIENCE (Apr. 28, 2018), https://towardsdatascience.com/face-recognition-for-beginners-a7a9bd5eb5c2 [https://perma.cc/43ZX-D3ED] (last visited May 25, 2023) (explaining how neural networks can facilitate use statistical techniques such as Principal Component Analysis, Linear Discriminant Analysis, Independent Component Analysis, Discrete Cosine Transforms, Gabor Filters, and Markov Models for face recognition); Arun Alvappillai & Peter Neal Barrina, *Face Recognition using Machine Learning*, U. CAL. SAN DIEGO, http://noiselab.ucsd.edu/ECE285/FinalProjects/Group7.pdf [https://perma.cc/YV5M-36YE] (brief but formal paper on face recognition algorithms).

51. This is the *feature extraction* step. Some commentators call this identifying "landmarks." *See* Adam Geitgey, *Machine Learning is Fun! Part 4: Modern Face Recognition with Deep Learning,* MEDIUM (July 24, 2016), https://medium.com/@ageitgey/machine-learning-is-fun-part-4-modern-face-recognition-with-deep-learning-c3cffc121d78 [https://perma.cc/4EJG-EVQS] (explaining how face recognition works, including role of landmarks).

52. One popular method is the Viola/Jones approach. *See* Paul Viola, *The Viola/Jones Face Detector (2001)*, https://www.cs.ubc.ca/~lowe/425/slides/13-ViolaJones.pdf [https://perma.cc/KW7V-TBZ9] (slides explaining method); Paul Viola & Michael Jones, *Rapid Object Detection*

magical about the analysis: it is factor analysis,[53] which has been used as a social science methodology for more than 100 years.[54] What has changed is computing power, the availability of digital storage, cheap digital cameras, and an enormous inventory of digital representations of faces.

In human face-matching, the process is the same, except that the foundational layer examines a large inventory of images of human faces (the *training database*) to learn what a face is.[55]

"The facial recognition technology typically looks for the following:

- Distance between the eyes
- Distance from the forehead to the chin
- Distance between the nose and mouth
- Depth of the eye sockets
- Shape of the cheekbones
- Contour of the lips, ears, and chin"[56]

After that, the obtained data are compared with those available in the database, and, if the parameters coincide, the person is identified. The feature measurements can be expressed as a "feature vector," or "faceprint," which represents a particular face.[57]

Pattern matching through machine learning works similarly when the domain of interest is natural language rather than images.[58] Large language models learn from large databases of text such as CC-100[59] or Pile.[60] The databases are constructed by crawling the Web, from specialized sources such as FreeLaw and

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using a Boosted Cascade of Simple Features, https://www.cs.cmu.edu/~efros/courses/LBMV07/Papers/viola-cvpr-01.pdf [https://perma.cc/T5ZQ-V3ZB] (describing method; more formal paper).

53. *See* Statistics Solutions, *Factor Analysis*, https://www.statisticssolutions.com/factor-analysis-sem-factor-analysis/ [https://perma.cc/6B38-PPS5] (last visited May 25, 2023).

54. Charles Spearman, *Demonstration of Formulæ for True Measurement of Correlation,* 18 AM. J. PSYCH. 161-69 (1907).

55. This is the "detection" step. *See* AWS, *What is Facial Recognition?* (explaining detection), https://aws.amazon.com/what-is/facial-recognition/ [https://perma.cc/54JQ-2Z2E] (last visited July 29, 2023); U.S. Patent No. US2,014,010,546,7A1, at paras. 0009-0015 (filed Sept. 8, 2009) (background of the Invention, describing Detection, Alignment, Normalization, Representation, and Matching steps in pattern matching).

56. *See* AWS, *supra* note 55; *see also* Dwivedi, *supra* note 50 (presenting a computer program in the Python language that performs the basic steps).

57. U.S. Patent No. 20,140,105,467 A1, at para. 0034 (filed Sept. 8, 2009) (explaining feature vector).

58. *See* Julia Hirschberg & Christopher D. Manning, *Advances in Natural Language Processing*, 349 SCIENCE 261, 261-66 (2015) (explaining the evolution of computerized natural language processing).; *see also CC100*, PAPERS WITH CODE, https://paperswithcode.com/dataset/cc100 [https://perma.cc/6WLH-8E5U] (last visited May 25, 2023).

59. *See CC100*, *supra* note 58.

60. Leo Gao et al., *The Pile: An 800GB Dataset of Diverse Text for Language Modeling*, ARXIV:2101.00027 (2020), https://pile.eleuther.ai/ [https://perma.cc/7RRG-CS7A].

PubMed, from online discussion groups like Reddit, from the Gutenberg books collection, and from Wikipedia.[61] NVIDIA uses:

- Web pages: Large language models can be trained on the text data available on the internet, which can include articles, blogs, and news reports.
- Books: Many large language models are trained on large corpora of books, which can include works of fiction, non-fiction, and academic texts.
- Scientific papers: Language models can also be trained on scientific papers from various fields, including physics, biology, chemistry, and more.
- Social media: Some models are trained on text data from social media platforms such as Twitter, Facebook, and Instagram.
- News articles: Language models can be trained on news articles from various sources to understand current events and trends.
- Chat logs: Some models are trained on chat logs and customer service interactions to better understand natural language and improve conversational abilities.[62]

It is a bottom-up learning process: first distinguishing individual words, then evaluating the frequency with which words appear together in phrases, then associating the phrases with concepts, and then building a hierarchy of concepts, a semantic tree,[63] not unlike a conventional thesaurus.[64]

A recent patent for generative AI explains how generative AI systems work at the technical level.[65] This 51-page patent explains in some detail how machine learning is used to train a system for natural language output in a style that "talks

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61. *See* Matt Rickard, *LAION, The Pile, and More Datasets* (Dec. 14, 2022), https://matt-rickard.com/laion-the-pile-and-more-datasets [https://perma.cc/FQD9-VV4G] (listing and evaluating different training datasets); *see also* Kevin Schaul et al., *Inside the Secret List of Websites that Make AI like ChatGPT Sound Smart*, WASH. POST (Apr. 19, 2023), https://www.washingtonpost.com/technology/interactive/2023/ai-chatbot-learning/ [https://perma.cc/3U4V-6PAB] (identifying major sources as patents.google.com, wikipedia.org, scribd.com, fool.com, and kickstarter.com).

62. April 16, 2023 ChatGPT response to prompt, "What sources do large language models use?"

63. *See* Jesús Giménez & Lluís Márquez, *Linguistic Measures for Automatic Machine Translation Evaluation*, 24 MACH. TRANSLATION 209, 232, 236 (Apr. 11, 2011) (noting use of semantic trees in machine translation of languages); Hyejin Youn, *On The Universal Structure of Human Lexical Semantics*, 113 PROC. NAT'L ACAD. SCI. U.S. 1766 (2016); Jean-Pierre Koenig & Anthony R. Davis, *The KEY to Lexical Semantic Representations*, 42 J. LINGUISTICS 71 (Mar. 2006).

64. Warren Sack, *Conversation Map: An Interface for Very Large-Scale Conversations*, 17 J. MGT INFO. SYS. 73, 79-80 (2001) (explaining analysis of email messages and Usenet posts with reference to semantic trees and thesauri).

65. U.S. Patent No. US11,042,713 B1 (issued June 18, 2019) (applied artificial intelligence technology for using natural language processing to train a natural language generation system) [hereinafter 713B1].

like me."[66] At a fundamental level, natural language analyzers and generators use an ontological network: a sophisticated, computerized thesaurus, which classifies linguistic concepts and organizes them according to their relationship with each other. The result is a semantic framework for a particular language. Particular words are slotted into their appropriate ontological classes, thus organizing the entire vocabulary of the language.

The system parses training text into sentences,[67] uses pattern matching to classify concepts expressed in each sentence, and then assigns semantic tokens accordingly.[68] Deictic context is developed by the use of anchor words, which signify that the surrounding syntactical units should be processed as teaching examples. Examples of anchor words signifying comparison include "increase, reduction, decrease, decline, rise, fall, raise, and lower."[69] Anchor words are specified for each semantic concept. A complete system may use scores of separately patented methods.[70]

The system described in the patent uses metadata from natural language processing to identify concept expressions, ultimately expressing them in the form of an annotated template structurally compatible with the transformer architecture. Concepts are identified by their inclusion of anchor words: single or compound words globally unique to a particular concept. The patent gives twenty-three examples of anchor words for the change concept.[71] It gives ten anchor words for the *compare* concept, beginning with "more" and "less."[72]
It summarizes the process flow as:

> 1. Tokenize a document into sentences
> 2. For each sentence:
>
> A. Preprocess dependency and constituency criteria for named entity recognition.
>
> B. Leverage user data in the system's ontology to identify and flag known resources (entities and attributes)
>
> 3. For each pre-processed sentence:
>
> A. Pass the sentence through a separate pattern matcher for each concept.
>
> B. For each template extractor, apply a set of heuristics to extract the relevant subtree from the parsed sentence and parameterize the sentence into a form compatible with the transformer.[73]

Subtree extraction works by moving up the tree from the anchor word to the

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66. *Id*.
67. *Id*. at 16-17.
68. *Id*. at 17-19.
69. *Id*. at 11.
70. The 713B1 patent lists 20 patents and 26 patent applications. *Id*. at 5-7.
71. *Id*. at 12.
72. *Id*. at 12-13.
73. *Id*. at 16.

complete clause containing the anchor word.[74] In 2023, the largest large language models included WuDao 2.0 Beijing Academy of Artificial Intelligence, with 1.75 trillion parameters; MT-NLG Nvidia and Microsoft, with 530 billion parameters; GPT-3, Open AI, with 175 billion parameters; LaMDA Google, with 137 billion parameters, and ESMFold Meta AI, with 15 billion parameters.[75] These models develop statistical predictions of what text comes next. Their numbers of parameters quantify the number of factors they consider in making predictions and generating output. Each parameter is a variable, the value of which the model can vary as it learns.[76]

Large language models use neural-network transformer architecture to learn the characteristics of a language from enormous amounts of data. The models typically undergo expensive database and computationally intensive basic training by their developers, and then a simpler "fine-tuning" by customers on their own language samples.

Sophisticated natural language and pattern-matching technologies have been embodied in commercial products for some time.[77] Microsoft Word[78] and Google[79] guess at how a user will complete words, phrases, and sentences. The author uses a product called Dragon Anywhere[80] to create the first drafts of everything he writes: law-review articles, magazine articles, briefs for courts and administrative agencies, and fiction. He's been doing this for five years or more. He dictates into Dragon on his iPhone, and Dragon transcribes the dictation into text in Microsoft Word. Only a modest amount of error correction and editing is necessary to create an acceptable draft.

A high level of artificial intelligence, in the form of natural-language processing, is used by Dragon to do the transcription. It spells words correctly, makes almost no grammatical errors and, when the spoken words or phrases are unclear to it, makes reasonable guesses as to what the context requires. The coherence, organization, persuasiveness, and gracefulness of the expression, on

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74. *Id*. at 18.

75. Cam Dilmegani, *Large Language Model Training in 2023*, AI MULTIPLE (Feb. 3, 2023), https://research.aimultiple.com/large-language-model-training/ [https://perma.cc/FNS3-3PZ4].

76. *Id*.

77. AI's basic statistical techniques have been around even longer. *What Is Generative AI?*, MCKINSEY & CO. (Jan. 19, 2023) https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai [https://perma.cc/TH4C-473F] (noting that machine learning is based on statistical techniques that have been available since the 18th century; the use of which now is more powerful because of dramatic improvements in computer processing capability).

78. *See* Sandy Writtenhouse, *How to Turn on and Use Text Predictions in Microsoft Word*, HOW-TO-GEEK (June 2, 2021), https://www.howtogeek.com/726539/how-to-use-text-predictions-in-microsoft-word/ [https://perma.cc/MLL8-PLVL].

79. *See* Google, *How Google Autocomplete Predictions Work*, GOOGLE, https://support.google.com/websearch/answer/7368877?hl=en [https://perma.cc/TL8P-9VK4] (last visited Apr. 23, 2023).

80. NUANCE, https://www.nuance.com/dragon/dragon-anywhere.html [https://perma.cc/8HTV-CYEV] (last visited June 29, 2023).

the other hand, are determined entirely by what the author dictates.

Generative AI goes a considerable step further. It processes and "understands" the information it obtains through methods like those of the traditional Google and uses rules of natural-language expression to express the synthesis in grammatically correct sentences and paragraphs with coherent organization and reasonably precise word selection.

The current state of generative-AI technology is very good at some things and not so good at others, illustrated by comparing the two versions of the hypothetical at the beginning of this Article. ChatGPT is not a very good storyteller. Its creations do not reflect an understanding of the role of conflict, suspense, story arc or rising and falling action, as good stories do.[81] Its efforts are flat and unappealing in that regard. The likelihood that there would be much of a market for the kinds of stories that ChatGPT or ChatGPTPlus can tell is low. But ChatGPT is quite good at nonfiction. The author got credible and workable responses to questions about aerodynamics, propagation of radio waves, the history of western cattle drives, and the CONTU report. ChatGPT's work on the CONTU report is presented in IV.C below. Moreover, there is every reason to suspect that ChatGPT and other generative AI products will get better at everything they do. It is certainly plausible that conflict, suspense and rising and falling action as criteria for good stories could be built on future versions of the software.

Also, video creation with the software is still primitive. While automating certain aspects of the animation process can substantially improve productivity, automating changes in facial expression or body movements is a far cry from scripting a story, deciding on the basic appearance and personalities of the characters, and arranging sequences of backgrounds and environments.

But, just as the basic technologies of storytelling will improve, so will the technologies improve for coupling those advances with the more technical aspects of animation. For the time being, however, most AI-generated works will depend on a human user to guide the technology in producing anything beyond rudimentary summaries of financial reports,[82] workout tips,[83] or sports scores.[84]

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81. *See* Henry H. Perritt, Jr., *Technologies of Storytelling: New Models for Movies,* 10 VA. SPORTS & ENT. L.J. 106 (2010) (summarizing and explaining principles of good narrative).

82. Ross Miller, *AP's 'Robot Journalists' Are Writing Their Own Stories Now*, VERGE (Jan. 29, 2015) https://www.theverge.com/2015/1/29/7939067/ap-journalism-automation-robots-financial-reporting [https://perma.cc/KUX8-BMVK] (reporting on use of AI to write financial stories).

83. Alexandra Bruell, *Sports Illustrated Publisher Taps AI to Generate Articles, Story Ideas*, WALL ST. J. (Feb. 3, 2023) https://www.wsj.com/articles/sports-illustrated-publisher-taps-ai-to-generate-articles-story-ideas-11675428443 [https://perma.cc/8YR8-H8HN] (reporting on use of AI to create workout tips).

84. Taylor Soper, *How This Startup is Using Robots to Write Sports News Stories for The Associated Press*, GEEKWIRE (Sep. 13, 2018) https://www.geekwire.com/2018/startup-using-robots-write-sports-news-stories-associated-press/ [https://perma.cc/VM7K-EZBE](reporting on AI-written sports stories).

III. LEGAL FRAMEWORK

Copyright law confers a limited statutory monopoly[85] on original expression as an incentive to its production. The Copyright Act[86] is an exercise of Congressional power under the Copyrights and Patents Clause of the United States Constitution[87] and is interpreted so as to remain within the limits of that power. Those limits gain traction in concrete cases through the statute's originality and authorship requirements, which frequently require adjudication of competing claims by multiple persons claiming copyright in the same work, some of them using human or inanimate intermediaries.

A. Constitution

Article 1, § 8 of the United States Constitution gives the United States Congress the power "[t]o 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."[88]

In the 1879 Trademark Cases,[89] the Supreme Court held that the clause imposes meaningful limits on Congressional establishment of intellectual-property protection, invaliding an early statute aimed at protecting trademarks.[90]

> [W]hile the word writings may be liberally construed, as it has been, to include original designs for engravings, prints, [et]c., it is only such as are original, and are founded in the creative powers of the mind. The writings which are to be protected are the fruits of intellectual labor, embodied in the form of books, prints, engravings, and the like.[91]

In *Feist Publications, Inc. v. Rural Telephone Service Co., Inc.*[92] the Supreme Court reiterated that "originality is a constitutional requirement."[93] It held that the white pages of a telephone directory[94] lacked the constitutionally requisite originality. It reached this conclusion while noting that the originality requirement is quite modest:

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85. Sony Corp. v. Univ. City Studios, Inc., 464 U.S. 417, 431 (1984) (referring to copyright as a "statutory monopoly").

86. The Copyright Act of 1976, 17 U.S.C. §§ 101-1511.

87. U.S. CONST. art. I, § 8.

88. *Id.* Known as the "Patents and Copyright Clause."

89. *In re* Trade-Mark Cases, 100 U.S. 82 (1879).

90. "Any attempt, however, to identify the essential characteristics of a trade-mark with inventions and discoveries in the arts and sciences, or with the writings of authors, will show that the effort is surrounded with insurmountable difficulties," it said. *Id*. at 93-94.

91. *Id*. at 94.

92. Feist Publ'n, Inc. v. Rural Tel. Serv. Co. 499 U.S. 340, 345-46 (1991).

93. *Id.* (internal citations omitted).

94. "The white pages list in alphabetical order the names of Rural's subscribers, together with their towns and telephone numbers." *Id.* at 342.

> The *sine qua non* of copyright is originality. To qualify for copyright protection, a work must be original to the author. Original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity. To be sure, the requisite level of creativity is extremely low; even a slight amount will suffice. The vast majority of works make the grade quite easily, as they possess some creative spark, 'no matter how crude, humble or obvious' it might be. Originality does not signify novelty; a work may be original even though it closely resembles other works so long as the similarity is fortuitous, not the result of copying. To illustrate, assume that two poets, each ignorant of the other, compose identical poems. Neither work is novel, yet both are original and, hence, copyrightable.[95]

The *Feist* Court reached its conclusion that white pages of telephone books are not eligible for copyright protection by revisiting the dichotomy between fact and expression, long informing the originality requirement.[96] Facts may not be copyrighted, the *Feist* Court said, because they already exist; protecting them is not necessary to stimulate the creation of art.[97] Since the Constitution empowers Congress to enact copyright law only to advance art, a copyright statute protecting mere facts would be unconstitutional—at least it would exceed the authority granted of the Patents and Copyrights Clause; it might be authorized by the Commerce Clause, as is trademark protection.[98] Expression, as contrasted with facts, is something new.[99] Protecting it encourages the conduct producing it and thus serves the constitutional purpose.[100]

Although the *Feist* Court did not explicitly talk about the balance that copyright law necessarily strikes between incentives for authors and costs to everyone else by withdrawing information from the public domain, it implicitly addressed that tension by limiting copyright protection for organization and arrangement of facts only to that organizational arrangement, leaving the facts themselves available for exploitation by anybody.[101]

B. Copyright Act

Section 102 of the Copyright Act[102] specifies the elements for copyright protection: original work of authorship fixed in a tangible medium of expression.

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95. *Id.* at 345-46.
96. *Id.* at 349-51.
97. *Id.*
98. *Id.* at 345-46.
99. *Id.* at 349-51.
100. *Id.*
101. *Id.* at 348-49.
102. 17 U.S.C. § 102(a).

The first element, commonly known as the *originality* requirement, is constitutionally required;[103] the second is the *authorship* requirement; and the third is the *fixation* requirement.

Fixation[104] is not an issue for generative AI because all of the practical implementations of the technology produce output in a form that is fixed in a tangible medium of expression by being represented as characters on a page, or images in a video recording. An application of the technology might express itself by simulated spoken words, but they also almost certainly would be fixed in a recording of some kind.

The constitutionally mandated originality requirement[105] means that the new work was not simply copied verbatim from something already existing. Relatively modest added value, such as translations, tagging of concepts, or reorganization can satisfy the originality requirement,[106] although the resulting copyright may vest only in the added value as opposed to the pre-existing material.[107] Copyright does not extend to mere ideas, but only to the expression of them,[108] the statute says, reflecting the fact/expression dichotomy so important to the *Feist* Court.

The courts have interpreted the originality requirement in a series of cases presenting new technologies. In *Bleistein v. Donaldson Lithographing Co.*,[109] The Supreme Court held that lithographed drawings of circus and ballet performers satisfied the originality requirement, stating:

> The copy is the personal reaction of an individual upon nature. Personality always contains something unique. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible, which is one man's alone. That something he may copyright unless there is a restriction in the words of the act . . . . If there is a restriction it is not to be found in the limited pretensions of these particular works. The least pretentious picture has more originality in it than directories and the like, which may be copyrighted . . . . There is no reason to doubt that these prints in their *ensemble* and in all their details, in their design and particular combinations of figures, lines, and colors, are the original work of the plaintiffs' designer.[110]

But putative authors who merely reproduce what they find have done nothing sufficiently original. In *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, then circuit judge Gorsuch, writing for a court of appeals panel, denied copyright to

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103. *See Id.*
104. § 101 (defining "fixed").
105. Feist Publ'n, Inc. v. Rural Tel. Serv. Co. 499 U.S. 340, 346 (1991).
106. *Id.* at 345-46.
107. *Id.* at 349.
108. § 102(b) (excluding from protection "ideas" and "concepts").
109. 188 U.S. 239 (1903).
110. *Id.* at 250.

an enterprise that had developed digital models of new automobile designs.[111] The models began with wire-frame depictions of the vehicle developed by the plaintiff from examining the cars.[112]

> [T]he facts in this case unambiguously show that Meshwerks did not make any decisions regarding lighting, shading, the background in front of which a vehicle would be posed, the angle at which to pose it, or the like—in short, its models reflect none of the decisions that can make depictions of things or facts in the world, whether Oscar Wilde or a Toyota Camry, new expressions subject to copyright protection.[113] That expressive creation took place *before* Meshwerks happened along, and was the result of work done by Toyota and its designers; indeed, at least six of the eight vehicles at issue are still covered by design patents belonging to Toyota and protecting the *appearances* of the objects for which they are issued.[114]

In *Sparaco v. Lawler, Matusky, Skelly, Engineers LLP*,[115] the court of appeals, reversing in part and affirming in part, held that a professional engineer was not entitled to copyright in the features of a site plan that merely reproduced natural features of terrain: "the existing physical characteristics of the site, including its shape and dimensions, the grade contours, and the location of existing elements, [as] it sets forth facts; copyright does not bar the copying of such facts."[116]

The plaintiff was, however, entitled to copyright in certain elements of the plan which comprised much more than "vague, general indications of shape and placement of the elements."[117] It included details on building footprints, parking lots, the layout of drives, curbs, walkways, and landscaping.[118]

The *Sparaco* Court distinguished *Attia v. Society of New York Hospital*.[119] In *Attia*, the court of appeals affirmed the district court's dismissal of a copyright infringement claim by an architect who prepared architectural drawings for a hospital expansion.[120] The court assumed copying by the defendants.[121]

> [N]o more was taken than ideas and concepts. The placement of a new building, the use of truss technology to transfer weight, the alignment of floor heights and corridors, the creation of a continuous traffic loop through the hospital complex, the placement of emergency services and

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111. 528 F.3d 1258, 1260 (10th Cir. 2008).
112. *Id*. at 1260-61.
113. *Id*. at 1265.
114. *Id*. at 1266.
115. 303 F.3d 460 (2d Cir. 2002).
116. *Id*. at 467.
117. *Id*. at 468.
118. *Id*. at 469 (giving examples of minimally creative specific details).
119. 201 F.3d 50 (2d Cir. 1999).
120. *Id*. at 51-52.
121. *Id*. at 53.

> ambulance parking along that roadway, the location of a pedestrian area and of mechanical equipment, the arrangement of space on particular floors—these are no more than rough ideas of general nature. They are barely a first step toward the realization of a plan. How these and other ideas would be expressed or realized in a finished plan is not even approached in Plaintiff's drawings . . . . We may assume with Plaintiff that the ideas taken, or at least some of them, are powerful, dynamic ideas of immense value to the successful enlargement of the Hospital. Under the law of copyright, however, the power of an idea does not improve the creator's right to prevent copying. The protection of copyright extends only to the author's expression of the idea. We find no instance in which Defendants have copied particularized expression that commands protection under the copyright law.[122]

The second element, *authorship*, received little independent attention until the advent of literate computers. Most of the controversies involving authorship were resolved by deciding whether a putative human author contributed original expression, thus conflating the two elements of section 102. Section 201 says, "[c]opyright in a work protected under this title vests initially in the author or authors of the work."[123]

The use of the word *authorship* in section 102 does not explicitly specify who might qualify as an author.[124] Nor does section 201.[125] Now, the meaning of the word author, as well as the originality requirement, loom large in the application of the statute to computer-generated works, considered in Part IV below.[126] Because "author" is a legal term of art under the act, this Article uses a different word, *initiator*, to refer to the person who puts generative AI into motion. In most cases that would be the user of a generative AI program, but as Part VI.B explains, it might be the person who organized the embedded database and wrote the code for the generative AI program—the programmer.[127]

C. Intermediaries

Much of the case law conflates analysis of originality with analysis of authorship; one cannot be an author without engaging in original expression.[128] Now, the question is: can something engage in original expression without being an author? The possibility of an inanimate author's satisfying the originality requirement narrows the focus on the meaning of author.

Initiators long have used intermediaries to generate works that they hope will

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122. *Id.* at 56.

123. 17 U.S.C. § 201(a).

124. *See* § 102.

125. § 201.

126. *See* discussion *infra* Part I.V.

127. *See* discussion *infra* Part VI.B.

128. Meshwerks, Inc. v. Toyota Motor Sales U.S.A., 528 F.3d 1258, 1263 (10th Cir. 2008) (explaining essentially of original expression for projectable authorship to exist).

be eligible for copyright protection. Sometimes the instrumentalities are mechanical, as with pens and pencils, typewriters, cameras, and word processing programs.[129] Sometimes the instrumentalities are human, as when the initiator hires a commissioned artist to create a drawing or an animation or produces a song or a movie.[130]

1. Rights.—Over the years the Copyright Office and the courts have scrutinized claims of authorship by initiators using various kinds of intermediaries. At one end of the continuum, they have had little difficulty in concluding that a person who uses a pen, a typewriter, a camera, or word processing software to generate a work qualifies as an author because it is the initiator who directs the machine, which has no capacity to provide creative input on its own.[131] The seminal case for this end of the continuum is *Burrow-Giles Lithographic Co. v. Sarony*, which recognized the copyrightability of photographs despite the intervention of an intermediary—a camera.[132] The work for which copyright was claimed was a photograph of Oscar Wilde.[133] The record showed that the photographer and copyright claimant had gone to some pains:

> [B]y posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging the subject so as to present graceful outlines, arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement, or representation, made entirely by the plaintiff, he produced the picture in suit.[134]

The Court rejected the argument that all the creative work had been done by the camera and the subsequent processing of the film and paper.[135] The facts of

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129. Clear Writing with Mr. Clarity, *A Digression: Writers, Pens and Typewriters*, http://clear-writing-with-mr-clarity.blogspot.com/2014/01/a-digression-writers-pens-and.html [https://perma.cc/5BMT-EVUF] (Jan. 20, 2014) (noting some writers using pens; some using typewriters); Shotkit, *We Asked 1,000 Photographers What Camera They Use In 2023 (And The Results Surprised Us!)* (Feb. 21, 2023), https://shotkit.com/camera-survey/ [https://perma.cc/48MC-USQQ] (observing that photographers use cameras).

130. Harry Bingham, *How To Commission A Cover Design For A Book*, https://jerichowriters.com/how-to-commission-a-cover-design-for-a-book-17-easy-tips/ [https://perma.cc/AU3S-DT63] (last visited July 29, 2023); Amalieiehluthra, *Film Roles Explained: Everything You Need To Know About Film Roles* (May 31, 2021), https://filmstro.com/blog/film-roles-explained-everything-you-need-to-know-about-film-roles [https://perma.cc/8A8X-77QM] (listing different types of intermediaries involved in moviemaking).

131. *See e.g.,* Baltimore Orioles, Inc. v. Major League Baseball Players Ass'n, 805 F.2d 663, 668-69 (7th Cir. 1986) (recognizing the possibility of copyright by one using a recording device to capture athletic performances).

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

133. *Id*. at 54.

134. *Id.* at 55.

135. *Id.* at 61 (quoting Nottage v. Jackson, 11 Q. B. Div. 627 (1883)).

Burrow-Giles involved considerable creative effort by the photographer, leaving open the possibility that some photographs, in which the camera played a larger role, and the photographer less of one, might be unprotected. But Judge Learned Hand, in *Jewelers' Circular Publishing Co. v. Keystone Publishing Co.*[136] took a more absolute view: "[N]o photograph, however simple, can be unaffected by the personal influence of the author, and no two will be absolutely alike . . . . The suggestion that the Constitution might not include all photographs seems to me overstrained."[137]

Even when the machine provides enhancements, as when a modern digital current camera corrects for exposure or lighting problems, or a modern word processor corrects spelling or basic grammatical errors, the lion's share of the creativity still comes from the human using the instrumentality.[138] But not all photographs are afforded protection, despite Learned Hand's suggestion.[139]

On the opposite side of the continuum is a situation in which the lion's share of the creative effort is attributable to the intermediary, responding to only broad directions by the initiator. Under this case law, one who commissions an architect and provides the architect with only general direction, resulting in the creation of architectural drawings, is not the author of those drawings; the commissioned architect is.[140] "[C]ourts have uniformly held that absent unusual circumstances, if a homeowner who lacks architectural training provides 'sketches,' 'instructions,' or 'input' to a professional architect, then the architect—not the homeowner—is the author of the resulting blueprints."[141]

In another case,

> ADG did not provide an independently copyrightable contribution to the design because it merely communicated the changes to Plaintiff . . . . Although the changes were requested by ADG, Plaintiff, as an architect, used his training to incorporate the changes into the design while ensuring that they complied with New York State code.[142]

Elsewhere,

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136. 274 F. 932 (S.D.N.Y. 1921), *aff'd*, 281 F. 83 (2d Cir. 1922).

137. *Id.* at 934-35.

138. *See* SHL Imaging, Inc. v. Artisan House, Inc.,117 F. Supp. 2d 301, 306-11 (S.D.N.Y. 2000) (extensively discussing how photographer almost inevitably satisfies minimal creativity standard).

139. *See* ATC Distrib. Grp. v. Whatever It Takes Transmissions & Parts, Inc., 402 F.3d 700, 712 (6th Cir. 2005) (denying copyright protection to catalog illustrations of transmission parts sketched from photographs in competitors' catalogs; plaintiff admitted illustrations were copied); Bridgeman Art Library v. Corel Corp., 36 F. Supp. 2d 191, 197 (S.D.N.Y. 1999) (denying copyright protection to photographs; "plaintiff by its own admission has labored to create 'slavish copies' of public domain works of art. While it may be assumed that this required both skill and effort, there was no spark of originality—indeed, the point of the exercise was to reproduce the underlying works with absolute fidelity. Copyright is not available in these circumstances.").

140. *See* Sorenson v. Wolfson, F. Supp. 3d 347 (S.D.N.Y. 2015).

141. *Id*. at 363.

142. Ranieri v. Adirondack Dev. Grp., 164 F. Supp. 3d 305, 330 (N.D.N.Y. 2016).

> Goodman, in our view, is not a joint author of the payroll programs. She did nothing more than describe the sort of programs Payday wanted S.O.S. to write. A person who merely describes to an author what the commissioned work should do or look like is not a joint author for purposes of the Copyright Act.[143]

Similarly, a music or movie producer who comes up with the idea for a song or movie and gives general direction to performers and directors is not the author; the playwright, songwriter, and performers are or maybe. In *Forward v. Thorogood*, the court of appeals, agreeing with the district court, held that a record producer was not entitled to joint copyright because he did not do enough.[144] The district court found that "Forward made no musical or artistic contribution" to the tapes, explaining that Forward did not serve as the engineer at the sessions or direct the manner in which the songs were played or sung.[145] The trial judge noted that Forward did request that certain songs be played but "the band then played those songs in precisely the same manner that it always played them."[146]

It contrasted a situation in which a record producer actually artistically supervises and edits the production.[147]

> If the act of 'setting up the recording 'session' were the record producer's only basis for claiming original contribution to the recording, and hence 'authorship,' it would be ill-based indeed. This is no more an act of 'authorship' than is the act of one who makes available to a writer a room, a stenographer, a typewriter, and paper.[148]

These conclusions are reinforced by the proposition that ideas are not copyrightable; only expressions of those ideas. The statute says so, explicitly,[149] and *Feist* says that the distinction is constitutional.[150]

Those cases establish the *sine qua non* for authorship. In doing so, they conflate the originality requirement with the status of the author; one can be an author only if he contributes original content.

Accordingly, those cases are not determinative when competing claims of authorship come, not from two or more human beings, but from a human being and a machine. Then, the criteria for originality may be met but attributable

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143. S.O.S., Inc. v. Payday, Inc., 886 F.2d 1081, 1087 (9th Cir. 1989).

144. Forward v. Thorogood, 985 F.2d 604 (1st Cir. 1993).

145. *Id*. at 607 (quoting Forward v. Thorogood, 758 F. Supp. 782 (D. Mass. 1991), *aff'd*, 985 F.2d 604 (1st Cir. 1993)).

146. *Forward,* 985 F.2d at 607.

147. *Id.*

148. Staggers v. Real Authentic Sound, 77 F. Supp. 2d 57, 63 (D.D.C. 1999) (quoting 1 Melville B. Nimmer & David Nimmer, Nimmer on Copyright § 2.10(A)(2)(b) (1999).

149. 17 U.S.C. § 102(b).

150. Feist Publ'n, Inc. v. Rural Tel. Serv. Co. 499 U.S. 340, 350-51 (1991) (explaining the constitutionally required distinction between facts and expression).

mostly to the machine rather than its human director. That circumstance focuses the question narrowly on whether a machine can be an author, entitled to a copyright.

The Second Circuit was confronted with the question of whether a nonhuman intermediary can be an author under the Copyright Act in *Naruto v. Slater*.[151] In that case, a camera had been rigged up to make it possible for a monkey—a monocot—to activate the shutter and take pictures of itself.[152] The camera captured the image, but there was no human photographer; the monkey operated the camera.[153] The Court of Appeals agreed with the District Court that the monkey lacked standing to sue under the Copyright Act.[154] Although statutory standing depends on the plaintiff's assertion of a legal right conferred by the statute,[155] the *Naruto* court jumped directly to standing to sue under the Act, without considering whether the monkey possessed any legal rights conferred by the statute.[156] The monkey did not have standing if he did not have a legal right as an author.[157] While most people read *Naruto* as holding that monkeys cannot be authors, the opinion does not explicitly say that.[158] The district court focused more sharply on the author and work-of-authorship concepts rather than jumping directly to standing.[159] Together, the trial court and appellate opinions reject the idea of nonhuman authorship.[160]

If the human initiator qualifies as an author, no need exists to decide if an inanimate intermediary qualifies as an author. In *Urantia Foundation v. Maaherra*,[161] the court of appeals reversed the district court and held that a book claiming non-human origin qualified for copyright, avoiding the question of inanimate authorship by designating the human initiator as the author.

> Thus, notwithstanding the Urantia Book's claimed non-human origin, the Papers in the form in which they were originally organized and compiled by the members of the Contact Commission were at least partially the product of human creativity. The Papers thus did not belong to that "narrow category of works in which the creative spark is utterly lacking

151. 888 F.3d 418 (9th Cir. 2018).

152. *Id*. at 420.

153. *Id.*

154. *Id*. at 424. The *Naruto* court found constitutional standing.

155. Havens Realty Corp. v. Coleman, 455 U.S. 363, 373 (1982) (explaining that "injury required by Art. III may exist solely by virtue of 'statutes creating legal rights'").

156. *Naruto*, 888. F.3d at 420-21.

157. *Id*. at 425-26.

158. *See id*.

159. *See* Naruto v. Slater, No. 15-CV-04324-WHO, 2016 WL 362231 at *3-*4 (N.D. Cal. Jan. 28, 2016), *aff'd*, 888 F.3d 418 (9th Cir. 2018) (discussing statutory authorship requirements and rights conferred on authors).

160. *See id*.; *see also Naruto,* 888 F.3d at 418.

161. 114 F.3d 955, 957-59 (9th Cir. 1997).

> or so trivial as to be virtually nonexistent.[162]
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> [T]he Contact Commission may have received some guidance from celestial beings when the Commission posed the questions, but the members of the Contact Commission chose and formulated the specific questions asked. These questions materially contributed to the structure of the Papers, to the arrangement of the revelations in each Paper, and to the organization and order in which the Papers followed one another. We hold that the human selection and arrangement of the revelations in this case could not have been so "mechanical or routine as to require no creativity whatsoever.[163]

Users of computer programs or the authors of such programs may claim copyright in the program's output. The initiator may not do enough to qualify as an author. *Torah Soft Ltd. v. Drosnin*[164] involved a computer program as an intermediary. The district court dismissed copyright infringement claims over the output of a computer program.[165] The court ruled out the possibility that the defendant user was the author of the output:

> [A]n end-user's role in creating a matrix is marginal. Creating a matrix is unlike the creative process used in many computer art programs, which permit an end-user to create an original work of art in an electronic medium. It is fair to say that users of such programs often supply the lion's share of the creativity to create the screen display. By contrast, an end-user of the Software merely inputs a word or phrase which the Software searches for in the Database. Thus, the Software does the lion's share of the work. Indeed, Drosnin's [the defendant] inputs, generally consisting of no more than a single word or phrase, would fail to meet the minimum threshold of originality . . . . In short, Drosnin is not the author of the matrixes.[166]

It also found that none of the plaintiff's alterations to the underlying Bible, which was in the public domain, satisfied *Feist's* tests for originality.[167] Thus the plaintiff's copyright-infringement claim failed.[168] The court granted summary judgment in favor of defendant Drosnin.[169] The computer program output was thus "authorless."[170] None of the relevant actors could establish the requisite

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162. *Id.* at 959 (quoting Feist Publ'n, Inc. v. Rural Tel. Serv. Co. 499 U.S. 340, 347 (1991)).

163. *Id.* (quoting *Feist,* 499 U.S. at 362).

164. 136 F. Supp. 2d 276 (S.D.N.Y. 2001).

165. *Id.*

166. *Id.* at 283 (citation omitted).

167. *Id.* at 289.

168. *Id.* at 278-79.

169. *Id.* at 279.

170. *Id.* at 278-79.

originality; thus no one qualified as the author.[171]

Design Data Corp. v. Unigate Enterprise, Inc. similarly involved a copyright-infringement claim over the output of a computer-aided design program generated by an unauthorized copy of the program.[172] While reversing summary judgment for the defendant on the unauthorized copying of the program itself, the court of appeals, giving a different interpretation to Drosnin, left open the possibility that copyright in the program might extend to its output.[173]

> [T]he copyright protection afforded a computer program may extend to the program's output if the program 'does the lion's share of the work' in creating the output and the user's role is so 'marginal' that the output reflects the program's contents. 4 NIMMER ON COPYRIGHT § 13.03[F] (quoting *Torah Soft Ltd. v. Drosnin*, 136 F.Supp.2d 276, 283 (S.D.N.Y. 2001)).[174]

> Assuming, without deciding, that copyright protection does so extend, we nonetheless conclude that Design Data did not . . . present evidence establishing that SDS/2 'does the lion's share of the work' in creating the steel detailing files or that the user's input is 'marginal.' Thus, the district court correctly rejected Design Data's argument that the SDS/2 copyright protects the images and files that UE imported and distributed.[175]

In *Digital Drilling Data Systems LLC v. Petrolink Services, Inc.*,[176] the district court, citing *Torah Soft* and *Design Data*, concluded that the owner of the copyright in the program owned a copyright in the output as well:

> [T]he database schema passes both the *Torah Soft* test and the *Feist* originality test. In terms of the user's role, it is true that the program relies on data input from the user in order to create the data output. However, the schema itself is not a result of user input; rather, it is an organizational structure that has been pre-formulated and exists in the source code independently of user input. The user input merely fills in the blanks of the schema. Furthermore, the amount of data organized by the schema is so vast, and there are so many possible different ways to arrange and coordinate the data, the Court finds that the database schema satisfies the level of originality required by *Feist*.[177]

Rearden LLC v. Walt Disney Co. involved a program that captured the

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171. *Id*. at 284-85.

172. 847 F.3d 1169 (9th Cir. 2017).

173. *Id*. at 1173.

174. *Id*.

175. *Id.* (quoting Torah Soft Ltd., v. Drosnin, 136 F. Supp. 2d 276, 283) (internal citations omitted).

176. No. 4:15-CV-02172, 2018 WL 2267139 (S.D. Tex. May 16, 2018), *aff'd sub nom.,* Digital Drilling Data Sys., L.L.C. v. Petrolink Servs., Inc., 965 F.3d 365 (5th Cir. 2020).

177. *Id.* at 7.

motion of a human face to create images for motion pictures.[178] The output of the program could be used to replace another real or fictional face with the actor's face.[179] The court discussed *Torah Soft* and *Design Data* and observed that the court of appeals in *Design Data* left open the question of whether copyright extends to a program's output.[180] It distinguished *Torah Soft* on the facts:

> The Court does not find it plausible that the MOVA Contour output is created by the program without any substantial contribution from the actors or directors. Unquestionably, the MOVA program does a significant amount of work to transform the two dimensional information captured on camera into three dimensional Captured Surface and Tracking Mesh outputs. But this cannot be enough since all computer programs take inputs and turn them into outputs. Here, Rearden must allege that the MOVA program has done the 'lion's share of the work,' and in particular 'the lion's share of the creativity' in creating the outputs.
>
> Rearden has not met this burden. Here, unlike in *Torah Soft*, where the user merely inputs a word into the program, MOVA Contour's user inputs a two dimensional camera capture that may range from Dan Stevens' 'facial expressions of all the scenes we had done on previous days' to the 'subtle and dynamic motions performed by the actor [Josh Brolin playing Thanos in Guardians of the Galaxy] to "Brad Pitt's 44-year-old face.' Defendants' role in creating the end-product is not so 'marginal' that the output reflects the program's contents.[181]

Since the plaintiff failed to prove that the program did "the lion's share of the work," or that the user's input was marginal, the court dismissed the copyright claims over the program output.[182]

a. Standing.—The possibility that a non-human might enjoy rights as an author under the Copyright Act presents the question of who has standing to represent such an author in enforcing its copyright. The Ninth Circuit's *Naruto* case focused on that question.[183] The Court of Appeals agreed with the District Court that the monkey lacked standing to sue under the Copyright Act.[184] Even if the monkey had standing, the court concluded that the nonprofit advocacy organization PETA could not represent it.[185] The *Naruto* court explored the requirements for next friend status and found them lacking in the monkey selfie

178. 293 F. Supp. 3d 963 (N.D. Cal. 2018).
179. *Id.* at 967 (describing the program).
180. *Id.* at 970.
181. *Id.* at 970-71 (internal citations omitted).
182. *Id.* at 971.
183. Naruto v. Slater, 888 F.3d 418, 420 (9th Cir. 2018).
184. *Id.* at 424 (the court found constitutional standing).
185. *Id.* at 421-22.

case.[186]

> The specific requirements to become a next friend are intended to keep 'intruders or uninvited meddlers, styling themselves next friends' out of the courts. . . . 'however worthy and high minded the motives of 'next friends' may be, they inevitably run the risk of making the actual defendant a pawn to be manipulated on a chessboard larger than his own case.'[187]

> We have no idea whether animals or objects wish to own copyrights or open bank accounts to hold their royalties from sales of pictures. To some extent, as humans, we have a general understanding of the similar interests of other humans. In the habeas corpus context, we presume other humans desire liberty. Similarly, in actions on behalf of infants, for example, we presume the infant would want to retain ownership of the property she inherited. But the interests of animals? We are really asking what *another species* desires. Do animals want to own property, such as copyrights? Are animals willing to assume the duties associated with the rights PETA seems to be advancing on their behalf?[188]

But even if, under *Naruto*, monkeys (or other inanimate creators) might be authors, no one has standing to enforce their rights because neither computer programs nor monkeys have the capacity to hire lawyers. The notion that an animal or a generative AI program might have standing is a nullity unless a person or entity can be identified to represent it as a next friend.

IV. EXTENSION TO COMPUTER-GENERATED WORKS

All the authorities, including courts, the Copyright Office, and commentators, long have accepted the possibility that an author might satisfy the originality requirement and qualify for copyright protection even though he uses various tools ranging from pens, typewriters, and cameras, to computers in assisting his creative efforts.[189] The touchstone of qualification for copyright is the traditional modest originality test articulated in *Feist*.[190]

The same authorities agree, at least in the abstract, that circumstances might exist under which the machine does so much of the creative work—the "lion's share"—and the machine user so little that the user of the machine would not satisfy the originality requirement for copyright.[191]

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186. *Id*.

187. *Id.* at 431 (Smith, J., concurring) (quoting Whitmore v. Arkansas, 495 U.S. 149, 164 (1990) *and* Leonard v. Wolff, 443 U.S. 1306, 1312 (1979)).

188. *Naruto,* 888 F.3d at 432.

189. *See* discussion *supra* Part III.

190. *See* discussion *supra* Part III.A. (discussing *Feist*).

191. The cases analyzed in Part III.C. ask who did the "lion's share" of the work—the computer program or its user. Under that test, if the computer program did the lion's share of the work, the user

In such circumstances, however, copyright still might exist, either because whoever programmed the machine qualifies for copyright in its output or because the machine itself owns the copyright in its output. Determining authorship when the initiator does not satisfy the originality test, but an inanimate object does, has received limited attention. The statute does not define "author", and virtually every controversy involves a dispute over which of several human beings is the author.[192] The typical case either grants or denies authorship based on an assessment of whether a putative author has met the originality requirement.[193] An author thus is one who engages in the original expression necessary for a copyright to exist.

Few of the decided cases consider whether a non-human can be an author, a question that looms large when an intelligent generative-AI computer satisfies the originality requirement without much original input by its user—not enough to satisfy the originality requirement of the Constitution and the statute. This is not an entirely novel question: in one common situation, the author may be an inanimate entity, though one with a legal personality. Under the Work for Hire doctrine, the author of a work made for hire is the employer or other person for whom the work was prepared.[194] Corporations and other inanimate entities may be employers.[195] The possibility that computer programs might be authors, entitled to copyright protection, has intrigued students of copyright law, and the Copyright Office itself, with intensifying attention, over the last thirty years, even as the technology has advanced to the point that the question is no longer entirely hypothetical.[196]

A. CONTU

The following three paragraphs were written on April 1, 2023, by ChatGPT in response to the author's prompt, "What was CONTU?"[197]

> *CONTU stands for the "Commission on New Technological Uses of Copyrighted Works". It was a commission established by the United*

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of the program cannot satisfy the originality requirement and thus cannot be the author of its output, entitled to a copyright.

192. 17 U.S.C. § 102(a); *see* discussion *supra* Part III.

193. *See* discussion *supra* Part III.

194. 17 U.S.C. § 201(b).

195. *See* John Cretics Co. v. McGinnis, 196 F. Supp 182 (E.D. Pa. 1961) (exploring contention that corporation to be employer); Barton v. Deseret Laboratories Int'l, No. 2:06-CV-00197 PGC, 2006 WL 1932343 at *2 (D. Utah July 11, 2006) (finding no genuine issue as to whether LLC was employer).

196. *See* discussion *infra* Part IV.

197. The author has reproduced the ChatGPT output without editing to provide an example of the capabilities of generative AI. *See Final Report on the National Commission on New Technological Uses of Copyrighted Works*, 3 Comput. L.J. 53 (1981). https://repository.law.uic.edu/cgi/viewcontent.cgi?article=1573&context=jitpl [https://perma.cc/8MNN-ZPAE] [hereinafter *CONTU Report*].

> *States Congress in 1974 to study the impact of new technologies on copyright law and to make recommendations on how to balance the interests of copyright owners and users in the digital age.*
>
> *The CONTU report, issued in 1978, provided guidelines for the use of copyrighted works in digital formats, such as computer software and databases. The report recommended that fair use principles apply to the use of copyrighted works in digital formats, but also recommended that copyright owners be entitled to reasonable compensation for certain types of uses.*
>
> *The CONTU report played an important role in shaping copyright law in the digital age, and its recommendations continue to be influential today.*

This is what Google's Bard said in response to the same question:

> *The Commission on New Technological Uses of Copyrighted Works (CONTU) was a United States government commission that was established in 1974 to study issues associated with copyrighted works in computers and computer-related works. The commission was established by the 93rd United States Congress for a period of three years as part of an effort to revise U.S. copyright law.*
>
> *The commission presented its final report on 31 July 1978. It recommended that computer programs be explicitly protected by copyright law. Its recommendations were largely implemented in the Computer Software Copyright Act of 1980 that became effective on December 12.*
>
> *CONTU also made recommendations on other issues, such as the protection of databases and other collections of information, and the use of technology such as photocopiers.*
>
> *CONTU's work was influential in shaping the development of copyright law in the United States and around the world.*[198]

The Commission considered the proposition that works independently created by computers should be denied copyright "because they had no human author."[199]

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198. April 1, 2023, query by the author, "What was CONTU?" Note that while ChatGPT and Bard did reasonably well in describing CONTU, the author had to revert to human analysis to extract the Commission's conclusions on computer-generated works. When asked about CONTU's views on artificial intelligence, ChatGPT erroneously said, "However, the specific views of CONTU on artificial intelligence are not well-known, as the commission did not focus on this topic during its brief existence." ChatGPT session with the author, April 3, 2023, at 1440.

199. *CONTU Report*, *supra* note 197, at 44.

But it viewed the possibility of such a capacity for artificial intelligence as highly speculative:

> [t]he commission believes that there is no reasonable basis for considering that a computer in any way contributes authorship to all work produced through its use. The computer, like a camera or typewriter, is an inert instrument, capable of functioning only when activated either directly or indirectly by human. When so activated it is capable of doing only what is directed to do in the way it is directed to perform.[200]

After offering examples of how a computer might be used to assist in authorship, the commission concluded that "the eligibility of any work for protection by copyright depends not upon the device or devices used in its creation, but rather on the presence of at least minimal human creative effort at the time the work is produced."[201] In other words, either the user of a computer program satisfies the originality requirement and qualifies for copyright, or no one does. The Commission did not consider the possibility that a copyright held by the programmer might extend to the program's output.

B. Arthur Miller

Fifteen years after CONTU was reported, Harvard law professor Arthur Miller wrote a law review article entitled "Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?"[202] His article had a substantial section on copyright in what Miller called "The Copyrightability and Authorship of Computer-Generated Works."[203]

> Miller concluded, first, that computer-generated expression is entitled to copyright protection, and second that the author of such expression ordinarily is the user of the computer that produced it. A work otherwise entitled to copyright should not be disqualified because of the computer's contribution to the expression's creation. Protection ought not depend on the existence of a literal human author of the computer's output; the purposes of copyright law are served when an otherwise copyrightable work is granted protection even though it was created with a computer's intermediation.[204]

But he hedged about the future:

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200. *Id*.

201. *Id.* at 45.

202. Arthur R. Miller, *Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since Contu?*, 106 HARV. L. REV. 977 (1993). The article has been influential. An April 26, 2023, Westlaw query by the author showed 4 cases, 246 secondary sources, and 25 appellate court documents citing Professor Miller's article.

203. *Id.* at 1042-72.

204. *Id.* at 1049.

> [I]t is premature to consider the status of a work of expression that is truly the product of a computer's 'mind.' Indeed, it is questionable whether that type of creation will materialize within any time-frame worth considering. Today's 'computer-generated' works still have identifiable human authors, and that will be true for the foreseeable future. Therefore, the human element in the creation of these works is sufficient to sustain their copyrightability and resolve any question of authorship.[205]

Miller focused his analysis on the then relatively new expert systems.[206] He did not deviate from his conclusion that expert-system output should be entitled to copyright protection but accepted the possibility that the author of the expert-system program and, particularly, the organizer of the databases used by the expert system, should be considered as authors along with the user of the system.[207]

Two things have changed significantly since Professor Miller wrote his article. First, pattern matching and machine learning have reached the point where the database used by computer creators is generated by a computer, without much human intervention except to identify the confines of the teaching database to be used in the machine-learning process.[208] In the case of the most interesting generative AI programs, the database is everything on the World Wide Web and is otherwise accessible through the Internet.[209] That change removed from contention for author status the knowledge engineer from the 1990s expert-system days who assembled the rules hierarchy from which the computer would draw its conclusions,[210] thus removing knowledge engineers as potential authors. Second, dramatic advances in natural-language processing, including semantic analysis,[211] now permit a user to give only the most general direction to a generative AI program, from which it can produce fairly elaborate stories, nonfiction essays, or artwork.[212] Diminished input by the user of such programs

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205. *Id.*

206. An expert system is a computer program that applies rules developed by a "knowledge engineer" expert in the domain to data submitted by a user to solve problems that ordinarily would require the involvement of a human expert in the field. *See* Henry H. Perritt, Jr., *Artificial Intelligence Techniques for Evaluating Employee Terminations on a Personal Computer*, 13 RUTGERS COMPUT. & TECH. L. J. 341 (1987) (describing expert system developed by the author).

207. Miller, *supra* note 202, at 1070-71 (considering alternative human authors).

208. *See* discussion *supra* Part II (explaining how machine learning creates templates from large teaching databases).

209. *See* discussion *supra* Part II (enumerating data sources used to teach generative-AI systems).

210. *See* Perritt, *supra* note 206 at 348-49 (explaining the role of knowledge engineer).

211. *See* discussion *supra* Part II (explaining analytical steps in natural language analysis and model construction).

212. *See* discussion *supra* Parts I.A. & IV.A. (examples of computer-generated fiction and non-fiction).

weakens that user's claim to authorship under the Copyright Act.

C. Copyright Office

The United States Copyright office has declared its position that machine-generated works are not entitled to copyright in two policy documents and two refusals of registration. The U.S. Copyright Office, Compendium of U.S. Copyright Office Practices, which sets standards for examining and registering copyrighted works[213] cites as examples of uncopyrightable works:

- A photograph taken by a monkey.
- A mural painted by an elephant.
- A claim based on the appearance of actual animal skin.
- A claim based on driftwood that has been shaped and smoothed by the ocean.
- A claim based on cut marks, defects, and other qualities found in natural stone.
- An application for a song naming the Holy Spirit as the author of the work.[214]

It states:

> [T]he 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. The crucial question is whether the 'work' is basically one of human authorship, with the computer [or other device] merely being an assisting instrument, or whether the traditional elements of authorship in the work (literary, artistic, or musical expression or elements of selection, arrangement, etc.) were actually conceived and executed not by man but by a machine.[215]

It cites as examples:

- Reducing or enlarging the size of a preexisting work of authorship.
- Making changes to a preexisting work of authorship that are dictated by manufacturing or materials requirements.
- Converting a work from analog to digital format, such as transferring a motion picture from VHS to DVD.
- Declicking or reducing the noise in a preexisting sound recording or converting a sound recording from monaural to stereo sound.
- Transposing a song from B major to C major.

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213. U.S. Copyright Office, Compendium of U.S. Copyright Office Practices § 101, § 313.2 (3d ed. 2021) ("Works That Lack Human Authorship"), https://www.copyright.gov/comp3/ [https://perma.cc/RNS5-PTF6].

214. *Id.* at 21.

215. *Id.* at 21-22.

- Medical imaging produced by x-rays, ultrasounds, magnetic resonance imaging, or other diagnostic equipment.
- A claim based on a mechanical weaving process that randomly produces irregular shapes in the fabric without any discernible pattern.[216]

In *LumenScript*,[217] the Copyright Office rejected an effort to register a copyright in data provided to a computer simulation. It found that the data simulation was an uncopyrightable compilation (due to lack of originality) of data that represented uncopyrightable facts under *Feist*.[218] It went further, to consider computer-generated works:

> Similarly, the Office does not register HTML code that is generated by website design software: '[i]f the website design software automatically creates the HTML code, the website designer is not considered the author of the resulting markup language.' COMPENDIUM (THIRD) § I 006.l(A). Here, the numbers and punctuation that comprise the Works are not the product of direct human authorship, but rather were created by a computer. Any human authorship occurred at the level of choosing the time and location for data collection and pointing the spectrometer, which is comparable to using website design software to create a website. A Lumen display might constitute a copyrightable work of authorship, but the underlying numbers and punctuation—the Works at issue here—do not. Any attempt to analogize the Works to photographs would be similarly flawed; photographs must still meet the foundational requirement of creative authorship.[219]

In a recent U.S. Copyright Office Review Board decision,[220] the Board accepted the registrant's representation that the work, a two-dimensional piece of artwork, was autonomously created by artificial intelligence without any creative contribution from a human actor.[221] The Board rejected the registrant's argument that the human-author requirement was unconstitutional. It cited court cases, reports like CONTU, and consistent Copyright Office practice all as supporting a human-authorship requirement.[222]

Kris Kashtanova sought to register a copyright in an 18-page story, "Zarya

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216. *Id.* at 22.

217. Letter from Chris Weston, Copyright Office Review Bd., to William F. Lang IV, Telelumen LLC (Mar. 16, 2017) [hereinafter Letter from Chris Weston], https://www.copyright.gov/rulings-filings/review-board/docs/sunset-lumenscript.pdf. [https://perma.cc/T65C-K8VL].

218. Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340 (1991).

219. Letter from Chris Weston, *supra* note 217, at 7.

220. Letter from Shira Perlmutter, Copyright Office Review Bd., to Ryan Abbott, Esq. (Feb. 14, 2022) [hereinafter Letter form Shira Perlmutter], https://www.copyright.gov/rulings-filings/review-board/docs/a-recent-entrance-to-paradise.pdf [https://perma.cc/YAT5-Q9F5].

221. *Id.* at 2.

222. *Id.* at 5.

of the Dawn," generated by an AI program, Midjourney, based on hundreds of prompts such as, "Zendaya leaving gates of Central Park."[223] The Office found that the text that Ms. Kashtanova had written qualified for copyright, as did the selection and arrangement of images.[224] The images themselves, however, created by the AI program Midjourney, did not satisfy the requirements for authorship for copyright because they were not products of human authorship.[225] It thus canceled Ms. Kashtanova's registration because she did not disclaim the machine-generated images in her registration.[226]

In its letter to Ms. Kashtonova's counsel,[227] the Office cited earlier decisions denying copyright registration to "a selfie snapped by a curious monkey named Naruto and for a song that the copyright applicant said had been composed by 'the Holy Spirit.'"[228] It rejected the idea that prompts could satisfy the requisites for authorship:

> Instead, prompts function closer to suggestions than orders, similar to the situation of a client who hires an artist to create an image with general directions as to its contents. If Ms. Kashtanova had commissioned a visual artist to produce an image containing 'a holographic elderly white woman named Raya,' where '[R]aya is having curly hair and she is inside a spaceship,' with directions that the image have a similar mood or style to a 'Star Trek spaceship,' 'a hologram,' an 'octane render,' 'unreal engine,' and be 'cinematic' and 'hyper detailed,' Ms. Kashtanova would not be the author of that image.[229]
>
> Absent the legal requirements for the work to qualify as a work made for hire, the author would be the visual artist who received those instructions and determined how best to express them. And if Ms. Kashtanova were to enter those terms into an image search engine, she could not claim the images returned in response to her search were 'authored' by her, no

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223. Tom Hals & Blake Brittain, *Humans vs. Machines: The Fight to Copyright AI Art*, REUTERS (Apr. 1, 2023), https://www.reuters.com/default/humans-vs-machines-fight-copyright-ai-art-2023-04-01/ [https://perma.cc/MRM3-K4V6] (describing operation of Midjourney). The copyright office initially approved the registration but then changed direction and denied it, based on its view that the output of the program was not the result of original expression by a human author.

224. *Id*.

225. *Id*.

226. *Id*.

227. Robert J. Kasunic, U.S. Copyright Off., Zarya of the Dawn (Registration # VAu001480196) (Feb. 21, 2023), https://copyright.gov/docs/zarya-of-the-dawn.pdf [https://perma.cc/F9MR-DKD7]. The letter stated, "the images in the Work that were generated by the Midjourney technology are not the product of human authorship." *Id*. at 1. "Rather than a tool that Ms. Kashtanova controlled and guided to reach her desired image, Midjourney generates images in an unpredictable way." *Id*. at 9.

228. *Id*. at 1.

229. *See id*. at 8 (text of prompt provided to Midjourney).

matter how similar they were to her artistic vision.[230]

Ms. Kashtanova reportedly is trying again with a new book, created with the aid of a product, Stable Diffusion, which will allow her to scan in her own drawings and to refine them with text prompts.[231]

Although rules promulgated by the Copyright Office lack the force of law, "[t]he weight accorded to the Copyright Office's interpretations 'depend[s] upon the thoroughness evident in its consideration, the validity of its reasoning, its consistency with earlier and later pronouncements, and all those factors which give it power to persuade.'"[232] This standard for effect applies *a fortiori* to Copyright Office opinions reached in individual cases as opposed to those expressed in the form of rules.[233]

The Copyright Office issued a statement of policy on computer-generated works in March 2023.[234] It said that "copyright can protect only material that is the product of human creativity" and that the term "author" "excludes non-humans."[235] The policy statement distinguishes situations in which the user of a generative-AI system merely provides prompts, which function "like instructions to a commissioned artist,"[236] from situations in which a human selects or arranges computer-generated material in a creative way.[237] The former is ineligible for copyright; the latter is eligible. It emphasizes that technology can be used as an aid to the creative process, offering the Photoshopping of an image and the addition of a guitar pedal to a musical work as examples.[238]

The patent office has taken a similar position with respect to the patentability of inventions generated by computers. In a policy statement issued in 2020, the USPTO said that only human beings qualify as inventors and expressed doubt that AI systems would develop sufficient autonomous capability to challenge existing law.[239]

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230. *Id*. at 10 (internal footnotes omitted).

231. Hals & Brittain, *supra* note 223.

232. Skidmore v. Swift & Co., 323 U.S. 134, 140 (1944).

233. *See* Morris v. Business Concepts, Inc., 259 F.3d 65, 71 (2d Cir. 2001) (holding that Copyright Office opinions not entitled to controlling weight).

234. Copyright Registration Guidance: Works Containing Material Generated by Artificial Intelligence, 88 Fed. Reg. 16190 (Mar. 16, 2023) (codified at 37 C.F.R. pt. 202).

235. *Id*. at 16191.

236. *Id*. at 16192.

237. *Id*.

238. *Id*. at 16193.

239. USPTO, Public Views on Artificial Intelligence and Intellectual Property Policy at 5-6 (Oct. 2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf [https://perma.cc/ZZZ3-RPJW] (synthesizing comments and inferring consensus that only human beings are entitled to patents, but expressing skepticism that an AI system could ever invent without a human user supplying patentable "conception").

D. Other Literature

Since the publication of Miller's article, a number of other students and scholars of copyright law have opined about the same subject, as technology has advanced, making it possible to generate more and more sophisticated forms of music, visual art, and literary works by computer.

William T. Ralston considered the copyrightability of computer-generated music in 2005.[240] He noted examples of computers programmed to write poetry, to write in the style of famous authors, and to generate new melodies and lyrics for music.[241]

He then described the basic elements of music[242] and explained how computer programs can use them to general new musical works.[243] He teed up the question of originality by contrasting the view that merely initiating a program involves no creativity, with the notion that merely pressing a button to activate a camera shutter does satisfy the originality requirement. He concludes that by selecting and publishing particular output a user "has improved the public domain."[244]

He reasons that either a completely deterministic output, or a completely random output, driven entirely by the rules embedded in the program, would not leave any original contribution for the user, although whoever coded the algorithms would qualify as an author.[245] But if the user provides even a minimal level of guidance to the program, he should satisfy the low standard laid out by the court in *Feist*.[246] He does not get specific, however. It is certainly plausible that a user might tell a computer program to express a certain rhythm, in a certain key, in a certain time signature, prescribe the shape of melodic lines, and suggest chord progressions.[247] Presumably, that would satisfy the originality criterion and qualify an author entitled to a copyright.

As to authorship and ownership of the copyright, Mr. Ralston rules out the computer and considers the arguments in favor of the computer user or the computer programmer.[248] The "computer is [merely] an amanuensis."[249] "[C]omputers do not need to be given incentives to generate output all it takes is

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240. William T. Ralston, *Copyright in Computer-Composed Music: Hal Meets Handel*, 52 J. COPYRIGHT SOC'Y U.S.A. 281 (2005).

241. *Id.* at 283.

242. *Id.* at 285-86.

243. *Id.* at 286-91.

244. *Id.* at 293.

245. *Id.* at 296-98.

246. *Id.* at 298 (discussing a reversal of the Copyright Office and finding that shapes generated by video game qualified for copyright).

247. All of these forms of user guidance are possible in high-end notation programs such as Sibelius, https://www.avid.com/sibelius [https://perma.cc/7ZSZ-ZY2K]. Many of them are available in simpler programs such as the free MuseScore, https://musescore.org/en [https://perma.cc/W8HR-L2YR].

248. Ralston, *supra* note 240, at 300-01.

249. *Id.* at 302.

electricity."[250] He concludes that the user is the most likely candidate, but that, in special cases, the programmer is the author or co-author.[251] He leaves for another day consideration of copyright policy, confining himself to the reasoning of the decided cases, like *Burrow-Giles*.[252]

Nina I. Brown, in a 2018 law- review article[253] argued that machines can generate original works,[254] that computers can be authors,[255] and that software developers and end users may be joint authors.[256] She notes that the Copyright Act does not define *author* and that its "work made for hire" doctrine recognizes the possibility of non-human authors—corporations that commission works.[257] Quoting the Miller article, she argues that the purpose of copyright is served because extending it to computer-generated works would provide an incentive for the increased production of such works. "The algorithms do not need the incentive to create works, but the programmers need the incentive to write the algorithms. Copyright can provide this incentive by offering one of the stakeholders (the programmer, end user, or both) a '"fair return"' for their effort."[258]

Although she claims that existing copyright law is sufficiently flexible to accommodate machine-generated works, she urges Congressional action to embrace the conclusion.[259]

Yale Law professor Shlomit Yanisky-Ravid, in a 2017 article,[260] argues that traditional copyright laws are inadequate to deal with new generative AI technologies,[261] and urges the adoption of a new model based on a broader version of the Work Made for Hire doctrine. "I propose that AI systems should be seen as the creative employee or self-contractor creators working for or with the user—the firm, human, or other legal entity operating the AI system."[262]

He notes that the Copyright Clause of the Constitution and the Copyright Act gives authors property rights to promote the creation of useful art[263] while observing that "Unlike humans, AI systems do not need incentives to create

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250. *Id.* at 302 (internal quotations omitted).

251. *Id.* at 303-06.

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

253. Nina I. Brown, *Artificial Authors: A Case for Copyright in Computer-Generated Works*, 20 COLUM. SCI. TECH. L. REV. 1 (2018).

254. *Id.* at 24-27

255. *Id.* at 27-33 (criticizing the position of the Copyright Office).

256. *Id.* at 33-38.

257. *Id.* at 29.

258. *Id.* at 20.

259. *Id.* at 41.

260. 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.

261. *Id.* at 670.

262. *Id.* at 671.

263. *Id.* at 700

artworks."[264] Programmers do not need additional incentives, because they receive copyright protection for the program itself.[265]

Yanisky-Ravid's quest for "accountability" in the Copyright Act[266] is puzzling. Liability for AI systems that run amok would not depend on whether the AI program is copyrighted or who held the copyright in it.

Jane Ginsburg and Luke Budiardjo, in their 2019 law- review article,[267] say that "[a]sking whether a computer can be an author therefore is the wrong question; the right question addresses how to evaluate the authorial claims of the humans involved in either preparing or using the machines that create."[268] They explore how the law differentiates between authors and amanuenses, concluding that when a principal constrains how an agent carries out a task, the principal is the author.[269] They then explore the relative claims of upstream and downstream authors.[270]

They marshal the arguments for system designers being the authors of works created by fully-generative machines.[271] As to partially generative machines, for example, a music program that creates music in the form of a duet to accompany a user, the key question is "at what point does the user of a generative machine exercise sufficient influence over the result to interrupt the authorship claim of the machine's designer? . . . [D]oes the user's interruption make her the (or an) author of the output?"[272]

They propose the following test:

> [W]hen the upstream creator's decisions define and bound the downstream creator's role, the downstream creator does not disrupt the upstream creator's claim of authorship. In these circumstances, the upstream creator has effected a limited delegation of creative control to the downstream creator, who simply completes the upstream creator's creative plan by making a relatively foreseeable choice—pushing a button, choosing between a limited set of parameters or settings, or moving a joystick to proceed through a simple videogame. But when the upstream creator's creative plan for the work does not limit the downstream user's creative autonomy, and instead relies on the downstream creator to endow the work with additional (and unforeseeable) creative content, the upstream creator cannot claim to be the sole author of the resulting work because she has not crafted a

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264. *Id.*

265. *Id.* at 702.

266. *Id.* at 664 (suggesting copyright law should be used to increase accountability).

267. Ginsburg & Budiardjo, *supra* note 29 (internal quotations omitted).

268. *Id.* at 343, 397-98.

269. *Id.* at 358-61.

270. *Id.* Upstream authors are the creators of a program. Downstream authors are those that run a program.

271. *Id.* at 410-13.

272. *Id.* at 419.

complete creative plan for the work's production.[273]

They conclude by conceding that some computer-generated works may be authorless, offering as examples a program that converts raw news- agency reports into stories reflective of a particular newspaper's style, and Pandora's creation of "stations" with playlists molded to sample songs provided by users.[274]

They say "we should not assume that we need copyright-like protection to stimulate the production of authorless outputs. Absent an author, the premise underlying incentive justifications requires substantiation."[275]

V. POSSIBILITIES

The Constitution, the statute, the judicial decisions, Copyright Office pronouncements, and the literature leave open multiple possibilities for copyright in computer-generated works. The user of the literate and creative robot may be the author, entitled to a copyright. The programmer who designed the generative-AI system may be the author of its output and entitled to a copyright in it. The computer program itself may be the author and entitled to a copyright. The output of a generative-AI system may be authorless, with no pendant copyright protection.

Interpretation of the authorship requirement is more challenging because the decided cases and the commentary often conflate authorship with originality, and, in the case of *Naruto*, authorship withstanding to sue for infringement. The 2023 Copyright Office guidance, however, distinctly addresses authorship and disentangles it from originality and standing.[276] It is unequivocal in its position that only human beings can be authors under the Copyright Act.

A. The User of The Robot Is the Author

The most obvious possibility for copyright eligibility is that the user of the machine holds a copyright in its output.[277] To qualify, the user must make more than a marginal contribution to the output. Whether merely asking a question of a program like ChatGPT is sufficiently original is dubious. On the other hand, if the user makes multiple prompts to constrain and shape the output of the machine, the user should qualify as an author, if not the author, and be entitled to copyright of a work that meets the "originality" requirement. In that regard, the

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273. *Id.* at 424 (internal footnote omitted).

274. *Id.* at 433-37.

275. *Id.* at 448.

276. Copyright Registration Guidance: Works Containing Material Generated by Artificial Intelligence, 88 Fed. Reg. 16190, 16191 (Mar. 16, 2023) (to be codified at 37 C.F.R. pt. 202) ("II. The Human Authorship Requirement").

277. *See* Kavya Rallabhandi, *The Copyright Authorship Conundrum for Works Generated by Artificial Intelligence: A Proposal for Standardized International Guidelines in the Wipo Copyright Treaty*, 54 GEO WASH. INT'L L. REV. 311, 346-47 (2023) (proposing that users of generative AI be deemed copyright authors, based on Chinese approach).

Copyright Office decision in *Kashtonova*[278] is wrong, because the user made hundreds of prompts to the program.

Machine translation from Spanish into English, now a regular feature of the Google search engine,[279] presents an example where originality is lacking. The user does no more than identify the input and output languages and provide the phrase or a larger chunk of text to be translated. Similarly, an initiator giving only the most basic prompts to a generative-AI program is like someone who uses traditional technologies merely to record and disseminate facts. Such a punitive author would not be entitled to copyright protection on his efforts under *Feist*.[280]

Consider the *Feist* test of selection and arrangement of facts. The Supreme Court held that such an activity would be sufficiently original to qualify for copyright protection, both constitutionally and under the terms of the statute. Original selection and arrangement, however, depends on the existence of alternatives. In *Feist*, there was only one sensible way to organize the white pages of a telephone book—alphabetically—and thus that sensible choice was not sufficiently original to deserve copyright protection.[281]

Imagine that a user of a generative-AI system tells it to go out on the Web and to whatever other sources are available, and to select all owners of Tesla automobiles and to list them by zip code. One can imagine a generative-AI system—or even sophisticated conventional database management software—that would perform the directed tasks and produce the desired result with only one or two prompts not more than a few words long. The overall results would be selected and arranged in a particular way, something not unlike the Yellow Pages of a telephone book, acknowledged by the Feist court as satisfying its standard of selection and arrangement for originality.[282]

If a photographer can obtain a copyright in an image captured by his camera when he does no more than point the camera in a particular direction, why should not the user of a generative-AI program be entitled to copyright on the story for an essay constructed when he points the software in a particular intellectual direction? The answer should depend on how much pointing the initiator does and how many other directions someone else might point to. "Write me a story," is not sufficient under any interpretation of *Feist*. But "write me a five-thousand-word story about a young Harvard MBA with an MIT engineering degree who wants to make money off of generative-AI technology but needs a copyright to do so," involves quite a lot of selection and arrangement from all the material

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278. *See* Robert J. Kasunic, U.S. Copyright Off., Zarya of the Dawn (Registration # VAu001480196) (Feb. 21, 2023), https://copyright.gov/docs/zarya-of-the-dawn.pdf [https://perma.cc/F9MR-DKD7].

279. *See e.g., Google Translate*, GOOGLE LLC, https://translate.google.com/ [https://perma.cc/E45B-T3MP].

280. *See* discussion *supra* Part III.A.

281. Feist Publ'ns, Inc., v. Rural Tel. Serv. Co., 499 U.S. 340, 362 (1991) (saying that organization of white pages could "not be more obvious").

282. *Id.* at 361 (acknowledging that yellow pages satisfied originality requirement for copyright).

available from a generative-AI system like ChatGPT. Should the human initiator be denied copyright protection because a computer system has done the lion's share of the work? Kashtanova suggests she would.[283]

To reach this conclusion biases copyright law against the use of state-of-the-art technology. Intellectual activity otherwise qualifying for copyright protection would be denied because sophisticated computer technology is involved. *Kashtanova* was wrongly decided, not because the Office imposed traditional originality requirements on Ms. Kashtanova, but because it erred in finding that she did not satisfy those requirements.[284] The record showed that Ms. Kashtanova had entered hundreds of prompts into Midjourney in order to generate the images she wanted.[285] The number and character of these prompts easily satisfy the requirements of *Feist*.[286] In prompting the system, she determined its selection and arrangement of material available to it.[287]

Moreover, Ms. Kashtanova's level of involvement in working with a generative-AI system is typical of the kind of human involvement necessary for such systems. It is not the case that one simply says to a system like Midjourney, "create an animated movie," and gives no further guidance. It is the initial guidance and the level of detail in shaping the AI systems output that qualifies as human user as the author of a copyrightable work.

Appropriate application of the *Feist* standard is enough. Wrestling with whether a computer system can be an author is unnecessary. Saying that the system can be an author and that the user of the system has standing to assert the system's rights is not different from finding that the user owns the copyright in what the system produces, and it is a much more straightforward conclusion.

As generative-AI systems get smarter, and the degree of guidance necessary from their users becomes less and less, the universe of authorless expression generated by computers will grow, however. Then, one can treat generative AI systems like any other authorial tool and credit the machine's creativity to its human user, thereby allowing human users of AI to obtain copyright even as the balance of contribution shifts from them to their machines. This is the approach that Professor Yanisky-Ravid would take, treating the generative-AI system output as a work made for hire.[288]

If the time comes when generative-AI can produce interesting and commercially viable work product based on nothing more than a direction to create "something," then the question of copyrightability of purely machine-generated works must be addressed, but not before.

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283. Hals & Brittain, *supra* note 223.

284. *See id*.

285. Letter to Van Lindberg from Robert J. Kusunic, Associate Register of Copyrights at 8 (Feb. 21, 2023), https://www.copyright.gov/docs/zarya-of-the-dawn.pdf [https://perma.cc/Z8BE-GYSQ] (describing Kashtanova's inputs) [hereinafter Kashtanova Letter].

286. *See id*.

287. *See* Feist Publ'ns, Inc., v. Rural Tel. Serv. Co., 499 U.S. 340 (1991).

288. *See* discussion of Yanisky-Ravid article *supra* Part V.D.

B. The Programmer or Knowledge Engineer Is the Author

A second possibility is that the owner of the copyright in the generative-AI program owns a copyright in its output. Authors of computer programs are entitled to copyrights in their program code.[289] But copyright protection only extends to the exclusive right to reproduce, publish, distribute copies, perform publicly, and create derivative works;[290] it does not extend to use. A few cases, however, have considered the possibility that a programmer's copyright might extend to the program's output. Historically, the circumstances justifying that result have been rare, but if the output is preordained by the program's algorithms and its selection and arrangement of data, with relatively little power of a user to influence the output, it is plausible to say that the owner of the copyright in the program should also own a copyright in its output, as do the *Unigate Enterprise*, *Petrolink Services*, and *Walt Disney* cases,[291] and the Ralston, Brown, and Ginsburg-and-Budiardjo articles.[292] The programmer has selected and arranged the material in the program's output by the way he wrote the code and input the data.

On the other hand, the technological advances in machine learning reduce the human input necessary to select and arrange data for a computer program, reducing the likelihood that the designer of a generative-AI system could satisfy the originality requirement and thus qualify as an author of the system's output. The programmer of a generative-AI program faces the same problem as the user of the program: the program rather than the human being does the lion's share of the work.

C. The Robot Is the Author

The third possibility is that the machine or the program itself, inanimate though it is, owns a copyright. It is that system that does the creative research, imposes intellectual organization, and constructs expression in natural language that traditionally constitutes the original contribution of a human author. All the human user does is to put it into motion.

The test for originality under *Feist*[293] disqualifies some generative-AI program output for copyright. Some such output is purely factual. Fiction, however, is not factual and it may be sufficiently elaborated to qualify for copyright protection under traditional criteria applied to the protection of themes, storylines, and characters for novels and movies.[294] And even fact-intensive non-

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289. Google v. Oracle, 141 S. Ct. 1183, 1196 (2021) (noting amendment of Copyright Act to include computer programs)

290. 17 U.S.C. § 106.

291. *See* discussion *supra* Part III.C.1.

292. *See* discussion *supra* Part IV.D.

293. *See* discussion of *Feist supra* Part III.A.

294. *Compare* Metro-Goldwyn-Mayer, Inc. v. American Honda Motor Co., Inc., 900 F. Supp. 1287, 1296-97 (C.D. Cal. 1995) (finding James Bond character protectable) *with* DuBay v. King, 366 F. Supp. 3d 1330, 1346 (M.D. Fla. 2019) (finding that cowboy character was standard scenes a faire

fiction involves non-obvious selection and arrangement.[295] The generative-AI technology engages in a very sophisticated form of selection and arrangement. *Feist's* teaching would allow that selection and arrangement to be protected by copyright.

Then, the justification for offering copyright protection under *Feist's* constitutional analysis would exist. Protecting the computer-generated output would stimulate greater production and thus satisfy part of the constitutional prerequisite for protection. The public interest would be served because generative AI would add to the store of art and information by contributing increments that did not exist before. The bare facts would remain in the public domain for different expression by someone else or a different generative AI program.[296]

The *Naruto* court's emphasis on non-humans' not being able to have widows or children as a reason to deny them copyrights is flawed because of the way in which copyright renewal provisions are applied to works made for hire. The renewal provisions give the original author the power to withdraw a copyright transfer or license and to renegotiate its terms at the midpoint of the copyright.[297] The purpose of the statutory provision is to protect naïve authors who might imprudently give up too much at the onset of the copyright because of weak bargaining power.[298] The power to withdraw a license and to renegotiate is vested not only in the original author, but also in his widow/[er], children, and grandchildren.[299] Importantly, however, this arrangement does not apply to works made for hire.[300]

Allowing inanimate generative-AI programs to be authors, while conceivable, according to this reasoning, requires the most ambitious adaptation of copyright statutory language and caselaw, rejecting multiple pronouncements by the Copyright Office, by most of the commentators, and by the few courts to have considered the subject. Moreover, allowing computer programs to be copyright authors presents the question of who would have standing to enforce the copyright—the conundrum presented to the *Naruto* court.[301] If no one has

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not entitled to copyright protection).

295. *See* discussion of ChatGPT *supra* Part IV.A.

296. *See* Feist Publ'ns, Inc., v. Rural Tel. Serv. Co., 499 U.S. 340, 348 (1991) (explaining why the Constitution requires that facts remain in the public domain).

297. 17 U.S.C. § 203(a)(3) (providing a five-year time window for exercise of power, beginning 35 years after initial assignment).

298. Penguin Group (USA) Inc. v. Steinbeck, 537 F.3d 193, 197 (2d Cir. 2008) (explaining purpose of recapture right; denying rights to John Steinbeck's successors in interest).

299. § 203(a)(2)(A) and (B).

300. § 203(a) (excluding works made for hire); *see also* Mills Music v. Snyder 469 U.S. 153 (1985); Warren v. Fox Family Worldwide, 171 F. Supp. 2d 1057 (C.D. Cal. 2001) (finding termination rights do not extend to works made for hire); *and* Markham Concepts, Inc. v. Hasbro, Inc., 1 F.4th 74, 79 (1st Cir. 2021) (holding that existence of termination rights depends on negating work made for hire status).

301. *See* discussion on *Naruto* Part III.C.2.

standing, to say that the AI system holds the copyright is meaningless. Two obvious candidates for standing exist: whoever wrote the code for the algorithms and organized the data or the user who pointed the system in the right direction. Those two possibilities collapse into the alternatives of authorship explored in Parts V.A. and V.B.

Broadening standing beyond those two possibilities and opening it up to any activist seeking to enforce a robot's copyright is likely could lead to a mess. Copyright, a property regime, would become a kind of socialist matrix without any of the traditional guardrails of government. That is the concern expressed by Judge Smith in his concurring opinion in *Naruto*.[302] The horrors of overly flexible standing rules pointed out by Judge Smith can be avoided in generative-AI cases by affording standing to represent the robot only to the users of the program or to its developers. But that divests the possibility of robot authorship of meaning; it would be more straightforward to treat the programmer or the program user as the author.

To evaluate the possibility of inanimate authorship further, one should consider the ways in which a copyright owned by a generative-AI system would operate. For these purposes, one should assume that the prompts by the human initiator do not qualify for copyright protection; in other words, the same situation that the Copyright Office found in *Kashtanova*.[303]

Someone copying the output of the generative-AI system would commit infringement and, depending on whether someone has standing, potentially be held to account in an action for infringement. But this potential defendant could obtain the same content by gaining access to the same generative-AI system and inputting the same, unprotected prompts. The first initiator has no rights in the generative-AI system itself. So she cannot prevent the second initiator from using the system. Because her prompts are unprotected, she cannot prevent the second initiator from copying her prompts—not under copyright law, anyway. Copyright law always has been clear that independent creation even of identical expression is not infringement,[304] and so a second execution of the generative-AI program, producing identical output to the first execution, is not copying and therefore not infringement.

So, reaching the opposite conclusion from the Copyright Office, and finding that a generative-AI system may be the author of a copyrightable work does not produce any useful practical legal result.

The Copyright Office and the commentators are right: computers cannot be authors.

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302. Naruto v. Slater, 888 F.3d 418, 427, 432 (9th Cir. 2018) (Smith, J., concurring) (pointing out dangers of overbroad standing rules).

303. *See* Robert J. Kasunic, U.S. Copyright Off., Zarya of the Dawn (Registration # VAu001480196) (Feb. 21, 2023), https://copyright.gov/docs/zarya-of-the-dawn.pdf [https://perma.cc/F9MR-DKD7].

304. Calhoun v. Lillenas Publishing, 298 F.3d 1228, 1232-33 (11th Cir. 2002) (stating that identical expression is not infringing if independently created).

D. Joint Authorship

Joint ownership between the program creator and program user is a third possibility, but it depends on the intention of each co-author at the time the work is created[305] that both individuals' efforts merge and that they are joint copyright owners.

The joint work concept is interesting in the generative-AI context because joint work controversies involve collaboration between or among multiple putative authors. In virtually all of the decided cases, everyone claiming a share in the authorship was a human being. But copyrightable work might be the result of a collaboration, not between two human beings, but between a human being and a computer.[306] Almost everyone agrees that the fact of collaboration is not enough for joint work to come into existence.[307] Instead, the statute and the case law require that the collaborators intend that their respective contributions merge and that they jointly own the result.[308] It is far from clear how even the smartest generative-AI system would form such an intent—unless the programmer's intent as to how the system should be used is imputed to the system with respect to any subsequent collaboration with a human user.

More controversial is the threshold for the contribution that each putative joint author must establish. Professor Nimmer, the late distinguished authority on copyright law, held the view that a *de minimis* contribution is all that should be required, something less than the originality required by *Feist*.[309] Under the Nimmer approach, a collaborator contributing only some critical revisions or ideas would enjoy protection under the umbrella of copyright for which the work of the whole qualifies.[310]

Most of the courts have rejected this test and instead, led by the Second Circuit's decision in *Childress v. Taylor*[311] and the Seventh Circuit's decision in *Erickson v. Trinity Theatre, Inc.*,[312] require that every contribution by joint authors be independently copyrightable, satisfying the *Feist* test for originality.

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305. 17 U.S.C. § 101 ("A 'joint work' is a work prepared by two or more authors with the intention that their contributions be merged into inseparable or interdependent parts of a unitary whole"); *see* H.R. Rep. No. 94-1476, at 120 (1976) (stating that the "touchstone . . . is the intention, at the time the writing is done").

306. *See* H.R. Rep. No. 94-1476 (1976).

307. *Id*.

308. § 101 (defining joint work); *See* discussion *infra* text and accompanying notes 314-319 for an analysis of case law.

309. Janky v. Lake Cnty. Convention & Visitors Bureau, 576 F.3d 356, 362 (7th Cir. 2009) (characterizing and rejecting Nimmer *de minimis* test).

310. Erickson v. Trinity Theatre, Inc., 13 F.3d 1061, 1069-70 (7th Cir. 1994) (describing and criticizing Nimmer approach).

311. Childress v. Taylor, 945 F.2d 500, 506 (2d Cir. 1991) (describing Nimmer view and citing cases and evaluating other reasons for rejecting it).

312. *Erickson*, 13 F.3d at 1061 (adopting *Childress* test requiring independent copyrightability by all joint author contributions; rejecting Nimmer *de minimis* test).

Otherwise, the courts fear, under the less-demanding Nimmer test, copyright protection might extend to facts and ideas that should remain in the public domain, available for exploitation by anyone.[313]

In *Janky,* the court of appeals explained the concern:

> We have observed in the past that published creations are almost always collaborative efforts to some degree—peers make suggestions, editors tweak words, and so forth. Were we to deem every person who had a hand in the process a co-author, copyright would explode. On the other hand, the very purpose of copyright law is to promote the progress of the arts and sciences, a purpose that is defeated if important contributions are denied copyright protection. Placing a contribution in one hopper or the other is not always an easy task, and the judge here made a commendable effort. In the end, though, this doo-wop ditty is a joint work.[314]

Under this prevailing view, joint authorship offers nothing to the analysis of possible protection for generative-AI works. If the human author does enough to satisfy the *Feist* originality test, then she qualifies for copyright; otherwise, she does not, either on her own or as a joint author with the machine. Moreover, most of the discussion of joint copyright involves the assessment of authorship,[315] and that takes one back to the question of whether a machine can be an author under the act.

But the rejection of the Nimmer test is judge-made, not statutory. So one way that copyright law could be adapted, without necessitating amendment, is to revisit the question of what level of contribution should be required by human collaborators in the joint work setting. If a human being, working with a generative-AI system generates original works, the protection available for such works, had they been the result of purely human activity, should be extended to the human initiator working with the smart computer as a collaborator. He is enjoying the protection under the umbrella represented by the protection afforded the overall work resulting from the merged contributions of the human initiator and the computer system.

The *Childress* court itself left the door open for rethinking the tests for joint

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313. Some courts have referred to this as the *Childress* versus the *Goldstein* tests. Others refer to it as the *Childress* versus the collaboration test, and still others refer to it as the Second Circuit versus the Nimmer test. *Id.* at 1070-71 (describing Paul Goldstein's view). Professor Paul Goldstein took the position later associated with Professor Nimmer, that independent copyrightability was not required; only a *de minimus* contribution. *Id.* (describing Paul Goldstein's view). In *Childress*, the United States Court of Appeals for the Second Circuit rejected the Nimmer and Goldstein test and held that one cannot be a joint author without making an independently copyrightable contribution to a joint work. *Childress*, 945 F.2d at 506 (describing Nimmer's view and citing cases and evaluating other reasons for rejecting it).

314. Janky v. Lake Cnty. Convention & Visitors Bureau, 576 F.3d 356, 363 (7th Cir. 2009) (internal quotations and citations omitted).

315. For examples of "authorship," see, e.g., *Erickson*, 13 F.3d at 1065, 1066, 1069, 1070 *and* BTE v. Bonnercaze, 43 F. Supp. 2d 619, 624 (E.D. La. 1999) (quoting *Childress*, 945 F.2d at 500).

copyright:

> If the focus is solely on the objective of copyright law to encourage the production of creative works, it is difficult to see why the contributions of all joint authors need be copyrightable. An individual creates a copyrightable work by combining a non-copyrightable idea with a copyrightable form of expression; the resulting work is no less a valuable result of the creative process simply because the idea and the expression came from two different individuals. Indeed, it is not unimaginable that there exists a skilled writer who might never have produced a significant work until some other person supplied the idea. The textual argument from the statute is not convincing. The Act surely does not say that each contribution to a joint work must be copyrightable, and the specification that there be "authors" does not necessarily require a copyrightable contribution. "Author" is not defined in the Act and appears to be used only in its ordinary sense of an originator. The "author" of an uncopyrightable idea is nonetheless its author even though, for entirely valid reasons, the law properly denies him a copyright on the result of his creativity. And the Register's tentative constitutional argument seems questionable. It has not been supposed that the statutory grant of "authorship" status to the employer of a work made for hire exceeds the Constitution, though the employer has shown skill only in selecting employees, not in creating protectable expression.[316]

This approach would lower the barrier to copyright protection for human users of generative-AI systems, requiring that their contributions be only *de minimis* rather than original.

One of the motivations for the courts' being stingy with joint copyright is the recognition that transaction costs multiply when two joint owners have rights; either of them can veto a proposed transaction to make use of the output. That concern is unwarranted when one of the joint authors is an inanimate computer system, incapable of exercising a veto. But if the objective is merely to lower the threshold for originality by a user of a generative-AI system, the simpler way to do that is to adopt Professor Yanisky-Ravid's suggestion that computer-generated works be treated as works made for hire.[317]

E. Authorless and Thus Uncopyrightable

Much of the authority accepts the possibility that the output of generative AI systems may be authorless—not entitled to a copyright at all because no human author can be identified according to established criteria.[318] CONTU[319] and the

316. *Childress*, 945 F.2d at 506.

317. *See* discussion on Yanisky-Ravid article *supra* Part V.D.

318. *See* Ginsburg & Budiardjo, *supra* note 29, at 433-37 ("the authorless output").

319. *See* discussion *supra* Part IV.A.

Copyright Office[320] take this position. *Naruto v. Slater*,[321] *Torah Soft Ltd. v. Drosnin*,[322] and Ginsburg and Budiajaro[323] accept this possibility.

The possibility should not be startling; ideas and facts have never been copyrightable,[324] and some human creations, as in the fashion industry[325] are not entitled to copyright protection. The Copyright Office lists other types of works not eligible for copyright, such as slogans, ideas and plans, blank forms, and calendars and schedules of sporting events.[326] Whether computer-generated works should be "authorless" depends on an assessment of the purposes of copyright.

VI. UTILITARIAN APPROACH

Copyright protection affords public benefits by creating incentives for authors; it also imposes costs by deterring other authors.[327] In considering copyright protection for new works such as those resulting from generative AI, it is, thus, appropriate to weigh the benefits and costs.

On the benefit side, it's hard to question the proposition that copyright protection for AI-generated works provides an incentive for greater use of generative-AI technology. If the users of the technology own copyrights in what the technology produces, they have an incentive to buy the technology and pay a higher price for it. The organizers of the data that the technology uses and those who write the code for its algorithms have an incentive to improve their products by the prospect of selling more of them at a higher price. This incentive exists regardless of who is identified as the author: the human user of the system, the developer of the system, or the inanimate system itself, represented by either its user or its developer.

The costs are a reduction in the diffusion of AI-generated works because one who simply copies the work and seeks to exploit it economically would be liable for infringement. The costs also would include a generally higher price to consumers of AI-generated works because the effect of copyright would be to limit competition. Assuming negative price elasticity of demand,[328] the result

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320. *See* discussion *supra* Part IV.C.

321. No. 15-cv-04324-WHO, 2016 WL 362231 (N. D. Cal. Jan. 28, 2016).

322. 136 F. Supp. 2d 276 (S.D.N.Y. 2001).

323. Ginsburg & Budiardjo, *supra* note 29.

324. 17 U.S.C. § 102(b).

325. *See* Star Athletic, L.L.C. v. Varsity Brands, Inc., 580 U.S. 408, 439 445-46 (2017) (Breyer, J., dissenting) ("[I]t is clear that Congress has not extended broad copyright protection to the fashion design industry").

326. 17 C.F.R. § 202.1 (2023).

327. *See* Matthew J. Sag, *Beyond Abstraction: The Law and Economics of Copyright Scope and Doctrinal Efficiency*, 81 TULANE 187, 205 (2006) (explaining economic costs and benefits of copyright); *see also* Feist Publ'ns, Inc., v. Rural Tel. Serv. Co., 499 U.S. 340, 349-50 (1991) (recognizing the tension between rewarding authors and making information unavailable to others).

328. *See In re* Wabash Valley Power Ass'n, 77 B.R. 991, 1009 (S.D. Ind. 1987) (explaining price elasticity of demand), *set aside on other grounds sub nom.* Nat'l Rural Utils. Co-op. Fin. Corp.

would be a lower level of such works.

On the other hand, the costs would be mitigated because the independent creation of such works would be so easy. Independent creation of a similar or even exactly the same work is not an infringement unless copying has occurred.[329] The wide availability of generative AI at a modest cost means that would-be pirates have an alternative to copying AI-generated works; they could generate their own. And since low for no creativity is required to use the systems, the barriers to entry by these competitors are quite low.

The current technology does not produce exactly the same result when the same prompt is presented a few days later. And so if the policy goal of the law in this area is to increase the number of new works, providing an incentive for would-be pirates to generate their own works with the technology rather than copying what already has been produced would have a positive, though modest, effect.

A. Economics of Free Riding

The purpose of the Copyright Act is usually expressed in terms of "stimulat[ing] artistic creativity for the general public good."[330] Application of the act to new technologies should be informed by that purpose. Copyright provides an incentive for creative expression by protecting generators of such expression from free riding by pirates;[331] it is not merely a subsidy for authors. Nicholas Suzor put it this way:

> The common utilitarian justification for copyright is that it is 'a tax on readers for the purpose of giving a bounty to writers.' It appears now that the role of copyright is not to provide authors with incentives to create, but to provide 'incentives for capital.' Without copyright, once a work is produced, it can be copied and redistributed very cheaply. Copyright provides the ability to exclude free-riders, allowing producers to sell copies to the public and recoup their costs of production. Copyright accordingly enables producers to invest the resources necessary to fund new productions, on the gamble that they will be successful.[332]

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v. Wabash Valley Power Ass'n., 111 B.R. 752 (S.D. Ind. 1990).

329. *See* Skidmore as Trustee v. Led Zeppelin, 952 F.3d 1051, 1064 (9th Cir. 2020) (en banc) (*"*Because independent creation is a complete defense to copyright infringement, a plaintiff must prove that a defendant copied the work").

330. Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417, 432 (1984) (quoting Justice Stewart on the purpose of the Copyright Act).

331. "When [copyright protection] is very low, few or no works will be created, since free riding by copiers may prevent any author from covering his cost of expression." William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL STUD. 325, 335 (1989) (offering equations for assessing the need for and the costs of copyright protection).

332. Nicolas Suzor, *Free-Riding, Cooperation, and "Peaceful Revolutions" in Copyright*, 28 HARV. J. LAW & TECH. 137, 143-44 (2014).

Julie Cohen said it a little differently:

> [T]he incentives-for-authors story impedes clear-eyed assessment of copyright's true economic and cultural functions. In the contemporary information society, the purpose of copyright is to enable the provision of capital and organization so that creative work may be exploited. Copyright creates a foundation for predictability in the organization of cultural production, something particularly important in capital-intensive industries like film production, but important for many other industries as well.[333]

In *Barclays Capital, Inc., v. Theflyonthewall.com*,[334] the court explained the free-riding concept and its application to copyright and to state misappropriation law.[335] It said, "the ability of other parties to free-ride on the efforts of the plaintiff or others would so reduce the incentive to produce the product or service that its existence or quality would be substantially threatened."[336]

A classic example of free riding would be someone who takes a novel by Charles Dickens and sells it, keeping all the revenue to himself without giving Charles Dickens anything. Copyright law is meant to mitigate that risk for Dickens by giving Dickens a copyright that he can enforce through a civil action for infringement against anyone who takes his work and copies it, distributes it, performs it, or displays it publicly without his permission.[337] Dickens can recover damages for such infringement that essentially make him whole, including the possibility of disgorgement of any profits earned by the pirate.[338]

So, in evaluating the need for copyright protection of the output of generative AI systems, the first thing to do is to explore the possibilities of free-riding on the output of generative AI systems. The typical free-riding pirate engages in piracy because he lacks the ability to, or wants to avoid the burden of, creating something himself. In his day, Dickens presented substantial investment for the

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333. Julie E. Cohen, *Copyright as Property in the Post-Industrial Economy: A Research Agenda*, 2011 Wis. L. Rev. 141, 143 (2011) (arguing for a less capitalistic view of copyright).

334. 650 F.3d 876 (2d Cir. 2011) (a case involving a claim of copyright infringement and misappropriation against a news service that distributed the plaintiff's "hot news" recommendations about investment securities).

335. *Id.* at 900-01.

336. *Id.* at 900.

337. After 1842, literary works by Dickens or anyone else were protected by and English copyright statute. 5 & 6 Vict., c.45, § 20; *see* Christopher Ledford, *The Dream That Never Dies: Eldred v. Ashcroft, the Author, and the Search for Perpetual Copyright*, 84 OR. L. REV. 655, 664-68 (2005) (describing English copyright law from the Statute of Anne to the Copyright Act of 1842); *and* Mark Rose, *Nine-Tenths of the Law: The English Copyright Debates and the Rhetoric of the Public Domain*, 66 LAW & CONTEMP. PROB. 75, 77-85 (2003) (describing debates over English copyright law).

338. *See* On Davis v. The Gap, Inc., 246 F.3d 152, 159-161 (2d Cir. 2001) (applying burdens of proof in profits-cover for infringement).

pirate to seek a free ride on. Dickens labored with a quill pen, periodically dipping it in black ink and writing on Bath Superfine lined paper. He took the manuscript pages to his printer, which set lead type by hand, pulled proofs, and then, after Dickens reviewed and corrected the proofs, produced the work a sheet at a time, probably on a cylinder press, bound the pages, and warehoused the books or magazine issues waiting for orders.[339] All of this investment represented sunk cost; Dickens could not resell his and his printer's labors for a different purpose.[340]

When the work to be pirated has been generated by a machine, the potential pirate has a new choice; he can engage in piracy, free-riding on the efforts of the first user of a generative-AI program, or he can use the generative-AI program himself. If the prompts involved were truly humdrum and pedestrian, the potential pirate will have no difficulty coming up with his own prompts, and doing so will impose very little burden on him.

If the goal is to protect authors against free riding, copyright should protect the author's investment that the pirate avoids and which the author cannot recover through reuse or resale of the investment: that portion of the author's investment that he must recover from earnings attributable to the work.

Dickens' and his printer's investment was mostly unrecoverable except through earnings. That is not so for the user of a generative-AI system. He can use the system to generate other works as easily as he could use it to generate the first one. He also, depending on the terms of his sale or license agreement with the programmer, can sell or rent the system to someone else, offsetting his costs. So the proportion of his costs that are sunk are much less than those of an author in Dickens' era.

Not only are the costs recoverable; they are significantly lower, both in terms of monetary outlays and authorial labor. A modern author or artist dictates into a natural language transcriber like Dragon[341] or works with a keyboard and a mouse, rather than writing in long hand with a quill pen. Even the most powerful computers capable of running top-of-the-line word-processing, graphical, and audiovisual editing software cost several orders of magnitude less than nineteenth-century printing presses. And the reproduction and distribution costs are close to zero. Advertising and promotion costs remain important, however,

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339. *Dickens at Work*, MORGAN LIBR. & MUSEUM, https://www.themorgan.org/collections/works/dickens/dickens-at-work [https://perma.cc/YD6V-EEZD] (last visited 27 April 2023).

340. *See* Watch Co. v. Citizen Watch Co., 2022 WL 1535262, at 3 (7th Cir. May 16, 2022) (explaining that sunk costs are unrecoverable investments, in dealership disputes) *and* Cass R. Sunstein, *Irreparability as Irreversibility*, 2017 SUP. CT. REV. 93, 106 (2017) (analyzing irreparability as a prerequisite for injunctive relief:

> Irreversible investments are sunk costs—those that cannot be recovered. Examples include expenditures on advertising and marketing, or even capital investments designed to improve the performance of a factory. In fact, the purchase of motor vehicles, computers, and office equipment is not fully reversible, because the purchase cost is usually significantly higher than the resale value.).

341. *See* discussion *supra* Part I. (describing this author's use of Dragon software).

and they are sunk.[342]

Just over 25 years ago, this author wrote a law review article explaining how economic analysis should be applied to the free-riding threat in the then-new Internet architecture.[343] The article stated the policy proposition thus:

> Owners of intellectual property should not be granted enlarged economic protection merely because they would like it. Users and exploiters of existing intellectual property should not be free of traditional intellectual-property restrictions just because they would like to be. Rather, intelligent appraisal of the role of property in an Internet-shaped information infrastructure should focus on the specific free riding and piracy risks created by the new technology.[344]

It then offered a set of simple equations to evaluate the free-riding risk. The first expressed the cost to the originator of creating a work.[345] The second expressed the cost of piracy to the pirate.[346]

The free-riding risk is significant enough for the law to address only when the cost to the original creator is much greater than the cost to the pirate.[347] The cost equation for the original creator includes elements of reproduction, marketing, advertising, and distribution, in addition to organizing the information—what the article called "chunking and tagging."[348] The cost equation for the pirate includes the same elements except for the cost of organizing the information. The pirate faces an additional cost element: that of copying the original work.[349]

In 1996, when the article was published, technology was changing the cost of all the elements except for the organizing of the information. Digital formats had reduced the cost of copying to zero, and the Internet was in the process of reducing the cost of distribution to zero or close to it. That reduced the pirate's costs but also reduced the original creator's cost.

In 2023, technology is impacting the cost of organizing—what the 1996 article and a 1992 article called chunking and tagging.[350] Chunking and tagging is equivalent to *Feist's* selection and arrangement. When state-of-the-art

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342. Chip MacGregor, *How Much Money Does A Publisher Invest In Marketing My Book?,* MACGREGOR & LUEDEKE (Jan. 15, 2013), https://www.macgregorandluedeke.com/blog/how-much-money-does-a-publisher-invest-in-marketing-my-book [https://perma.cc/2K6D-Q4BS] (reporting marketing budget of $50,000 for mass market hardcover). Marketing costs are sunk because they are not recoverable for another purpose.

343. Henry H. Perritt, Jr., *Property and Innovation in the Global Information Infrastructure*, U. CHI. LEGAL F. 261 (1996).

344. *Id.* at 262.

345. *Id.* at 277.

346. *Id.*

347. *Id* at 277-78.

348. *Id.* at 277.

349. *Id.*

350. Henry H. Perritt, Jr., *Tort Liability, the First Amendment, and Equal Access to Electronic Networks*, 5 HARV. J. L. & TECH 65, 68-69 (1992) (explaining chunking and tagging concept).

generative-AI is involved, many levels of chunking and tagging occur, from the assembly of the basic learning database, performed by web crawlers in the case of ChatGPT and Bard, to the analysis of the data and the development of semantic templates by means of machine learning, to the processing of user input to match user requests with templates, and to the use of natural language rules to produce the output.[351] Much of this work will have been done by the developers of the generative-AI system or by the system itself.[352] But some of it, in the form of prompts and other directions and specifications given the system at the time it is used, is decisive in determining the final selection and arrangement.[353]

Compared with traditional methods of creation for literary, musical, visual-art or audiovisual works, the cost of creating new works with generative AI is much lower. Also, the relationship between fixed and marginal costs has shifted. The marginal cost of this activity has been reduced to zero or something close to it, the fixed costs have increased—no one can say by how much—because of the need to invest in a generative-AI system. The price of a subscription for Midjourney (the generative-AI system used by Ms. Kashtanova) represents a touchstone for the cost of generative-AI systems to the end user. The annual cost of a Midjourney subscription ranges from $96 to $576, to which must be added charges of $4 per hour for processor time.[354] For now, ChatGPTPlus and Bard are free to users, but it is likely that such systems will migrate into more commercial versions for which the developer collects a fee either for purchase or subscription.

The relationship between fixed and marginal costs matter because marginal costs, once incurred, are embedded in the work; they can be recovered only through revenue earned by the work. Fixed costs, on the other hand, may be recovered in whole or in part by transferring the fixed asset to other uses or other owners. That is so unless the fixed costs are sunk. The user of a generative-AI system disappointed in his commercial results can sell the system to someone else.

So the free riding risk depends on the capital cost—the fixed costs of generative AI and its switching costs.[355] If both fixed and switching costs are high, the initiator has more of an investment to protect by the need to earn a fair return, and the potential pirate faces a higher economic barrier to entry as a legitimate competitor. In other words, the risk of piracy is high.

The lower the capital costs of generative AI, the lower the initiator's need for a large return, and the lower the potential pirate's barriers to competing legitimately; he can simply buy his own generative AI machine. If the fixed cost or switching cost of a generative-AI system is low, the initiator has less of an investment to recover through a stream of revenue from the computer-generated

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351. *See* discussion *supra* Part II (explaining the technology of machine learning).

352. *Id*.

353. *See* discussion *supra* Part V.A. (explaining role of human user of generative AI).

354. *Subscription Plans*, MIDJOURNEY, https://docs.midjourney.com/docs/plans [https://perma.cc/FM78-BQ63] (last visited May 24, 2023).

355. Switching costs matter because they represent transaction costs of a sale or rental of the fixed asset and must be deduced from the sale price or rent.

works, and the pirate has less of an incentive to engage in piracy.

B. Protect User Investment In Computer Systems

The original user and claimant of copyright in the output of the system could claim that he needs copyright protection to recover his investment in the generative AI system, regardless of how original his contribution is in using it. Braden and his investors would be glad to have the extra rents obtainable from a monopoly, however limited.[356]

Apart from the need to protect against free riding, incentives resulting from copyright protection may be desirable for another reason, to encourage the use of generative AI and thus benefit the public. It is hard to question the proposition that entitlement to copyright protection for all of the output of a generative AI system would provide a substantial incentive to invest in such systems and to use them energetically to produce lots of output.

Indirectly, that's what Braden seeks in the story at the beginning of this Article. In order to put into operation his business plan and to produce the output that he thinks will have traction with the public, he must get financing, and the financing depends upon some form of intellectual property protection for his and his machine's output.

The need for copyright protection to protect the investment of authors against rewriting is minimal when all the author has done is point a generative AI program in a relatively obvious direction. Copyright law has never extended this protection to the people who do the obvious, concluding that doing the obvious is not sufficiently original. Moreover, however plausible the economic argument in favor of boosting Braden's ability to raise capital, it ventures into the Sweat of the Brow doctrine disavowed by *Feist*.[357] Creators of works have never been entitled to copyright merely to cover the costs of their investments in pens, typewriters, cameras, or computers, or their labor.

C. Developers Already Protected

The people who build generative AI systems already enjoy copyright protection in the selection and arrangement of the data used—to the extent that they can establish that they actually select and arrange anything, as opposed simply to vacuuming up all the contents from the web. It certainly affords protection to the coders who wrote the programs that constitute the software. Computer programs qualify for copyright protections, although the algorithms expressed in them do not.[358]

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356. *See* Viamedia, Inc., v. Comcast Corp., 951 F.3d 429 (7th Cir. 2020) (noting that eliminating competition enables firm to extract "monopoly rents").

357. Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 343-46 (discussing and rejecting Sweat of the Brow doctrine. Feist's discussion of Sweat of the Brow concerned the effort involved in collecting uncopyrightable facts. Its logic "time and effort" can be extended to any claim to copyright protection premised on substantial investment, without reference to originality).

358. Lotus Dev. Corp. v. Paperback Software Int'l., 740 F. Supp. 37, 53-54 (D. Mass. 1990)

It's far from obvious that system developers need additional rents from copyright in their systems' output. And the authors of computer programs almost never have been entitled to copyright in the output of those programs when they are used by others.[359]

D. Wait and See

The best solution is to leave generative AI free from intellectual-property protection other than that which already exists. The justification for such protection—potential free-riding on the investment of others—is absent, or nearly so.

In guiding the adaptation of existing law, it is important to resist the all-too-present tendency to say that law must halt technological development until lawmakers figure out what the guidelines should be. One cannot figure out what the guidelines should be until one has actual experience with collisions between applications of the technology and concrete interests that the law recognizes.

Robust discussion should continue, pending further implementation of generative AI into actual commercial products, and the determination of actual disputes involving competing claims of property rights. Legislators should wait and see how the market develops. No one can know yet what terms and prices will be demanded of those who wish to use state-of-the-art generative AI. Those terms and prices will govern the investment to be recovered by the initiator and the barriers to legitimate entry to the potential pirate.

As disputes develop over the eligibility of computer-generated works for copyright, policymakers can scrutinize what the Copyright Office and the courts do to resolve these disputes. Only after a sufficient record of such administrative and judicial decisions is developed will anyone be in a position to write sensible law on the subject. The basic framework established by the Copyright Act is perfectly adequate to accommodate generative AI; it is not necessary to create some new intellectual-property regime from whole cloth, which would be a daunting task indeed. Nor is it necessary to amend the Copyright Act to implement the interpretations urged in this Article or elsewhere in the literature. All of the proposed approaches can be accommodated by relatively modest interpretations of existing law and precedent.

E. Protections Other Than Copyright

The need for copyright protection for computer-generated works also should be assessed in light of other protections available for such works. The three other intellectual property regimes—patent, trademark, and trade secret—potentially protect important parts of the generative-AI universe, as do technological means of copy protection.

1. Patent.—A serious analysis of the role of patent law in protecting

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(distinguishing expressive elements of computer programs, which are copyrightable, from ideas, processes, and methods embodied in them, which are not).

359. *See* discussion *supra* Part III.C. (analyzing cases).

generative AI is beyond the scope of this Article. Nevertheless, a few basic observations about patent law in the generative-AI context are appropriate.

First, the patent office has aligned itself with the copyright office in holding only human beings can hold patents. The United States Court of Appeals for the Federal Circuit affirmed the United States Patent and Trademark Office (USPTO) position in October 2022, in *Thaler v. Vidal*.[360] The court noted that the Patent Act provides that inventors be "individuals,"[361] and that the Supreme Court says that "'individual' ordinarily means a human being, a person."[362] Moreover, the Patent Act uses the pronouns "himself" and "herself" to refer to inventors, not "itself" as it would have done if Congress meant to include inanimate objects as inventors.[363] Finally, federal-circuit precedent says that only natural persons, and not corporations or sovereigns can be inventors.[364] The case involved a patent claim for neural flames and fractile containers developed by a generative AI system the applicant called "DABUS."

Second, asserting patent protection for graphical art, music, or literary works generated by computers is not going to be successful because those outputs are not eligible patent subject matter; they do not constitute "new and useful process, machine, manufacture, or composition of matter."[365]

Third, the developer of a generative AI system wishing to assert intellectual property protection over the output of the system can achieve his desired result by enforcing a patent in the system. Such systems are patentable.[366] The patent would not cover the output, but anyone using the system without a license from the patentee would infringe the patent.[367] The patentee thus would control the output by limiting its generation to his licensees.

2. Trade Secret.—Trade secret law might protect the generative AI system itself, but it would not protect its output if the output were public, as it surely would be for the most conceivable uses to generate literary works, music, or visual art. Secrecy is an element of trade secret misappropriation.[368]

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360. 43 F.4d 1209 (Fed. Cir. 2022).

361. *Id.* at 1211.

362. *Id.*

363. *Id.*

364. *Id.* at 1212.

365. 35 U.S.C. § 101; *see also In re* Alappat, 33 F.3d 1526, 1553 (Fed. Cir. 1994) ("Music of course is not patentable subject matter; a composer cannot obtain exclusive patent rights for the original creation of a musical composition" (Archer, C.J., concurring)).

366. McRO, Inc., v. Bandai Namco Games Am. Inc., 837 F.3d 1299, 1307 (Fed. Cir. 2016). (the court of appeals reversed the district court and held that a patent claim for a "[a] method for automatically animating lip synchronization and facial expression of three-dimensional character constituted patentable subject matter."); *see also* Chinese Patent No. 1,017,965,87B (issued Mar. 6, 2013) *and* U.S. Patent No. 936,941,0B2 (issued June 14, 2016) *and* U.S. Patent No. 2,019,019,965,8A1 (issued June 14, 2019).

367. Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 484 (1964) ("[I]t has often and clearly been held that unauthorized use, without more, constitutes infringement.").

368. HENRY H. PERRITT, JR., TRADE SECRETS: A PRACTITIONER'S GUIDE §§ 6:1-6:12 (2nd ed.

Although trade-secret law would not protect the output of a generative-AI system because such output would not satisfy the secrecy element, it very well might protect the prompts the human user gives the system. An initiator need not reveal the prompts he gives to a generative-AI system, and the collection of prompts well might confer a competitive advantage by virtue of their not being generally known – the criterion for trade secret status.[369]

Chemical formulas and recipes regularly qualify for trade secret status, and the collection of prompts for a generative-AI system are similar to such knowledge.[370]

Judge Friendly distinguished between outputs, not entitled to trade secret protection, and the processes used to produce the outputs, potentially protectable:

> If the requisite elements of secrecy were proved, one could imagine that a manual on how to set up acquisition deals, a list of contracts, or even model letters and forms might so qualify. Information like this would be used in *running* the business; to draw an industrial analogy, it would be like the formulas or processes used in manufacturing. In contrast, the information at issue here was not used to run Lehman's business but was its *product:* like the car that rolls off the production line, this information was what Lehman had to sell.[371]

The user of a generative-AI system suspecting misappropriation of his trade secrets in the prompts he used, could raise an inference of misappropriation by showing that the system could produce the same output only with the same prompts. The alleged misappropriator then would be put in the position of explaining how he obtained the same output without using the claimed trade secrets.

3. Trademark.—Creative use of trademark might afford the user of a generative AI system some protection. He could come up with a mark that is sufficiently unique and distinct to qualify for trademark protection[372] and then

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2023).

369. *See id*. at § 1:2.1 (defining trade secret). Already a cottage industry is developing in "prompt engineering."; *see also* Linda Houser, *Prompt Engineering for Generative AI*, WEVOLVER (Apr. 25, 2023) https://www.wevolver.com/article/prompt-engineering-for-generative-ai [https://perma.cc/L5F3-6SL9] (offering guidance on how to frame good prompts); *see also* Nik Popli, *The AI Job That Pays Up to $335K*, TIME (Apr. 14, 2023), https://time.com/6272103/ai-prompt-engineer-job/ [https://perma.cc/3WJL-HR6J] (reporting on upsurge in high-paying prompt engineering jobs).

370. *See* PERRITT, *supra* note 368, at § 3:9.1 (citing Am. Can Co. v. Mansukhani, 728 F.2d 818, 819-20 (7th Cir. 1982)) (formulas of commercial jet inks were trade secrets); *see e.g.,* Dotolo v. Schouten, 426 So. 2d 1013 (Fla. Dist. Ct. App. 1983) (formula for citrus-based pet products was trade secret even though defendant obtained formula by having chemical laboratory analyze sample to determine percentage of various ingredients in product).

371. Lehman v. Dow Jones & Co., 783 F.2d 285, 298 (2d Cir. 1986). (emphasis in original)

372. *See* Amazing Spaces, Inc. v. Metro Mini Storage, 608 F.3d 225, 244 (5th Cir. 2010) (discussing role of uniqueness and distinctiveness in qualifying for trademark protection); *see also*

associate it with works that he generates using a particular system. If the works gain popularity, a pirate might be tempted to engage in unauthorized reproduction and distribution of the works, also making unauthorized use of the mark. That would constitute trademark infringement, for which the original author could get damages and an injunction.[373]

4. Copy Protection.—Copy protection is available in certain kinds of works as a substitute for copyright protection. Even purely textual works can be published and formatted in ways that make it difficult to copy and print them. Although most such works depend on easy digital reproduction as a means of legitimate distribution to earn revenue, they can be made available for reading only on web browsers or proprietary readers while not being downloadable in more generic formats.

More complicated formats make copy protection easier to implement. Certainly, video games and audiovisual works can have copy protection embedded in them that limits the uses necessary for piracy.[374]

F. Procedure for Testing Eligibility for Copyright

One who claims copyright has the power to sue for infringement in federal court only after he registers the copyright or is denied registration.[375] Copyright owners denied registration may request reconsideration. The initial reconsideration request is conducted by a staff attorney not involved in the original decision. A second reconsideration request goes before a Review Board comprising the Register of Copyright and the General Counsel or their designees and a third member designated by the Register.[376] Decisions by the Copyright Office to deny registration are subject to judicial review under the Administrative Procedure Act.[377]

The degree of deference owed a final denial of registration by a court hearing an infringement claim is unclear, but it is reasonable to use *Skidmore v. Swift & Co.*[378] as a guide. *Skidmore* requires a court to assign weight to an administrative

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In re Chippendales USA, Inc., 622 F.3d 1346, 1351-52 (Fed. Cir. 2010) (distinguishing inherent distinctiveness from acquired distinctiveness).

373. Chanel, Inc. v. besumart.com, 240 F. Supp.3d 1283, 1290-91 (S.D. Fla. 2016) (holding that injunction as well as damages were available for trademark infringement).

374. *See e.g.* U.S. Patent No. 901,397,0B2 (issued Apr. 21, ,2015) (improved copy protection for audiovisual data using encryption); U.S. Patent No. 836,530,7B2 (issued Jan. 29, 2013).

375. 17 U.S.C. § 411(a); *see also* UAB "Planner5D" v. Facebook, Inc., 534 F. Supp. 3d 1126, 1132-33 (N.D. Cal. 2021) (rejecting argument that rejection must be final; suit may proceed while request for reconsideration is pending).

376. *UAB "Planner5D",* 534 F. Supp. 3d at 1129 (N.D. Cal. 2021) (describing process and composition of Review Board).

377. *See* Ashton v. U.S. Copyright Off., 310 F. Supp. 3d 149, 157-58 (D.D.C. 2018) (finding refusal not arbitrary and capricious under 5 U.S.C. § 706(2)(A) because Office provided full analysis of its rejection of every material argument submitted by registrant).

378. 323 U.S. 134 (1944).

judgment based on "the thoroughness evident in its consideration, the validity of its reasoning, its consistency with earlier and later pronouncements, and all those factors which give it the power to persuade, if lacking the power to control."[379]

If the Copyright Office's attention is to be directed to the boundaries for computer-generated works, it must know that generative AI was involved in creating works submitted for registration. That could be provided fairly easily with a modified form in which the author would check a box indicating that generative AI was used in creating the work and then be asked to describe what creative value the author added, perhaps indicating the number and content of prompts provided to the software.

Under the March 2023 policy statement, applicants for copyright registration must disclose "the inclusion of AI-generated content in a work submitted for registration and to provide a brief explanation of the human author's contributions to the work."[380] Only the standard application, and not more abbreviation forms, such as the online application allow for submission of such information.[381] A Copyright Office examiner will follow up, as necessary to obtain additional detail about the respective roles of the computer program and its human user.[382]

The statement presents the possibility that when someone seeks to register the copyright in this Article, she will have to disclaim the relatively minor provisions created with the aid of ChatGPT.

The author and his publishers regularly obtain copyright registration for works that start out with Dragon dictation, and it has not occurred to anyone that the works would be disqualified from copyright because artificial intelligence was involved in creating them.[383] This experience shows that market participants and the Copyright Office take for granted author use of common computer tools using certain types of artificial intelligence.

VII. BRADEN'S BUSINESS MODEL

So, returning to the story that began this Article—the human version, involving Braden Langley.

It is not likely that Braden will embrace a business model that has him building large language models from scratch. That would be hugely expensive, and such models are already available to him at a fairly modest cost. Instead, if he undertakes any development at all, it almost certainly will be confined to fine-tuning the existing models, based on elements of style and storytelling that his

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379. *Id.* at 140; *see also* Hagans v. Comm'r of Soc. Sec., 694 F.3d 287 (3d Cir. 2012) (using *Skidmore* as a guide for application of non-binding Social Security determination).

380. Guidance for Copyright Applicants, 88 Fed. Reg. 16190, 16193 (Mar. 16, 2023) (to be codified at 37 C.F.R. pt. 202).

381. *Id.* at 16193 n.39.

382. *Id.* 16193.

383. The author has published thirty books and more than a hundred law-review and other articles, text described his usual practice and experience.

own artistic judgment impels him to adopt. It can be done at a cost of a few hundred or a few thousand dollars per year.

Braden recognizes the irony that his relationship with the new technology presents. Fifty years ago, if he wanted to create an animated movie, he would have to associate himself with a big studio like Disney. Only such an entity had the physical capital in the form of film editors and processors, soundstages, and the hundreds of human editors, voiceovers, animators, and photographers necessary to put together all the pieces of an animated movie. Even if he had aimed at publishing a novel in print form, he would have had to associate himself with an enterprise that had arrangements with editors, typesetters and printing presses binderies, and order-fulfillment warehouses.

Then, with the diffusion of small computer technology and the Internet to the farthest reaches of literary aspiration, an author could write, illustrate, and animate by himself with little more than subscriptions to Microsoft Word, Adobe Photoshop, and Adobe Studio, each costing only a few hundred dollars[384] and then promote and distribute his work himself through Internet websites and blogs. Now, the production function has shifted back. Braden is once again dependent on large enterprises to select and arrange material from their enormous repositories according to his creative direction. The barriers to entry for what he wants to do are once again substantial, much more than a subscription to Microsoft Word or Adobe Studio for a few hundred dollars. He must associate himself with an NVidio, Amazon, Google, or Microsoft in order to have available their large language models.[385]

Braden could seek to reassure his potential investors by using discourseCPR and its companion software, animationCPR, to generate pilot animations, publishing some by posting them on a website and then registering them with the Copyright Office. Assuming he already has the software for both discourseCPR and animationCPR, the cost of generating a pilot animation would be trivial, and the cost of registering it would be $65 plus about ten minutes of his time to fill out the online copyright registration form. He would, as required by the 2023 statement of policy,[386] disclose the involvement of his generative-AI systems.

If registration is granted, he can take his registration certificate to his potential investors as assurance that copyright protection will be available. The registration, by itself, however, does not ensure that he might not lose an infringement suit if a court subsequently determines that Braden's animation-project works are not, after all, entitled to copyright protection.[387]

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384. MICROSOFT, https://www.microsoft.com/en-us/microsoft-365/buy/compare-all-microsoft-365-products [https://perma.cc/Q8YW-A343] (last visited May 29, 2023); ADOBE, https://www.adobe.com/products/photoshop/compare-plans.html [https://perma.cc/7JJQ-A6AW] (last visited May 29, 2023).

385. *See* discussion *supra* Part I (identifying and discussing enterprises with large language models).

386. *See* discussion *supra* Part VI.F.

387. *See* M & D Int'l Corp. v. Ling Lum, Inc., 901 F. Supp. 1502, 1510 (D. Hawaii 1995) (finding that sculptures lacked necessary originality, despite registration).

The only way he can cover that risk or provide assurances to his potential investors in the case that the Copyright Office denies registration is to litigate copyrightability in federal court. He might do that by challenging the denial of registration under the
Administrative Procedure Act, but that would not protect him against another court considering an infringement action and deciding, de novo, on the copyrightability issue in that infringement action.

To wait for a judicial decision in an infringement action would require him actually to assemble his business, create his works, market them, wait for an infringer, file suit, and wait for the suit to be decided, a multistep process that would take some years, at least.[388] He needs the funds in order to put the business together and launch his first products.

So the bolder entrepreneurial approach would be to put a business plan together that does not depend on copyright protection.

Braden believes that the creative effort that he puts into his generative robots qualifies him for copyright protection of those inputs. He is concerned, however, that his potential investors know about the *Kashtanova* case[389] and are afraid that when he seeks to register a copyright in his work that the Copyright Office will deny it on the strength of its decision in *Kashtanova*.

Moreover, to register a copyright he must file a copy of the work he seeks to register with the Copyright Office. To do so would disclose the prompts and instructions he gives the system, thereby vitiating trade secret protection. Until and unless *Kashtanova* is withdrawn by the Copyright Officer or overturned by a reviewing court, Braden is best served by keeping his prompts and instructions secret and defending his proprietary interest in the output of the systems via the law of trade secret misappropriation and trademark rather than copyright.

But he should explain to potential investors that his best protection against piracy is rapid innovation. If he releases new episodes, new seasons, and new titles every few weeks, the pirates will be unable to catch up.[390] Through carefully planned obsolescence for his work, he can ensure that the shelf life of his works is shorter than any pirate's lead time.

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388. *See* INSTITUTE FOR THE ADVANCEMENT OF THE AMERICAN LEGAL SYSTEM, CIVIL CASE PROCESSING IN THE FEDERAL DISTRICT COURTS (2009), https://www.uscourts.gov/sites/default/files/iaals_civil_case_processing_in_the_federal_district_courts_0.pdf [https://perma.cc/427J-F9SE] (showing median time from filing to disposition for different types of cases, generally not less than 300 days) (last visited May 29, 2023).

389. *See* discussion *supra* Part IV.C. (discussing the *Kashtanova* decision).

390. Charles Dickens, himself, initially released his novels as serial episodes. *Charles Dickens: 200 Years of Commerce and Controversy*: *Serials and Advertising*, DUKE UNIV. LIBR., https://exhibits.library.duke.edu/exhibits/show/dickens200/serials [https://perma.cc/G3EP-ERBX] (reporting that Dickens serialized novels to he could revise episodes in light of current events and audience reactions) (last visited May 29, 2023); Andrea Schlottman, *The Serial Novel: A Brief History [Infographic]*, BOOKS ON THE WALL, https://booksonthewall.com/blog/serial-novel-a-brief-history/ [https://perma.cc/H7HQ-T53W] (reporting that Dickens published all of his novels first in serial form; reason usually was to make them affordable to readers) (last visited 28 Apr. 2023).

That is not altogether different from that of a daily newspaper in the first part of the 20th century, which did not care too much if someone copied day-old or week-old news.[391] The daily was always a jump ahead of the copier.

Braden can market directly to consumers and receive revenue from them as soon as they view his product, according to whatever payment terms he chooses to offer. He, therefore, has a first-mover advantage over any pirate.

Recognizing that piracy of his product, though relatively easy—all a pirate need do is to copy Braden's animated movie from the Internet and rebroadcast it in her own e-commerce web framework—the piracy nevertheless will take some time: days at least, if not weeks or months. Braden can stay a jump ahead of the pirate by releasing new episodes or new stories frequently.

He also, of course, can encumber his material with various forms of copy protection and paywalls that make the work of the pirate harder and more time-consuming. The experience of the music industry suggests that this can be a successful business model. Although the legacy music labels were quite aggressive in litigating copyright-infringement claims, ultimately, music creators managed to survive economically by frequent releases with good copy protection and paywalls, priced at a level that diminishes the incentive for piracy.[392] It is likely that he will be able to find a generative-AI application that helps him strengthen the copy protection for the works that he releases.[393]

From a consumer's perspective, the market for entertainment products like novels, movies, streaming videos, and video games will move even farther toward a subscription model rather than a sale model.[394] Subscription models are helpful to Braden because they permit him to enforce his interest in his works against piracy through technological copy protection and to update the copy protection with each new subscription renewal or update of the material.

If Braden's business and story ideas are sufficiently creative, he should flourish without copyright protection—a result copyright law seeks.

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391. *See* Gregory D. Beaton, *The Cold Reality of the Ineffective Hot News Remedy, and The Case For Contract*, 12 COLUM. L. REV. 2068, 2072 (2012) (recognizing that the value of news dissipates quickly).

392. *See* Nika Aldrich, *An Exploration Of Rights Management Technologies Used In The Music Industry*, B.C. INTELL. PROP. & TECH. F. 051001 (2007) (reviewing history and technology of copy protection for music and concluding that it is good solution for piracy); Henry H. Perritt, Jr. *New architectures for music: Law Should Get Out of the Way,* 29 HASTINGS COMM. & ENT. L.J. 259 (2007) (questioning over reliance on copy protection); Henry H. Perritt, Jr., *Flanking the DRM Maginot Line Against New Music Markets*, MICH. ST. J. INT'L LAW 113 (2007).

393. *See* SECLORE, https://www.seclore.com/demo-drm/ [https://perma.cc/7DP4-257A] (last visited May 29, 2023).

394. *See* Susan Bradley, *The Ever-Evolving Software Subscription Model*, COMPUTERWORLD, Mar. 13 2023, https://www.computerworld.com/article/3690729/the-ever-evolving-software-subscription-model.html [https://perma.cc/GVB3-M4HM] (reporting on trend toward subscription models for software) (last visited May 29, 2023).