Northwestern Journal of Technology and Intellectual Property

Volume 19 | Issue 1 Article 4

12-2021

Ostrich with Its Head in the Sand: The Law, Inventorship, & Artificial Intelligence

Ben Kovach

Follow this and additional works at: https://scholarlycommons.law.northwestern.edu/njtip

Part of the Intellectual Property Law Commons

Recommended Citation

Ben Kovach, *Ostrich with Its Head in the Sand: The Law, Inventorship, & Artificial Intelligence*, 19 Nw. J. Tech. & Intell. Prop. 137 (2021).
https://scholarlycommons.law.northwestern.edu/njtip/vol19/iss1/4

This Note is brought to you for free and open access by Northwestern Pritzker School of Law Scholarly Commons. It has been accepted for inclusion in Northwestern Journal of Technology and Intellectual Property by an authorized editor of Northwestern Pritzker School of Law Scholarly Commons.

NORTHWESTERN
JOURNAL OF TECHNOLOGY
AND
INTELLECTUAL PROPERTY

OSTRICH WITH ITS HEAD IN THE SAND: THE LAW, INVENTORSHIP, & ARTIFICIAL INTELLIGENCE

Ben Kovach

December 2021 VOL. 19, NO. 1

© 2021 by Ben Kovach

Copyright 2021 by Ben Kovach
Northwestern Journal of Technology and Intellectual Property
Volume 19, Number 1 (2021)

OSTRICH WITH ITS HEAD IN THE SAND: THE LAW, INVENTORSHIP, & ARTIFICIAL INTELLIGENCE

Ben Kovach[*]

ABSTRACT— As artificial intelligence (AI) system's capabilities advance, the law has struggled to keep pace. Nowhere is this more evident than patent law's refusal to recognize AI as an inventor. This is precisely what happened when, in 2020, the U.S. Patent and Trademark Office (USPTO) ruled that it will not accept an AI system as a named inventor on a patent.

This note explores untenable legal fiction that the USPTO's ruling has created. First, it explores the current state of AI systems, focusing on those capable of invention. Next, it examines patent law's inventorship doctrine and the USPTO's application of that doctrine to AI inventors. The note then explains that disallowing AI systems as inventors does not map well onto patent law's most common justifications. Finally, the note recommends a solution that maximizes patent law's incentive structure; AI systems should be allowed as named inventors when patent ownership has been pre-contracted away to a natural person. If patent ownership has not been pre-contracted, the idea should enter the public domain and be unpatentable.

INTRODUCTION 138
I. ARTIFICIAL INTELLIGENCE AND THE CURRENT PATENT REGIME 140
A. Creativity Machines – A Unique Class of Artificial Intelligence 140
B. Patent Law's Inventorship Requirement 143
II. WHO SHOULD BE THE INVENTOR OF AN AI CREATED IDEA? 147
A. Justifications for Patent Law 147
B. If Not AI, Then Who? 148
C. AI Should Be Allowed as an Inventor 151
CONCLUSION 153

[*] Northwestern University Pritzker School of Law, J.D., 2022. I would like to thank Professor Laura Pedraza-Fariña for all her help and guidance through the writing process.

INTRODUCTION

The law has an artificial intelligence problem. The legal system's continued refusal to acknowledge artificial intelligence's (AI) ever-advancing ability has led to incoherent legal results. In 2018, a self-driving car powered by an AI system in development by Uber hit and killed a pedestrian.[1] After concluding its investigation, the National Transportation Safety Board (NTSB) determined that Uber's AI system did not correctly identify and predict the path of the pedestrian, leading to the vehicle striking and killing her.[2] Despite the NTSB's conclusion, Uber did not face any criminal liability for the death.[3] Only the human occupant in the vehicle at the time, who was there for monitoring purposes, was charged with negligent homicide.[4] It is unknown whether or not Uber would have been held civilly liable because the company preemptively settled with the decedent's family within two weeks of the crash.[5]

What can be gleaned from this lack of criminal liability for an AI system onto IP law? As illustrated by the Uber AI tragedy, AI's decision-making capability and general sentience is being ignored by the law, leading to incoherent and unjust outcomes. The driver of the car, an AI system, was not charged when the car struck and killed a pedestrian.[6] The creator, developer, and owner of that driving system was also left legally untouched.[7] The law has opted to stick its head in the sand rather than address AI's increasing autonomous ability.

Nowhere is this lack of acknowledgement of AI's capabilities more evident than in patent law's grappling with AI systems and inventorship. AI systems are capable of conceiving patentable inventions right now.[8] And yet, the United States Patent and Trademark Office (USPTO), based on readings of the current statutory law, case law, and regulatory law, will not allow AI to be listed as a named inventor on a patent.[9]

---

[1] Matt McFarland, *Uber Self-Driving Car Operator Charged in Pedestrian Death*, CNN BUSINESS (Sept. 18, 2020, 11:09 AM ET), https://www.cnn.com/2020/09/18/cars/uber-vasquez-charged/index.html [https://perma.cc/PS3Q-VSA3].

[2] *Id.*

[3] *See id.*

[4] *Id.*

[5] *Id.*

[6] *Id.*

[7] *Id.*

[8] *See* Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C.L. REV. 1079, 1085 ("Dr. Thaler is listed as the patent's inventor, but he states that the Creativity Machine invented the patent's subject matter. . . .").

[9] *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 6 ("U.S. patent law does not permit a machine to be named as the inventor in a patent application.").

The first part of this paper analyzes AI as it exists now and how the current patent law regime is dealing with AI. It begins by describing the very basics of artificial intelligence. Creativity machines, a unique class of AI capable of generating patentable ideas, are described in more detail along with specific examples of the patentable ideas that they have generated.[10] Then, the paper explains inventorship, the most difficult patent law hurdle for an AI system to clear.[11] It shows, through reference to specific examples of AI-conceived ideas, that creativity machines can meet the requirements of inventorship.[12] Finally, the USPTO's decision to disallow AI as an inventor is analyzed.[13] It shows that the decision, while a correct reading of the current law, also created an untenable legal fiction.

The second part of this paper considers how patent law *should* handle AI as an inventor. It begins by analyzing the major theories of justification for patent law, namely utility theory and labor theory.[14] Next, it analyzes the obvious candidates for AI inventorship if AI is not allowed to be an inventor: the AI user, the AI creator, or nobody. It shows that all three of those options have significant issues and that adhering to the legal fiction that AI cannot be an inventor is problematic.

Rather than follow the USPTO's legal fiction, this paper recommends that the law properly recognize AI's capability to invent and allow AI as a named inventor when patent ownership has been pre-contracted away to a natural person. This follows the thinking of Professor Ryan Abbott, author of *The Reasonable Robot: Artificial Intelligence and the Law* and a leader in artificial intelligence legal scholarship,[15] who has argued that AI should be allowed as an inventor and is also in favor of automatic patent assignment to the AI owner.[16] Abbott, however, does not consider what to do if an AI system does not have an owner, a likely possibility with the growing availability of open-source AI systems.[17] This paper recommends that open-

[10] *IEI's Patented Creativity Machine Paradigm*, IMAGINATION ENGINES INC., http://imagination-engines.com/iei_cm.php [https://perma.cc/57L8-X57M].

[11] *See* Abbott, *supra* note 8, at 1085 (discussing the lack of clarity and deception surrounding whether or not AI systems are in fact inventing patented subject matter).

[12] *Id.* (noting that AI systems have already conceived of patented ideas).

[13] *See generally In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 6.

[14] William W. Fisher III, *Theories of Intellectual Property*, *in* NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY 168, 169—170 (Stephen Munzer ed., 2001) (stating that the most popular justification for intellectual property protections is utilitarian and the second most common is labor).

[15] *Professor Ryan Abbott*, University of Surrey, https://www.surrey.ac.uk/people/ryan-abbott [https://perma.cc/PYZ9-ARBL].

[16] *See* Abbott, *supra* note 8, at 1114.

[17] *See generally* Abbott, *supra* note 8.

source AI ideations become part of the public domain and are added as a class of unpatentable subject matter.

I. ARTIFICIAL INTELLIGENCE AND THE CURRENT PATENT REGIME

A. Creativity Machines – A Unique Class of Artificial Intelligence

To begin, it is helpful to define the type of artificial intelligence system at issue in this paper. Artificial intelligence is a broad field and the term itself has become a buzzword so frequently used that it has lost meaning.[18] It can be generally said that "AI . . . refers to machines that are capable of performing tasks that, if performed by a human, would be said to require intelligence."[19] To perform these tasks, the vast majority of AI systems rely on pattern recognition. These patterns are divined from the processing of massive amounts of data, far more data than any person, or team of people, could humanly process. Traditional AI systems then use those patterns to achieve a narrow, explicit task.[20]

The aforementioned self-driving cars are an example of this traditional method of AI. The self-driving systems are attempting to replicate a task that humans already perform well – driving a car. The systems process huge amounts of data, again, far more than any person is capable of. Uber has reported that its self-driving cars have driven, and thus processed and learned from, millions of miles of driving.[21] Contrast that with the experience of an average American driver. The U.S. Department of Transportation and Federal Highway Administration reports that the average person drives roughly 13,500 miles per year.[22] As of 2019, the median age of an American

---

[18] Ian Bogost, *'Artificial Intelligence' Has Become Meaningless*, THE ATLANTIC (Mar. 4, 2017), https://www.theatlantic.com/technology/archive/2017/03/what-is-artificial-intelligence/518547/ [https://perma.cc/7D9J-8KWM] ("But in most cases, the systems making claims to artificial intelligence aren't sentient, self-aware, volitional, or even surprising. They're just software.").

[19] Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 362 (describing his definition of AI as "blissfully circular").

[20] Eban Escott, *What Are the 3 Types of AI? A Guide to Narrow, General, and Super Artificial Intelligence*, CODEBOTS (Oct. 24, 2017), https://codebots.com/artificial-intelligence/the-3-types-of-ai-is-the-third-even-possible [https://perma.cc/64FR-G6EJ]("[Traditional] AI is goal-oriented, designed to perform singular tasks – i.e. . . . driving a car. . . .").

[21] Kyle Wiggers, *Uber's 250 Autonomous Cars Have Driven 'Millions' of Miles and Transported 'Tens of Thousands' of Passengers*, VENTUREBEAT: THE MACHINE (Apr. 11, 2019, 2:05 PM), https://venturebeat.com/2019/04/11/ubers-250-autonomous-cars-have-driven-millions-of-miles-and-transported-tens-of-thousands-of-passengers/ [https://perma.cc/R3HU-2B7Z]("Uber revealed that it's collected data from 'millions' of autonomous vehicle testing miles to date. . . . ").

[22] Hearst Autos Research, *What Is Average Mileage Per Year?*, CAR AND DRIVER, https://www.caranddriver.com/research/a32880477/average-mileage-per-year/ [https://perma.cc/VF5Z-A8BP] ("The U.S. Department of Transportation's Federal Highway Administration states the average person drives around 13,500 miles every year.").

was 38.4 years.[23] Assuming a minimum legal driving age of 16, the average American has been driving for 22.4 years. The average American driver, then, has driven about 300,000 miles in their life. The advantage that the traditional AI approach has is quickly apparent. Uber's self-driving system is learning from millions of miles of driving while the average person behind the wheel has only experienced approximately 300,000 miles. This is representative of a typical AI system's approach. The typical system processes vast amounts of data, recognizes patterns from that data, and uses those patterns to approximate a task that has been historically performed by people.

This paper, however, is focused on a narrow subset of AI systems that function differently and are built to perform a different sort of task entirely. This subset of AI systems will be referred to as "creativity machines," a phrase coined in Dr. Stephen Thaler's pioneering patent for exactly such a machine.[24] Creativity machines are built for the sole purpose of creating unique ideas.[25] They are not built to perform a narrow and specific task, like drive a car. They are built to perform a broad and amorphous task: to formulate new ideas.[26] Creativity machines also function in a different way than the typical AI system. These machines do not rely on processing huge datasets and pattern recognition as most AI systems do.[27]

While the detailed machinations differ between systems, creativity machines follow the same general functionality. First, the creativity machine is exposed to a field of knowledge.[28] Next, the machine is activated and begins to generate ideas.[29] Finally, the machine flags ideas that are new and worthwhile.[30] Creativity machines are not processing large amounts of data

---

[23] *Median Age of the Resident Population of the United States from 1960 to 2019*, STATISTA (JAN. 20, 2021), https://www.statista.com/statistics/241494/median-age-of-the-uspopulation/[https://perma.cc/XQH6-783V] (showing that the median age of the U.S. population in 2019 was 38.4.).

[24] *See* U.S. Patent No. 5,659,666 (filed Oct. 13, 1994) (describing the artificial intelligence system that is being patented as a type of system "which we refer to as autonomous systems or 'creativity machines.'").

[25] *See IEI's Patented Creativity Machine Paradigm*, *supra* note 10 (explaining that the creativity machines are AI systems that generate new ideas.).

[26] *Id.*

[27] *See id.* (stating that creativity machines are simply trained upon a body of knowledge). *But see* Wiggers, *supra* note 21 (explaining that Uber's self-driving AI, a system representative of the way AI typically learns and functions, processes millions of miles of driving to learn.).

[28] *See IEI's Patented Creativity Machine Paradigm*, *supra* note 10 (explaining that the creativity machine is a "network that has been trained upon some body of knowledge.").

[29] *See id.* (explaining that, after being exposed to a body of knowledge, a creativity machine is "then perturbed in a specially prescribed way [that] tends to activate into concepts and/or strategies (e.g., new ideas) generalized from that conceptual space.").

[30] *See id.* (explaining that a creativity machine has a component that is "trained to filter out the most salient of these notions . . . , accumulating useful concepts. . . .").

necessarily; they are simply taught a general field of knowledge. They are not systems purposely built to perform a narrow task, they are simply taught and set on their way to generate whatever ideas they may generate.

The most recent creativity machine of note is a creation of the aforementioned Dr. Thaler. Thaler's latest creativity machine is called DABUS, which stands for "Device for the Autonomous Bootstrapping of Unified Sentience."[31] DABUS is described as "a swarm of many disconnected neural nets, each containing interrelated memories. . . ."[32] DABUS invented two creations for which patent applications have been filed. First, a container for food or beverages with a unique geometry that would lend itself to tight packing for shipping or easier grasping by robotic arms.[33] Second, a light that flickers in a unique way so as to better grab peoples' attention,[34] which could perhaps be implemented as a beacon on search and rescue vehicles.

Patents were filed for the creations with the creativity machine, DABUS, listed as the sole inventor.[35] The USPTO rejected the applications for one reason only. It stated that the listing of DABUS as the sole inventor amounted to a failure to identify each inventor by their legal name.[36] That rejection, and the reasoning behind it, will be discussed in more detail in the next section. Looked at another way, however, the rejection on the narrow inventorship ground indicates that the inventions otherwise met all other requirements of patentability.

---

[31] David McCombs, *AI Invents But Can't Be an Inventor. So Now What?*, LAW.COM: LEGALTECH NEWS (Aug. 31, 2020, 7:00 AM), https://www.law.com/legaltechnews/2020/08/31/ai-invents-but-cant-be-an-inventor-so-now-what/ [https://perma.cc/MT97-8TQT].

[32] *DABUS Described*, IMAGINATION ENGINES INC., https://imagination-engines.com/dabus.html [https://perma.cc/P3VH-EMA7].

[33] *In re* Application No. 16/524,532, 2020 Dec. Comm'r Pat.; *see also* Leo Kelion, *AI System 'Should be Recognised as Inventor'*, BBC NEWS (Aug. 1, 2019),https://www.bbc.com/news/technology-49191645 [https://perma.cc/3Z5T-2NLU] ("The first patent describes a food container that uses fractal designs to create pits and bulges in its sides. One benefit is that several containers can be fitted together more tightly to help them be transported safely. Another is that it should be easier for robotic arms to pick them up and grip them.").

[34] *In re* Application N. 16/524,350, 2019 Dec. Comm'r Pat.; *see also* Tyler Sonnemaker, *No, an Artificial Intelligence Can't Legally Invent Something – Only 'Natural Persons' Can, Says US Patent Office*, BUSINESS INSIDER (Apr. 29, 2020, 2:41 PM), https://www.businessinsider.com/artificial-inteligence-cant-legally-named-inventor-us-patent-office-ruling-2020-4 [https://perma.cc/H2DF-R8RU] ("The second is a flickering light that mimics brain activity – or 'neural flame,' as Thaler dubbed it – that could potentially be more effective at catching a person's attention in an emergency situation.").

[35] *See In re* Application No, 16/524,532, 2020 Dec. Comm'r Pat.; *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat.

[36] Rebecca Tapscott, *USPTO Shoots Down DABUS' Bid for Inventorship*, IPWATCHDOG (May 4, 2020), https://www.ipwatchdog.com/2020/05/04/uspto-shoots-dabus-bid-inventorship/[https://perma.cc/8BEQ-YU6V].

DABUS is positive proof that creativity machines are capable of generating patentable inventions all on their own. Consequently, creativity machines are requiring patent law to take stock of itself and interrogate the inventorship requirement.

B. Patent Law's Inventorship Requirement

Naturally, in order for there to be a patent, there must first be an inventor.[37] Creativity machines have shown they are capable of inventing patentable ideas.[38] Yet, the letter of the law indicates that AI systems cannot be a named inventor on a patent.[39] An unsteady legal fiction has resulted.

i. The Conception Requirement

The Federal Circuit has explained that "[m]aking [an] invention requires conception and reduction to practice."[40] It has further explained, in *Burroughs Wellcome Co. v. Barr Laboratories, Inc.*, that in order to be a named inventor on a patent, an inventor needs only to show conception, not reduction to practice.[41] In *Burroughs*, a group of scientists conceived of an invention.[42] A separate group of scientists then completed the reduction to practice through a series of experiments.[43] The group that conceived of the original idea was deemed the inventors for the purposes of the patent.[44] The latter group that reduced the idea to practice were not considered inventors.[45]

Conception is the key requirement of inventorship, or, as the *Burroughs* court went on to clearly state, "[c]onception is the touchstone of inventorship. . . ."[46] So, what is conception? Conception is "the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice."[47] It is the formation of the inventive idea as claimed in the patent.[48] That inventive idea

---

[37] 35 U.S.C. § 111(a)(1) ("An application for patent shall be made, or authorized to be made, by the inventor. . . .").

[38] *See* Abbott, *supra* note 8, at 1085.

[39] *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 6 ("U.S. patent law does not permit a machine to be named as the inventor in a patent application.").

[40] Solvay S.A. v. Honeywell Int'l Inc., 742 F.3d 998, 1000 (Fed. Cir. 2014).

[41] 40 F.3d 1223, 1228 (Fed. Cir. 1994) ("But an inventor need not know that his invention will work for conception to be complete. He need only show that he had the idea; the discovery that an invention actually works is part of its reduction to practice.").

[42] *Id.* at 1226.

[43] *Id.*

[44] *Id.* at 1230.

[45] *Id.*

[46] *Id.* at 1227.

[47] Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (internal quotations omitted).

[48] *Burroughs*, 40 F.3d at 1228.

must be more than just a general plan or theory; it must be a definite and permanent idea.[49] The Federal Circuit explains that "[a]n idea is definite and permanent when the inventor has a specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan he hopes to pursue."[50] The inventor does not need to know, however, that the invention will work in order to meet the conception requirement.[51] The inventor just needs to be able to prove that he had the idea.[52] The confirmation that the idea is a success falls under the aforementioned reduction to practice requirement.[53]

ii. Creativity Machines and Conception

Creativity machines are meeting the requirements to be an inventor, particularly the salient conception requirement. The most difficult question is whether or not creativity machines are in fact conceiving of these ideas. Thaler has made this point clearly with his most recent patent applications, listing his creativity machine DABUS, and only DABUS, as the inventor on the patents.[54]

Creativity machines are simply exposed to a body of knowledge and go on to generate ideas entirely on their own.[55] The machines themselves recognize and single out particularly salient ideas.[56] These ideas are, as the USPTO has confirmed by granting patents, complete and operative enough to be granted patents.[57] Human involvement, as is explored further, below, is very minimal.

---

[49] *Id.*

[50] *Id.*

[51] *Id.* at 1228. ("But an inventor need not know that his invention will work for conception to be complete.").

[52] Scholars have pointed out that problem finding, the first identification that there is an underlying problem in need of a solution, is undervalued and even ignored in patent law's conception analysis. *See* Laura G. Pedraza-Fariña, *The Social Origins of Innovation Failures*, 70 S.M.U.L. REV. 377, 383 (2017) ("[A] crucial step in idea generation—but one that is underappreciated in both patent law doctrine and theory—is problem finding and problem framing."). Even if problem finding were a required component of conception, creativity machines would almost certainly still meet the conception requirement given that the machines both identify and solve problems on their own.

[53] *Burroughs*, 40 F.3d at 1228 ("[T]he discovery that an invention actually works is part of its reduction to practice.").

[54] *See In re* Application No. 16/524,532, 2020 Dec. Comm'r Pat.; *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat.

[55] *See IEI's Patented Creativity Machine Paradigm*, *supra* note 10.

[56] *See IEI's Patented Creativity Machine Paradigm*, *supra* note 10 (explaining that the creativity machine recognizes the "novelty, utility, or value" of the different ideas it generates.).

[57] Abbot, supra note 8 at 1079 ("Dr. Thaler is listed as the patent's inventor, but he states that the Creativity Machine invented the patent's subject matter. . . .); *see* U.S. Patent No. 5,852,815 (issued Dec. 22, 1998).

iii. USPTO Rules That AI Cannot be an Inventor

Can AI be a named inventor on a patent? The USPTO has unambiguously let its position be known, ruling that it does not accept an AI system as a named inventor on a patent.[58] As stated earlier, Thaler submitted two patent applications with his creativity machine, DABUS, listed as the sole inventor on both.[59] Based on the way DABUS functions, and Thaler's description of the process, it seems clear that DABUS, and DABUS alone, was in fact the inventor behind the subject matter in the patent applications.[60] And yet, the USPTO ruled that DABUS would not be allowed as the named inventor on the patent applications.

The DABUS application was denied for want of a named inventor, with the USPTO sending a Notice to File Missing Part of Nonprovisional Application that stated the application "does not identify each inventor by his or her legal name."[61] The crux of the Office's position is that an inventor must be a natural person, stating "U.S. patent law does not permit a machine to be named as the inventor in a patent application."[62] This position was based on a reading of the language in the statutory law, case law, and regulatory law germane to inventorship.[63]

In coming to its conclusion, the USPTO looked to the U.S. code underlying the Patent Act, Federal Circuit precedent, and the Manual of Patent Examining Procedure.[64] The USPTO asserts that the language used in all of these references clearly requires an inventor to be a human.[65] The code underlying the Patent Act defines an inventor as "the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[66] Further language in the code, the USPTO contended, unequivocally shows that an individual must be referring to a

---

[58] *See In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 6 ("U.S. patent law does not permit a machine to be named as the inventor in a patent application.").

[59] *See In re* Application No. 16/524,532, 2020 Dec. Comm'r Pat.; *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat.

[60] *See* Pramod Chintalapoodi, *USPTO Confirms AI Cannot Be Listed as Inventor in a Patent Application*, CHIP L. GRP. (Apr. 28, 2020), https://www.chiplawgroup.com/uspto-confirms-that-ai-cannot-be-listed-as-inventor-in-a-patent-application/ [https://perma.cc/497Q-GK7C]("[Thaler] further asserted that DABUS was not created to solve any particular problem, and it was not trained on any special data relevant to the instant invention. Instead, it was the machine, not a person, which recognized the novelty and salience of the instant invention.").

[61] *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 2.

[62] *Id.* at 6; *see id.* at 4.

[63] *See generally id.*

[64] *See id.* at 4-6.

[65] *Id.* at 4 ("[T]he patent laws require an inventor be a natural person." (citing Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften e.V., 734 F.3d 1315, 1323 (Fed. Cir. 2013))).

[66] 35 U.S.C. § 100(f).

natural person.[67] 35 U.S.C. § 101, for example, used the word "whoever" when referring to an inventor, clearly suggesting that an inventor must be a natural person.[68] The code goes on to refer to the "individuals" that are inventors by using the pronouns "himself" and "herself," again connotating personhood.[69]

The Office bolstered its interpretation by showing that the Federal Circuit has come to the same conclusion.[70] In *University of Utah v. Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.*, the court stated that conception, the mental act requirement of invention, could only be performed by a natural person.[71] The Federal Circuit has also stated, in *Beech Aircraft Corp. v. EDO Corp.*, that "only natural persons can be 'inventors.'"[72] Finally, the USPTO highlighted that the language used in the Manual of Patent Examining Procedure (MPEP) also implies an inventor must be a natural person.[73]

iv. The USPTO Correctly Interpreted the Law but Established a Legal Fiction

The USPTO seems to have correctly interpreted the law as currently written to require that an inventor must be a natural person. The code underlying the Patent Act, referring to an inventor with "whoever," "himself," and "herself," is particularly persuasive.[74] The Federal Circuit having come to the same conclusion and throwing its considerable weight behind the interpretation only reinforces the reading.[75] The USPTO and Federal Circuit agree and the reading of the law seems inarguable; an inventor must be a natural person and therefore an AI system cannot be a name inventor on a patent.

---

[67] *See generally* 35 U.S.C. §§ 100, 101.

[68] 35 U.S.C. § 101 ("*Whoever* invents or discovers any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefor, subject to the conditions and requirements of this title." (emphasis added)).

[69] 35 U.S.C. § 115(b)(2) ("[S]uch individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application.").

[70] *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 4 ("In addition, the U.S. Court of Appeals for the Federal Circuit (Federal Circuit) has explained that the patent laws require that an inventor be a natural person.").

[71] 734 F.3d 1315, 1323 (Fed. Cir. 2013) ("To perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns.").

[72] 990 F.2d 1237, 1248 (Fed. Cir. 1993); *In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 5.

[73] *See In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 6 ("[MPEP] follows the patent statutes and the Federal Circuit case law concerning inventorship. . . .").

[74] 35 U.S.C. §§ 101, 115(b)(2).

[75] *See In re* Application No. 16/524,350, 2019 Dec. Comm'r Pat. at 4.

And yet, in interpreting the law as disallowing AI inventors, the USPTO and Federal Circuit have also created a troublesome legal fiction.[76] As has been established, these creativity machines are capable of conceiving patentable inventions.[77] DABUS was listed as the sole inventor on two patent applications because DABUS, on its own, conceived of the ideas underlying the patent claims.[78] That DABUS, the inventor, is not allowed as the named inventor on the patent is a legal construction.[79] This fiction especially flies in the face of inventorship. While the ownership of a patent can be contractually delegated, the inventorship of a patent cannot.[80] "[A] person not entitled to be named an inventor cannot bargain to become one."[81] Patent law will now not only allow that possibility but require it for AI conceived inventions. AI invented subject matter will only be granted a patent if a person, who is not the inventor, puts their name down as inventor instead.

II. WHO SHOULD BE THE INVENTOR OF AN AI CREATED IDEA?

The USPTO seems to have correctly interpreted the law as written by not permitting an AI system as a named patent inventor. The ruling also ignores the reality of the situation and creates an untenable legal fiction. As analyzed below, there is no logically coherent or compelling policy solution available other than to allow AI to be a named inventor.

A. Justifications for Patent Law

There are two common justifications for America's current patent law regime – utilitarian theory and labor theory. The most dominant theory in legal discourse is the utilitarian or incentive justification.[82] The idea is that by maximizing innovation and the number of inventions produced, a society in turn maximizes utility and social welfare.[83] The theory is that a legal protection for inventive ideas will encourage and incentivize people to innovate.[84] Without that protection, the worry is that people will not innovate for fear that others, known as free riders, will swoop in and steal the idea as

---

[76] *See Legal Fiction*, BLACK'S LAW DICTIONARY (11th ed. 2019) ("An assumption that something is true even though it may be untrue. . . .").

[77] *See* Abbott, *supra* note 8, at 1085.

[78] *See* Chintalapoodi, *supra* note 60.

[79] *See Legal Fiction*, BLACK'S LAW DICTIONARY (11th ed. 2019).

[80] ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, PATENT LAW & POLICY 1010 (7th ed. 2017).

[81] *Id.*

[82] Gordon Hull, *Intellectual Property*, *in* INTERNATIONAL ENCYCLOPEDIA OF ETHICS 1-3 (Hugh LaFollette ed., 2019) ("The most common justification for IP is broadly utilitarian. . . .").

[83] *Id.* at 3 ("[H]aving more goods such as inventions and art in a society increases overall utility.").

[84] *See id.*

soon as it is complete.[85] Thus, the innovator would put the time and money into inventing something but the free rider, having spent nothing, would come in and reap the benefits, taking them away from the innovator.[86] Without a protection against that loss to free riders, rational people may opt to not innovate at all.[87] Patent law provides that legal protection to innovators in an effort to incentivize, and hopefully maximize, innovation.[88] By maximizing innovation, the hope is that societal wellbeing will be maximized as well.[89]

The labor theory for patent law is as it sounds, that legal protection is the rightful reward to the inventor for their labor.[90] This justification follows the logic of John Locke, that "when one labors on something, one . . . makes it one's own."[91] These two theories of justification, utilitarian and labor, dominate patent law analysis.[92] They shape the view that patent law exists for two primary reasons, to incentivize innovation and to reward a person that labored to bring the innovation about.

B. If Not AI, Then Who?

If the USPTO's legal fiction is to be followed, and AI is not allowed as a named inventor even when it conceives of the idea claimed in a patent, then which party should be the inventor? There are three viable candidates: the user or operator of the AI system, the creator of the AI system, or nobody. All of these candidates, when considered against the primary theories of patent law justification, have arguably disqualifying flaws.

First, the user or operator of the AI system is considered as a candidate for inventor of an AI-conceived idea. For the purposes of this paper, the user is referring to the person exposing a creativity machine to an area of knowledge and receiving the resultant idea.[93] It is oftentimes the case that the creator and user of a creativity machine is the same person. As creativity

---

[85] *Id.* ("[A] rational agent will not produce such goods without some sort of compensating incentive structure.").

[86] *See id.* ("[I]t is very difficult to prevent other from free riding on the good, since intangible goods are usually (and increasingly) cheap to copy, and since no one will pay more for something she can get for less. . . .").

[87] *See id.*

[88] *See id.*

[89] *See id.*

[90] *See id.* at 6 ("This claim right is something that the individual has earned as the just dessert of her labor.").

[91] *Id.*

[92] *See* Fisher, *supra* note 14, at 169-70 (stating that the most popular justification for intellectual property protections is utilitarian and the second most common is labor).

[93] *See generally IEI's Patented Creativity Machine Paradigm*, *supra* note 10(explaining that the creativity machine is a "network that has been trained upon some body of knowledge. . . .").

machines inevitably become more widespread, it is a surety that more and more people outside of the creators will be the users of the machines. For that reason, this analysis considers each candidate on its own. For example, when analyzing the AI user as a candidate for inventor, it will be assumed that the person is a user only and *not* also the creator.

Ideally, patent law's incentive power would be harnessed to incentivize the development of better creativity machines. In other words, the people creating and developing creativity machines should be the ones targeted by the incentive power of patent law. The user, having had no role in the creation of the AI, is therefore a poor fit with incentive theory. The user seems closer to a free rider, swooping in to extract the benefit from an innovation he did not necessarily contribute to.[94] The user is the person contributing the most proximate labor to the generated idea.[95] However, the amount of labor that the user provides, simply exposing the creativity machine to knowledge and possibly inputting basic solution requirements, does not seem very significant. The proximate, but small, amount of work contributed means that the user is also a poor fit with labor theory. In summation, the user is the human most closely involved with the creativity machine when it conceives of an idea. However, the user's justification for being an inventor under both incentive and labor theories is so weak, it does not seem useful or proper to allow the user to be considered the inventor of an AI-created work.

Next, the creator of the AI system is considered. In many ways, the creator represents the opposite side of the coin from the user in the justification analysis. If patent law seeks to incentivize the creation and improvement of creativity machines, the AI creators are the people to incentivize. If AI creators were considered the inventors of all works conceived by their AI systems, a very strong incentive would exist for AI creators to continue to improve existing systems and build new systems. After all, the creators would be able to reap the reward of all inventions generated by their machines. It could also be argued that the AI creator is the most deserving of the patent reward according to labor theory. The creator is, after all, expending considerable time and effort in creating the creativity machine in the first place. This labor, however, is quite removed from the creativity machine's idea conception. The creator's labor is not nearly as proximate to the creativity machine's ideation as the user's labor is.

---

[94] *See generally* Hull, *supra* note 82, at 3 (describing free riders as those who don't contribute to an innovation but seek to benefit from it).

[95] *See Proximate,* BLACK'S LAW DICTIONARY (11th ed. 2019) (defining proximate as "[i]mmediately before or after" or "[v]ery near or close in time or space").

If the AI creator were assigned as inventor, a disastrous fairness and practicality issue would likely arise. Awarding inventorship of any and all ideas to the creator of the AI system would have massively far-reaching consequences. If a patented AI system, like Thaler's original creativity machine, were broadly used, it would mean a single person (or party, depending on how generously Thaler construes the definition of creator) would be the inventor of all AI created ideas. That would be a nearly limitless, wide ranging, and powerful grant of IP protection. This would also introduce complex line drawing disputes for creators of AI systems. The question of who is legally considered a creator would become incredibly important and lead to increased cost and litigation upon the legal system. For these reasons of fairness and practicality, the creator of the AI does not seem to be the proper candidate to award inventorship to.

Finally, if neither the AI user nor creator are fit candidates for inventorship, perhaps no person should be awarded inventorship and AI generated ideas should not be patentable. This is an unsatisfying solution because it is completely abandoning the use of patent law as an incentive tool.[96] It is clear that AI generally and creativity machines specifically will play in integral part in the way we innovate and invent going forward.[97] To not fully leverage patent law to incentivize the development of creativity machines would be a missed, or more accurately abandoned, opportunity. This solution would also encourage AI users to act dishonestly and claim AI conceived ideas as their own, as Thaler himself has already admitted to doing.[98]

The USPTO's legal fiction, not allowing an AI system to be a named inventor even when it is conceiving of the patented claim, does not seem to have a compelling solution. There does not seem to be a fitting human candidate for inventorship of an AI-created idea. The AI user is not situated to create and improve creativity machines, and thus the incentive power of patent law is lost on him. Additionally, the user's labor, while proximate to the creativity machine's idea creation, is minimal. The AI creator is the ideal party for patent law to incentivize further AI development and also puts considerable labor into the creativity machine. The practical effect of

---

[96] *See generally* Hull, *supra* note 82, at 3 (discussing patent law being used as an incentive).

[97] *See generally* Dirk Knemeyer & Jonathan Follett, *Could Machines Become Creative?*, TOWARDS DATA SCI. (June 13, 2019), https://towardsdatascience.com/could-machines-become-creative-49f346dcd3a3 [https://perma.cc/Y5YT-ANL4]
("AI automation is coming, and it's going to impact knowledge workers–writers, artists, designers, scientists, managers, and entrepreneurs").

[98] Abbott, *supra* note 8, at 1085 (stating that Thaler has listed himself as the inventor on patents where the underlying creation was actually invented by his creativity machine).

assigning inventorship to the creator, however, is too wide-ranging to be allowed.

Finally, not allowing any person to be an inventor, thus rendering AI-conceived ideas unpatentable, is also undesirable as it is an abandonment of patent law as an incentive tool for AI development.

C. AI Should Be Allowed as an Inventor

i. A Proposed Solution

The legal fiction concerning AI and inventorship seems untenable. A possible solution is to acknowledge that AI is capable of invention and allow AI as a named inventor when patent ownership has been pre-contracted away to a natural person. The pre-contracting of patent ownership is already the status quo for the vast majority of patents; as of 2013, "about ninety-three percent of patents were assigned to organizations rather than individuals."[99] When a creativity machine is used to generate an idea, and the owner of the resultant patentable idea has been decided ahead of time by a contract, the AI would be allowed as inventor and the patent ownership would be immediately transferred to the contractually identified person.

This solution would utilize patent law to incentivize creativity machine development without the pernicious scope that an AI creator being assigned inventor could allow. It would allow creativity machine creators to easily license their machines to users. Users could be confident in the decision to license a creativity machine knowing that they could legally assign all resultant AI patents to themselves via contract. User confidence in licensing would in turn increase the economic value of creativity machines, giving AI creators another means of monetizing their work and a compelling incentive to continue creativity machine development. It is true that under the current regime, patents could be assigned to users, but the entire system is reliant upon users claiming they are inventors when they really are not. A user could not be confident in licensing a creativity machine under this climate, relying on the law to continue to look the other way as users take matters into their own hands.

ii. An Imminent Problem

A growing problem remains unaddressed. The proposed solution, while a logically coherent adjustment of patent law, is relying largely on contract law to solve the issue. What is to be done in situations where the owner of an AI-generated patent is not contractually decided ahead of time? This is a likely possibility, as AI systems are increasingly made publicly available as

[99] Abbott, *supra* note 8, at 1092 n.101.

open-source systems.[100] There have already been disagreements over who owns an open-source AI system's creation with significant money at stake.[101] In 2018, an art collective known as Obvious used an AI system to create a painting and proceeded to sell said painting at venerated British auction house Christie's for $432,500.[102] There was just one problem – Obvious used an open-source AI and the creator of that AI was not happy about it.[103] The AI creator, Robbie Barrat, did not like that Obvious used his system to generate a work and sell it for a profit.[104] The issue was ultimately left alone, as Barrat indicated he would not seek a share of the profits and Obvious did not comment on whether it would voluntarily share any.[105]

A possible solution would be for AI-generated ideas, when the owner of any resultant patent has not been contractually decided ahead of time, to enter the public domain and be unpatentable. This could function as an expansion of the unpatentable subject matter doctrine.[106] In addition to "the laws of nature, physical phenomena, and abstract ideas," a category such as *ideas generated by a non-human where ownership has not been pre-contracted* could be added.[107] This would maintain a logical approach and acknowledgement of AI's ability. AI is capable of generating patentable ideas and it does no good to pretend otherwise. At the same time, it should not considerably weaken patent law's incentive for creators to improve and innovate creativity machines. As stated earlier, as of 2013, over ninety percent of patents were owned by corporations, not individuals.[108] Thus, instances where AI is generating patentable ideas outside of pre-contracted terms would likely be the vast minority of AI ideation. Further, for that minority of instances, AI creators who opt to make their AI open source are likely to motivated by something other than money.[109]

---

[100] Cynthia Harvey, *Open Source Artificial Intelligence: Leading Projects*, DATAMATION (Mar. 25, 2021), https://www.datamation.com/artificial-intelligence/open-source-artificial-intelligence-projects.html [https://perma.cc/6MDC-2AQ7]("Open source artificial intelligence projects don't always get a lot of publicity, but they play a vital role in the development of artificial intelligence.").

[101] Chavie Lieber, *Christies Just Sold an AI-Generated Painting for $432,500. It's Already Controversial.*, VOX (Oct. 29, 2018, 2:40 PM EDT), https://www.vox.com/the-goods/2018/10/29/18038946/art-algorithm (last visited Oct. 14, 2021).

[102] *See id.*

[103] *See id.*

[104] Robbie Barrat (@videodrome), TWITTER (Oct. 24, 2018, 9:31 PM), https://twitter.com/videodrome/status/1055285640420483073 [https://perma.cc/CGX4-HWGE] ("Does anyone else care about this? Am I crazy for thinking that they really just used my network and are selling the results?").

[105] Lieber, *supra* note 101.

[106] Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980).

[107] *Id.*

[108] *See* Abbott, *supra* note 8, at 1092 n.101.

[109] Samuel Schlaefli, *What Motivates Open Source Coders?*, WORLD ECON. FORUM, https://www.weforum.org/agenda/2014/12/what-motivates-open-source-coders/[https://perma.cc/54RN-

CONCLUSION

The law has refused to acknowledge AI's ever-advancing capabilities. This was made clear by the USPTO's ruling that AI systems may not be named inventors on a patent. The result is a troubling legal fiction where, despite AI systems being capable of invention, the law will not allow them to be acknowledged as such.

Rather than relying on that legal fiction, this note suggests a two-part solution centered on the pre-contracting of patent ownership when an AI system is the inventor. First, when patent ownership has been pre-contracted away to a natural person, AI systems should be allowed as named inventors on patents. Second, when patent ownership has not been pre-contracted away to a natural person, any resultant discoveries made by an AI system should be deemed unpatentable. This could be accomplished by expanding the unpatentable subject matter doctrine to include "ideas generated by a non-human where ownership has not been pre-contracted." Such a solution would acknowledge the reality that AI systems are capable of invention while also best utilizing the incentive power of patent law. The clarity of this solution, that patents could be granted to AI systems as long as ownership was contracted ahead of time, would incentivize AI creators and users alike to continue the development of AI systems.

CGZZ] (explaining that for open source coders, "the motivation behind [open source work] is of an intrinsic nature – driven by interest, fun, altruism and a desire to learn").