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AI: ARTIFICIAL INVENTOR OR THE REAL DEAL?

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The utilization of Artificial Intelligence ("AI") in the process of innovation has been occurring for decades. However, with the increased sophistication of AI, it is becoming gradually more difficult to discern between the point in which AI is simply being employed as a tool, contributing to human innovation, from the point in which AI is actually being inherently innovative. While autonomous AI systems resemble what is predicted as Artificial General Intelligence ("AGI") in the distant future, it is becoming progressively evident that AGI could be on the near horizon. In the instance of DABUS, an artificial intelligence device listed as the sole inventor of multiple patent applications, AI is already capable of independently generating inventions and internally appreciating its creations as novel and useful. With current patent law requiring that an inventor be a natural person, patents for AI-generated inventions are at a stand-still. Without adequate patent protection for AI-generated inventions, the United States Patent and Trademark Office has inadvertently proscribed two avenues for individuals to intelligently pick their poison. Either individuals will be forced to fraudulently disclose themselves as the inventor instead of indicating the true inventor, their AI system, or keep useful innovation as a trade secret—both of which contradict the fundamental underpinnings of the Intellectual Property Clause of the Constitution. Thus, granting patent protection on novel, AI-generated inventions is perhaps the best solution to encourage creativity and progress science.

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I. INTRODUCTION

"My dad thought the biggest problem in this world was unrealized potential,"[1] Liam tells Dolores in the premiere of the third

[1] *Westworld: Parce Domine* (HBO television broadcast Mar. 15, 2020).

season of HBO's *Westworld*.[2] For those who are not avid viewers of the show, "Westworld" is a Western theme park populated by human-like robots called "hosts."[3] In the show, wealthy humans pay to visit the lawless park and indulge in their morally suppressed fantasies, illuminating the darkest, most problematic sides of humanity.[4] The park's attraction stems from the idea that the hosts are almost indiscernible from humans, not only in their outward appearances but also in the ways they harbor and express sentiment.[5] To prevent the hosts from becoming too human-like, their neural networks are erased each night, and they begin their pre-programmed, character-based loops fresh the following day.[6] But, as with most entertaining plots, unpredictability reigns, and the creators of the hosts realize that perhaps these "robots" have developed independent thoughts, aspirations, and sentiments despite their initial programming.[7] The show is based in the 2050s[8]—a mere thirty years from now, but ironically, the themes echoed in *Westworld* are already issues society faces today. With the technological world advancing far more quickly than the law can set precedent, adapting and harvesting its potential may seem difficult. Yet, one of the ways to harvest technology's potential is recognizing that forms of Artificial Intelligence ("AI"), like humans, can create novel inventions to which they are the sole inventor. However, the United States Patent and Trademark Office ("USPTO") disagrees.

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[2] *Id.*

[3] Gabrielle Bruney, *Here's How Westworld's Rohoboam Technology Put Humanity on a Loop*, ESQUIRE (Mar. 16, 2020), https://www.esquire.com/entertainment/tv/a31665341/rehoboam-westworld-season-3-explained/ [https://perma.cc/X2QW-M8QN].

[4] *Westworld: Parce Domine*, *supra* note 1.

[5] *Id.*

[6] *Id.*

[7] Bruney, *supra* note 3.

[8] Greg Braxton, *This Season, 'Westworld' Imagines Los Angeles in 2058. Here's What it Looks Like*, L.A. TIMES (Mar. 15, 2020, 6:00 PM), https://www.latimes.com/entertainment-arts/tv/story/2020-03-15/westworld-hbo-los-angeles-blade-runner [https://perma.cc/Z4XB-MY26].

In July 2019, Dr. Stephen Thaler, expert and pioneer in AI technologies, filed two patent applications with the USPTO.[9] However, Dr. Thaler claimed that his AI machine, "Device for Autonomous Bootstrapping of Unified Sentience" ("DABUS"), autonomously, without human assistance, created two inventions:[10] (1) a light beacon that mimics the human lacunar nerve impulses to make light more noticeable in emergencies ("Neural Flame"), and (2) a beverage container based on fractal geometry that enhances gripping ("Fractal Container").[11] Patent applications usually require an oath or declaration by the true inventor(s).[12] However, because the inventor in this instance was DABUS, which lacks a legal personality and is incapable of executing an inventor's oath, Dr. Thaler filed a substitute statement identifying himself as the legal representative of DABUS.[13] Additionally, Dr. Thaler filed an assignment document indicating himself as the assignee of the inventions' rights and interests.[14] Regardless of how potentially useful DABUS's creations were, the USPTO issued a Notice stating that both of Dr. Thaler's applications failed to identify an inventor by his or her legal name.[15] In response, Dr. Thaler filed two subsequent petitions requesting that the Notices be reviewed and vacated; however, the USPTO denied both Dr. Thaler's initial and subsequent petitions.[16] The USPTO published a final decision in April 2020, stating that DABUS could not be named an inventor and was ineligible for patent protection on its creative works.[17]

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[9] U.S. Patent Application No. US16/524,350 (filed July 29, 2019) [hereinafter Decision on Petition].

[10] *Id.* at 3–4.

[11] Ryan Abbott, *Patent Applications*, THE ARTIFICIAL INVENTOR PROJECT (2020), https://artificialinventor.com/patent-applications/ [https://perma.cc/R5NW-CAGZ].

[12] 35 U.S.C. § 115(b) ("An oath or declaration . . . shall contain statements that . . . such individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application.").

[13] *See* 37 C.F.R. 1.64 (2019).

[14] 37 C.F.R. 3.73(c) (2019).

[15] Decision on Petition, *supra* note 9, at 1–2.

[16] *Id.*; 37 C.F.R. § 1.181 (2019).

[17] Complaint at 8, Thaler v. Iancu, et al, No. 1:20-cv-00903 (E.D. Va. Aug 06, 2020) [hereinafter Complaint, Thaler v. Iancu].

As a result of the USPTO's decision, a new distinction arose, which now turns on the *amount* of contribution an AI system is attributed for a specific invention. In the past, AI systems have acted as tools in assisting human inventorship.[18] In these scenarios, the final invention—regardless of whether AI contributed to ninety-nine percent of the substantive product—is referred to as an AI-assisted invention and is protected under current patent law.[19] The protection of AI-assisted inventions inevitably stems from the fact that only a natural human is listed as the inventor(s).[20] On the other hand, AI-generated inventions, which could theoretically contribute to 100% of the final invention, and could meet all the other patentability requirements, do not have patent protection because a human inventor cannot be named.[21] Thus, arguably, the difference in patent protection could be the additional one percent in which AI is no longer assisting human inventorship but being inherently innovative. The issue with the USPTO making this slight, but drastic, distinction is that all novel and valuable inventions created solely by AI will go unprotected—at least for now.

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[18] Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079, 1093 (2016).

[19] *E.g.*, USPTO, *Artificial Intelligence: Opening Remarks | Overview of AI | Patenting AI: Views Across the Corporate Spectrum*, VBRICK REV at 01:11:00-01:11:55 (Jan. 31, 2019), https://rev-vbrick.uspto.gov/#/videos/73b95f54-ca6e-4ba5-9e95-a8b3a8aa60ea [https://perma.cc/G53G-6CXA]. *See* Erica Fraser, *Computers as Inventors - Legal and Policy Implications of Artificial Intelligence on Patent Law*, 13 SCRIPTED 305, 306 (2016) (describing that there is a vast spectrum of computer involvement in the inventive process with one end consisting of computers being used for simple calculations while the other involves computers acting autonomously).

[20] Decision on Petition, *supra* note 9, at 6.

[21] *See* Benita Rose Matthew, *Ryan Abbott Presenting on AI-Generated Inventions at EmTech MENA*, ARTIFICIAL INVENTOR at 00:04:08-00:04:49 (June 30, 2020), https://artificialinventor.com/ryan-abbott-presenting-on-ai-generated-inventions-at-emtech-mena-2/ [https://perma.cc/57YY-BKMA] (asserting that even if an AI meets all the requirements of patentability, it cannot be an inventor because it is not a natural person). "If I train my PhD student to solve complex problems and she does, I'm not an inventor on her patents [and] I don't have any claim to having devised the final invention. So, if I just ask Siri to invent something and it does, well, that would make Siri and inventor—at least it would if Siri was a natural person." *Id.*

After the USPTO issued its final decision denying DABUS's inventions as patentable, Dr. Thaler filed suit in federal court against the USPTO.[22] In his complaint, Dr. Thaler argued that the USPTO's decision effectively prohibits patents on all AI-generated inventions.[23] Dr. Thaler further argued that "a patent application for an AI-generated invention should not be rejected on the basis that no natural person is identified as an inventor."[24] Furthermore, he requested that his applications be reinstated and that the prior decision on his petitions be vacated.[25] Depending on the success of Dr. Thaler's claims, AI-generated inventions could still have the potential to receive patent protection since the decisions of the USPTO do not necessarily bind federal courts.[26]

Undoubtedly, current patent laws were structured during a time in which AI-generated inventions were unimagined.[27] Although patent laws have been able to adapt along with technological advancements, it is clear that patent laws are irreconcilable with the sophistication of AI-generated inventions. Soon, they may also become unable to accommodate further technological growth.[28] By denying recognition of DABUS as the sole inventor of its creative works, the USPTO is excluding all AI-generated inventions and ultimately setting a foundation that will restrict future innovation, which may be the product of unanticipated technology. Thus, in essence, the DABUS decision completely undermines the explicit rationale of the Intellectual Property Clause of the Constitution.

This Article argues that AI should be recognized as an inventor. Part II provides a brief discussion on the background of AI and the emergence of DABUS. Part III explores current patent law requirements and analyzes the USPTO's decision denying

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[22] Complaint, Thaler v. Iancu, *supra* note 17, at 1.

[23] *Id*. at 7.

[24] *Id*. at 17.

[25] *Id.* at 16–17.

[26] Cleveland Clinic Found. v. True Health Diagnostics LLC, 760 F. App'x 1013, 1020 (Fed. Cir. 2019) ("While we greatly respect the PTO's expertise on all matters relating to patentability . . . we are not bound by its guidance.").

[27] Francesca Mazzi, *Patentability of AI Generated Drugs*, 4 EPLR 17, 17 (2020).

[28] *Id.*

DABUS's inventorship recognition. Part IV discusses current approaches to addressing AI inventorship. Part V describes why AI should be recognized as an inventor. Part VI discusses potential drawbacks to allowing AI inventorship. Lastly, Part VII concludes that AI-generated inventions should be afforded patent protection because AI inventorship ultimately preserves the patent system's moral integrity and promotes the progression of arts and sciences.

II. BACKGROUND: ARTIFICIAL INVENTION AND THE CREATION OF DABUS

The AI industry has rapidly impacted nearly every sector of modern life and contributes to humans' life, liberty, and pursuit of happiness.[29] AI has gained recognition through publicized exhibitions, including DeepMind's "AlphaGo Master" beating the world champion of the board game *Go* in 2017 and IBM's "Watson" winning a game of *Jeopardy!* in 2011.[30] While these instances have undoubtedly captivated a mesmerized audience, DeepMind and IBM's more impressive work has illuminated AI's degree of social utility.[31] By the year 2027, experts predict that the AI industry will be worth $733.7 billion in the United States—a growth rate of 42.2% from 2020's report of $62.4 billion.[32] While advertising and

[29] USPTO, *supra* note 19, at 00:21:10-00:21:24 (explaining how AI affects humans' life (*i.e.*, education, healthcare, law, and personal services), liberty (*i.e.*, national security and law enforcement), and their pursuit of happiness (*i.e.*, finance, transportation, communication, agriculture, marketing, and science and technology)).

[30] RYAN ABBOTT, THE REASONABLE ROBOT 1–2 (2020) (ebook).

[31] For example, DeepMind's AI is able to consistently predict development of acute kidney failure forty-eight hours earlier than human physicians and Watson can thoroughly analyze the genetics of cancer patients in about ten minutes, a task that can take a team of health care experts roughly 160 hours to do. In fact, with the ability to memorize dozens of medical books, hundreds of thousands of articles, and an exorbitant amount of medical records, several companies claim that their AI can already outdo human doctors in certain areas of the medical profession. It is only a matter of time until AI can consistently prescribe the best-suited prescriptions, perform diagnosis, and precisely replicate surgical procedures. *Id.*

[32] *Artificial Intelligence Market Size, Share & Trends Analysis Report By Solution (Hardware, Software, Services), By Technology (Deep Learning, Machine Learning), By End Use, By Region, And Segment Forecasts, 2020–2027*,

media sectors accounted for most of the industry's market in 2019, sectors like healthcare, banking, and law are expected to dominate the AI industry by 2027.[33] In the pharmaceutical and medical professions, some argue that AI is already doing ninety-nine percent of the work required to develop drugs and vaccines.[34] In the financial industry, autonomous machines can execute complex transactions, flag potential criminals using facial recognition software, and perform extensive document reviewal.[35] AI is also beginning to drastically permeate the legal field by aiding criminal justice[36] and predicting litigation outcomes.[37] In the form of "automated lawyers,"[38] AI is analyzing case law, assisting with discovery

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GRAND VIEW RSCH (July 2020), https://www.grandviewresearch.com/industry-analysis/artificial-intelligence-ai-market [https://perma.cc/X262-M2BC].

[33] *Id.*

[34] USPTO, *supra* note 19*,* at 01:10:55 (raising question of who the true inventor really is when scientists and researchers initially design the specific screenings for drugs, but then it is the millions of different compounds in which robots then move into wells, stain, rinse, and analyze that results in a billion-dollar drug). *But see id.* at 01:12:26 (stating that while humans' offload most of the analysis piece to computers, at the end of the day, a human has to tell the computer to do it).

[35] Matthew U. Scherer, *Regulating Artificial Intelligent Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J.L. & TECH. 353, 354 (2016).

[36] Christopher Rigano, *Using Artificial Intelligence to Address Criminal Justice Needs*, NAT'L INST. OF JUST. (Oct. 8, 2018), https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs [https://perma.cc/CK6F-JSTR].

[37] For a fascinating article discussing whether using predictive algorithms in the U.S. criminal justice system makes the judicial process less biased, see Karen Hao & Jonathan Stray, *Can You Make AI Fairer Than a Judge? Play Our Courtroom Algorithm Game*, MIT TECH. REV. (Oct. 17, 2019), https://www.technologyreview.com/2019/10/17/75285/ai-fairer-than-judge-criminal-risk-assessment-algorithm/ [https://perma.cc/C75C-TGTC], and Julie Sobowale, *How Artificial Intelligence is Transforming the Legal Profession*, ABA J. (Apr. 1, 2016), https://www.abajournal.com/magazine/article/how_artificial_intelligence_is_transforming_the_legal_profession [https://perma.cc/42WH-AVPP] (explaining an algorithm created at the Chicago-Kent College of Law which was able to predict the outcomes of Supreme Court cases with 70% accuracy based on an analysis of 7,700 rulings between 1953 and 2013).

[38] Shlomit Ravid & Xiaoqiong Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era*, 39 CARDOZO L. REV. 2215, 2219 (2018).

processes, drafting trial briefs,[39] and even appealing parking tickets.[40] These basic examples display a fraction of AI's expansive proficiencies, and even still, these instances illuminate AI's capacity to perform tasks autonomously. Thus, it seems counterintuitive that the USPTO rejects AI's ability to invent in a way analogous to humans. Regardless of the USPTO's outward rejection of AI as an inventor, the USPTO has already granted AI inventors several patents.[41]

Legal scholars speculate that the USPTO has been granting patents for AI-generated inventions for decades.[42] In those instances, scholars and attorneys have suggested that the true AI inventor was never disclosed, and a human was listed in its place.[43] For example, Dr. Thaler claimed that his first patent, the "Creativity Machine," actually generated his second patent[44] even though he listed himself as the inventor.[45] The Creativity Machine is also credited with numerous other inventions[46] like the cross-bristle design of the

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[39] Rigano, *supra* note 36.

[40] Leanna Garfield, *A 19-Year-Old Made A Free Robot Lawyer That Has Appealed $3 Million In Parking Tickets,* BUS. INSIDER (Feb. 18, 2016), https://www.businessinsider.com/joshua-browder-bot-for-parking-tickets-2016-2 [https://perma.cc/87PQ-C49L].

[41] Abbott, *I Think*, *supra* note 18, at 1085; Kay Firth-Butterfield & Yoon Chae, *Artificial Intelligence Collides with Patent Law*, WORLD ECON. FORUM, at 6 (Apr. 2018), http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf [https://perma.cc/TP4X-Z32C].

[42] Matthew, *supra* note 21, at 00:02:10-00:02:40.

[43] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 73 (explaining that Dr. Thaler followed his attorney's advice and did not list his Creativity Machine, his first patent, as the inventor of his second patent, but if Dr. Thaler's claims are true, then the USPTO has granted a patent for an invention created by a nonhuman inventor as early as 1988).

[44] Dr. Thaler's second patent is titled "Neural Network Based Prototyping System and Method" and, also preceded DABUS. *Id.* at 73.

[45] *Id.* ("As one of Thaler's associates observed in response to the Creativity Machine's Patent, 'Patent Number Two was invented by Patent Number One. Think about that. Patent Number Two was invented by Patent Number One!'").

[46] For an excellent in-depth discussion with Dr. Thaler about the Creativity Machine's inventions and projects with the U.S. Air Force, Raytheon, and Gillette, see generally Benita Rose Mathew, *Dr. Thaler Speaks On How Dabus Can Invent*, ARTIFICIAL INVENTOR PROJECT (July 15, 2020), https://artificialinventor.com/467-2/ **[**https://perma.cc/TS4A-7MWF] (sharing a

Oral-B Cross Action Toothbrush or devices that search the internet for messages from terrorists.[47] Additionally, scientist John Koza[48] claims that his AI, called the "Invention Machine," autonomously generated a system to make factories more efficient.[49] Koza, like Dr. Thaler, stated that his attorney advised his team to consider naming themselves as the inventors on the patent applications "despite the fact [that] 'the whole invention was created by a computer.'"[50] Consequently, the USPTO granted a patent to the "Invention Machine's" factory efficiency system while continuing to be utterly oblivious to the actual inventor.[51] Conceivably, these examples represent a tiny fraction of the scientists who have faced the same predicament: knowing their AI has autonomously generated a patentable invention but being forced to list themselves as the inventor to protect valuable subject-matter.[52] While inventors may use their name in place of AI amidst the glare of the USPTO, creative minds have long understood the undeniable ability of machines to engage in their autonomous abilities—ones that allow them to flourish independent of human interaction.

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discussion with Dr. Thaler, Ryan Abbott, and the American Intellectual Property Law Association about the Creativity Machine's past projects, how DABUS functions, and the legal implications of AI-generated inventions).

[47] *Id.* at 14:30.

[48] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 73–74. John Koza is a computer scientist and pioneer in the field of genetic programming as well as the inventor of the scratch-off lottery ticket. *Id.*

[49] *Id*. at 74 ("The Invention Machine generated the content of the patent and an improved controller (a common component of electrical products)[.] It did so without a database of expert knowledge and without any knowledge about existing controllers.").

[50] *Id.* at 74–75.

[51] *Id.* at 73–75.

[52] *Id.* Abbot explains that as early as 1983, AI program known as "Eurisko" autonomously discovered new information through combining microchip structures together to create several novel designs; however, Stanford University abandoned filing a patent for "Eurisko's" chip designs for unknown reasons. *Id.* In addition, a computer program called "TED," created by Alexander Kott in the late 1980's, "rediscovered at least two significant and well-known inventions and also generated previously unknown and nontrivial designs." *Id.*

A. History of Invention Machines

Lady Lovelace, an English mathematician and daughter of Lord Bryon, is considered one of the original computer programmers of our "modern-day" generation.[53] In 1843, she worked as Charles Babbage's accomplice in creating his proposed mechanical general-purpose computer dubbed the "Analytical Engine."[54] In her discussions about the Analytical Engine, Lady Lovelace iterated a modernly accepted premise—computers are only capable of producing desired outputs through a series of inputs.[55] She stressed that computers would never be able to originate anything on their own.[56]

However, as history has inevitably shown,[57] exclaiming the forbidden "never" is a dangerous game. In the early 2000s, a team of scientists, including Selmer Bringsjord and IBM's "Watson" developer, David Ferrucci, designed a test to determine whether a

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[53] PAMALA MCCORDUCK, MACHINES WHO THINK: A PERSONAL INQUIRY INTO THE HISTORY AND PROSPECTS OF ARTIFICIAL INTELLIGENCE 32 (2004) (ebook).

[54] *Id.*

[55] *Id.* at 33 ("One statement of Lady Lovelace's has often been quoted: 'The Analytical Engine has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform.' And this statement has been adduced as evidence that machines cannot, in any way, be said to think.").

[56] *Id.*

[57] *Id.* at xix ("Those who said a thing could never be done were later replaced by those who had to concede that it could, but then said it ought not to be."); AUGUST COMTE, THE POSITIVE PHILOSOPHY 148 (Harriet Martineau trans., 2000) (1875) (explaining that humans would never know anything about the composition of stars); 148 Cong. Rec. 23289 (2002) (statement of Bob Ingram while speaking in the context of unknown consequences) ("And I'm inclined to not predict such things unless I end up like Lord Kelvin, an English Scientist and president of the Royal Society, who has gone down in history for saying: "Radio has no future. Heavier-than-air flying machines are impossible. X-rays will prove to be a hoax. I have not the smallest molecule of faith in aerial navigation other than ballooning."); Samuel J. McNaughton, *What Is Good Science*, 13 NAT. RES. & ENV'T. 513 (1999) (quoting Robert Milliken, Nobel Prize winner in physics, who said in 1923: "There is no likelihood that man can ever tap the power of the atom" and Charles H. Duell, director of the U.S. Patent Office, who said in 1899: "Everything that can be invented has been invented."). In all of these instances, science and technology have proven these figures wrong. *Id.*

computer can think like a human.[58] Purportedly, the test more accurately represents AI cognition than the previously renowned "Turing Test,"[59] named after British mathematician and logician Alan Turing.[60] Based on Lady Lovelace's proposition that no form of machine could ever think like a human, the "Lovelace Test" was born.[61] To "pass" the Lovelace Test, an artificial agent, designed by a human, must: (1) originate a novel program, idea, piece of music, etc., that it was not engineered to produce, and (2) the agent's designers must not be able to explain how the original code led to the novel idea.[62] The irony of scientists like Selmer Bringsjord and David Ferrucci naming their AI cognition test after Lady Lovelace illustrates, in and of itself, the danger of using the word "never," especially in the realm of technology.[63] In the instance of DABUS, one could say, "Houston, we have a problem,"[64] because it seems

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[58] Jordan Pearson, *Forget Turing, the Lovelace Test Has a Better Shot at Spotting AI*, VICE (July 8, 2014, 2:30 PM), https://www.vice.com/en_us/article/pgaany/forget-turing-the-lovelace-test-has-a-better-shot-at-spotting-ai [https://perma.cc/CP32-CN5J]. *See generally* Selmer Bringsjord et al., *Creativity, the Turing Test, and the (Better) Lovelace Test*, 11 MINDS AND MACHS., 1, 3–22 (2001) (explaining the Lovelace Test in depth and what differentiates it from the Turing Test).

[59] MCCORDUCK, *supra* note 53, at 262.

[60] John R. KOZA, *Human-Competitive Results Produced by Genetic Programming*, 11 GENETIC PROGRAMMING & EVOLVABLE MACHS. 251, 252 (2010) ("Turing correctly perceived in 1948 and 1950 that machine intelligence might be achieved by an evolutionary process [similar to a child] in which a description of a computer program (the hereditary material) undergoes progressive modification (mutation) under the guidance of natural selection (i.e., selective pressure in the form of what is today usually called 'fitness' by practitioners of genetic and evolutionary computation."). MCCORDUCK, *supra* note 53, at 65 (explaining Alan Turing's computer design is regarded as the push behind cracking German cipher machine, "Enigma," stating "'I won't say that what Turing did made us win the war,' says I. J. Good, now a professor at Virginia Polytechnic Institute, who was then Turing's statistical clerk, 'but I daresay we might have lost it without him.'").

[61] Bringsjord et al., *supra* note 58, at 2 (emphasis added).

[62] Pearson, *supra* note 58.

[63] *See* MCCORDUCK, *supra* note 53, at xix.

[64] Michael S. Rosenwald, *'Houston, We Have a Problem': The Amazing History of the Iconic Apollo 13 Misquote*, WASH. POST (Apr. 13, 2017), https://www.washingtonpost.com/news/retropolis/wp/2017/04/13/houston-we-

like this dangerous game has, yet again, played out quite predictably.

Dr. Thaler proposed that DABUS has accomplished the "impossible" by passing the Lovelace Test.[65] DABUS has not only autonomously generated two novel inventions, but it has also independently appreciated them as novel.[66] Furthermore, Dr. Thaler claims that while he generally understands the process in which DABUS creates, he cannot explain the exact "ah-hah!" moment that leads DABUS to conceptualize and solidify its novel inventions.[67] By no means does Dr. Thaler purport DABUS to be exactly human-like; instead, he proposes that the manner in which DABUS conceptualizes spaces and ideas proves reminiscent of human cognition, consciousness, and sentience.[68]

B. Emergence of DABUS

DABUS is a type of creative-machine; however, DABUS functions entirely differently than Dr. Thaler's earlier patented Creativity Machine.[69] The Creativity Machine requires at least two neural networks ("nets"): (1) an idea generator net and (2) a critic net.[70] The two nets are permanently connected in a quasi-brainstorming session where the critic net "judges" what the generator net generates and "steers" its artificial ideation in the

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have-a-problem-the-amazing-history-of-the-iconic-apollo-13-misquote/ [https://perma.cc/VT5P-SF8S].

[65] Perpetual Motion Podcast, *Are All Inventors Humans?*, IHEARTRADIO, at 37:00 (July 8, 2020), https://www.iheart.com/podcast/966-perpetual-motion-podcast-69966811/episode/are-all-inventors-human-episode-69976714/ [https://perma.cc/5J7D-LH98] (explaining that the Turing Test is not an accurate representation if AI can "think," instead, the more impressive test is the Lovelace Test and the only reason why critics say that an AI has never passed it is to "keep others out").

[66] *Id.* at 18:47 (emphasis added).

[67] *Id.* (explaining that pigeon language is how humans think as well and it is not until our brain chooses to be eloquent and polite that we appear to be intelligent with the rearrangement of our thoughts in the form of grammatical sentences).

[68] *Id.* at 34:55.

[69] *What is DABUS?*, IMAGINATION ENGINES, INC. (last visited Nov. 1, 2020), http://imagination-engines.com/iei_dabus.php [https://perma.cc/Z7QQ-XFXV].

[70] *Id.*

direction of useful, novel, or valuable notions.[71] After the critic "approves" of an idea, it reinforces that idea within both neural nets to create superior ideas.[72] While the Creativity Machine performs parametric optimizations (i.e., it has parameters to what it can generate), DABUS lacks a "critic net,"[73] consequently creating a greater latitude for conceptualization.[74] DABUS autonomously combines simple concepts into more complex ones that, in turn, launch a series of memories and express the anticipated consequences of those memories or ideas.[75] DABUS's ideas are not represented by the "on-off" patterns of neuron activations like the Creativity Machine but by "ephemeral structures or shapes formed by chains of nets that are rapidly materializing and dematerializing."[76] If randomly one of these "geometrically represented ideas incorporates one or more desirable outcomes," DABUS reinforces the desirable patterns.[77] In contrast, patterns representing undesirable notions are "weakened through a variety of induced chaotic noise."[78]

The underlying difference between DABUS's structure and other common forms of AI is that DABUS is not directed what to invent.[79] When DABUS discovers a new concept chain, its internal networks appreciate the concept's novelty.[80] To communicate its appreciation of a novel concept chain, DABUS rings these "bells" to alert Dr. Thaler of the idea.[81] DABUS can then convey its specific, novel idea to Dr. Thaler through images flashed upon a screen or through text in the form of pidgin language.[82] Even though DABUS

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[71] *Id.*
[72] *Id.*
[73] *Id.*
[74] *Id.*
[75] *Id.*
[76] *Id.*
[77] *Id.*
[78] *Id.*
[79] *Id.*
[80] *Id.*
[81] Perpetual Motion Podcast*, supra* note 65, at 18:47.
[82] *Id.* at 19:07. Dr. Thaler describes DABUS's pidgin language as a primitive form of communication, not something that is "necessarily grammatical or beautiful." *Id.* However, Dr. Thaler explains that "humans think in this way too

primarily functions without a directional course, Dr. Thaler can also confine its knowledge to be within specific conceptual spaces, such as medical information, so DABUS will concentrate its thinking within that conceptual space to solve a particular problem dealing with medical information.[83]

DABUS's conceptualization processes can be equated to human stream of consciousness.[84] Human brains have subliminal conceptualization going on at all times. However, unlike machines, humans' potentially novel ideas are suppressed because daily tasks and rudimentary thoughts take priority.[85] Thus, what could have been an extraordinary concept may never resurface in a human mind.[86] Regardless of how similar DABUS's neural processes are to a human's cognition, one significant barrier stands in the way of inventorship eligibility—DABUS is not a natural person.

III. CURRENT PATENT LAW REQUIREMENTS AND USPTO'S DABUS DECISION

The USPTO focused on two underlying rationales when denying Dr. Thaler's final petition listing DABUS as the sole inventor of its creations.[87] The USPTO determined that an inventor must be a natural person, and because DABUS is not a natural person, it cannot be capable of "conception," which is commonly referred to as the "touchstone of inventorship."[88] In making its conclusion, the USPTO relied heavily on the plain meaning of current patent law

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before we decide to be polite or appear somewhat intelligent" by rearranging our thoughts into congruent sentences. *Id.* For instance, Dr. Thaler explains pidgin language as something like: "Me Tarzan, you Jane; Silver bird fly over mountain." *Id.*

[83] *Id.* at 26:37 (explaining that DABUS can limit its conceptual space, but that is more of a task for the Creativity Machine).

[84] *Id.*

[85] *Id.*

[86] *Id.* at 25:10.

[87] *See* Decision on Petition, *supra* note 9, at 3–7.

[88] *Id.* at 5–7 (citations omitted) ("While these Federal Circuit decisions are in the context of states and corporations, respectively, the discussion of conception as being a 'formation in the mind of the inventor' and a 'mental act' is equally applicable to machines and indicates that conception—the touchstone of inventorship—must be performed by a natural person.").

found in Title 35 of the United States Code ("Patent Act") and the case law interpreting it.[89] Thus, the USPTO effectively conducted a dualistic analysis, qualifying DABUS's inventorship status based on: (A) a discussion of its existence as an inventor and (B) its resulting inability to be capable of conception.

A. "Inventor"

The USPTO employed two methods in excluding DABUS from the term "inventor"—both of which are flawed. The USPTO first relied on specific terms in various sections of the Patent Act to justify that DABUS cannot be an inventor because DABUS is not an "individual" and an "individual" must be a "natural person."[90] The USPTO pointed towards § 100(f) of the Patent Act: "The term 'inventor' means the *individual*, or if joint invention, the individuals collectively who invented or discovered the subject matter of the invention."[91] Since the Patent Act itself does not define the term "individual," the UPSTO's first flaw was rationalizing that "individual" means a "natural person" by pointing to other terms in the Patent Act like "whoever" and "person."[92] In crafting a definition for the word "individual" to mean "natural person," the USPTO asserted that § 101 clarifies any ambiguity by stating: "*Whoever* invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."[93] Citing the dictionary, the USPTO stated that the plain meaning of "individual" accompanied by the term "whoever" illustrated that an inventor must be a "natural person."[94] Additionally, the USPTO stressed that § 115 of the Patent

[89] *Id.* at 3.
[90] *Id.* at 4 (emphasis added).
[91] *Id.* at 3 (quoting 35 U.S.C. § 100(f) (2012)) (emphasis added).
[92] *Id.*
[93] *Id.* (citing 35 U.S.C. § 101 (2012)) (alteration in USPTO decision) (emphasis added).
[94] *Id.* at 3 (citing MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY (10th ed. 2001)).

Act, which covers inventors' oaths and declarations before receiving a patent, must be done by a "person."[95]

Although the USPTO pointed towards words in the Patent Act like "whoever,"[96] "individual,"[97] and "person"[98] to ultimately exclude AI from being an inventor, the decision did little to clarify these terms' meanings other than stressing the words' common connotations. The issue with the USPTO using "[w]hoever" from § 101 to indicate that an individual must mean a natural person is that "the word[] 'whoever' include[s] corporations, companies, associations, firms, partnerships, [and] societies."[99] Furthermore, under current U.S. patent laws, "the term *person* includes both individuals and corporations."[100] Thus, using "whoever" and "person" to indicate that an "individual," as referenced in § 101 defining who can be an inventor, means "natural person" is inconsistent. While terms like "whoever" and "person" do not explicitly include AI, these terms are associated with entities that are not natural humans. For the USPTO to state that DABUS is excluded from being an inventor because DABUS is not an "individual" (i.e., "natural person"), and then to support that assertion by using words that do not always mean "natural person" is heavily flawed.

Furthermore, depending on the emphasis of commas, "whoever," found in § 101, could instead reference the list of "new and useful process[es]."[101] Namely, "whoever"—meaning "machine, manufacture, or composition of matter, or any new and useful improvement thereof"—"may obtain a patent."[102] In other words, DABUS is a machine and, is itself, a useful improvement that may obtain a patent. Thus, the USPTO's interpretation of "inventor" and what can be one demonstrates that patent law, in the

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[95] *Id.* at 6 (citing 35 U.S.C. § 115 (2012)).
[96] *Id*. at 4 (citing 35 U.S.C. § 101 (2012)).
[97] *Id.* (citing 35 U.S.C. § 100(a) (2012)).
[98] *Id.* (citing 35 U.S.C. § 115(h)(1) (2012)).
[99] 1 U.S.C. § 1.
[100] GREGORY A. STOBBS, BUSINESS METHOD PATENTS § 19.07 (2nd Edition, 2011).
[101] 35 U.S.C. § 101.
[102] *Id.*

realm of AI, is not as black and white as the USPTO indicates it to be.

The second major flaw in the USPTO's reasoning for rejecting DABUS as an inventor was equating AI to corporations. Drawing on case law defining who can be an inventor, the USPTO reasoned that since corporations cannot be an inventor, it follows that AI cannot be one either.[103] However, AI, as an inventor, is not synonymous with corporations. A historical rationale behind rejecting corporations as inventors is rooted in protecting human inventors' moral rights from the powers of large corporations.[104] Since corporations file most patents, early patent law strived to recognize the individuals who truly worked on the patent and contributed to its conception.[105] Thus, if an individual were to invent something while employed at a corporation, the title would still go to the creator, not the company.

Moreover, another rationale for rejecting corporations as inventors rests in property law—more precisely, that the title to the invention should vest initially in the intellectual creator of the work.[106] As a practical matter, this makes sense because corporations are often comprised of numerous people and deeming one inventor, or numerous co-inventors, in a hierarchical corporation poses underlying integrity issues.[107] In other words, it could lead to a higher-ranked employer manipulating and taking credit for a newer, lower-ranked associate's creation.[108]

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[103] Decision on Petition, *supra* note 9, at 4–5 (citing Beech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248 (Fed. Cir. 1993)).

[104] Matthew, *supra* note 21, at 00:05:35-00:06:07.

[105] *Id.*

[106] *See*, *e.g.*, Agawam Woolen Co. v. Jordan, 74 U.S. 583, 602 (1868) ("He is the inventor and is entitled to the patent who first brought the machine to perfection and made it capable of useful operation . . . No one is entitled to a patent for that which he did not invent unless he can show a legal title to the same from the inventor or by operation of law.").

[107] Ravid & Liu, *supra* note 38, at 2233.

[108] *See* Matthew, *supra* note 21, at 00:05:35–00:06:07.

B. "Conception"

In addition to the USPTO rejecting DABUS as an inventor because AI is not a natural person, the USPTO also found that DABUS was incapable of "conception."[109] Conception is often referred to as the "touchstone of inventorship, the completion of the mental part of invention," and the USPTO emphasized that this "touchstone" is reserved for natural persons.[110] While some Federal Circuit decisions connote that conception is a whimsical process occurring only in the "minds" of inventors,[111] "the descriptions are not particularly informative about what is specifically required."[112]

In addition to relying on case law comparing corporations to DABUS to reject DABUS as an "inventor," the USPTO also referenced case law concerning corporations to reject DABUS's ability of "conception."[113] The USPTO's decision relied on case law pertaining to corporations to explain that 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 thereafter to be applied in practice."[114] However, the underlying legality of why corporations cannot be "inventors" or perform "conception" is entirely different and arguably incompatible with the instance of DABUS. Since DABUS, and other forms of AI, can imitate a human brain's neural workings, it is unclear what "formation in the mind" actually means when applied to AI.[115] The USPTO's attachment of such weight to an ambiguous phrase—"formation in the mind"—in concluding that AI cannot conceive is quite troublesome, in part because minds, while often associated with human brains, consist of the same internal structures as AI-neural networks.[116] Furthermore, the Patent Act provides that patentability "shall not be negated by

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[109] Decision on Petition, *supra* note 9, at 5.

[110] *Id.* at 5 (citing Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223 (Fed. Cir. 1994)) ("To perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns.").

[111] *E.g., Burroughs Wellcome Co.*, 40 F.3d at 1230 ("[C]onception occurs in the inventors' minds, not on paper.").

[112] Complaint, Thaler v. Iancu, *supra* note 17, at 13.

[113] Decision on Petition, *supra* note 9, at 5.

[114] *Id.*

[115] *Id.*

[116] Perpetual Motion Podcast*, supra* note 65, 20:03.

the manner in which the invention was made."[117] This phrase is directly at odds with the USPTO's analysis on the intricacies of conception and its explanation of why DABUS cannot perform this integral step of inventorship.

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The DABUS decision illustrates how patent law, in relation to AI-generated inventions, creates a fallacy in reasoning. The USPTO employed a cyclical and fallacious "begging the question" rationale when interpreting terms like "inventor" and "conception" to ultimately exclude AI.[118] This type of fallacy is commonly known as a *petitio principii*.[119] These fallacies "assume the conclusion of the argument offered and take the proposition for which they are arguing to use it as a premise in the argument."[120] Since technically this type of argument is valid, the *petitio principii* usually goes uncontested.[121] The fallacy exemplifies that any proposition logically follows from itself, so certainly, when a premise is propositionally identical to the conclusion, the premise is relevant to the conclusion. Thus, the issue with a *petitio principii* argument is that "it is no argument at all, other than the degenerate form of 'p, therefore p.'"[122]

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[117] 35 U.S.C. § 103.

[118] *See* Kevin W. Saunders, *Informal Fallacies in Argumentation*, 44 S.C.L. REV. 343, 357 (1993).

[119] *Id.*

[120] *Id.*

[121] *Id.* at 358. *See also* Alex Kozinski, *The Virtues of an Ordered Mind; After Hours; Books, Arts, Leisure*, LEGAL TIMES, Nov. 27, 1989, at 3 (1989) ("Discussing the legal fallacy, petitio principii, [Judge Aldisert] laments [t]his fallacy is really a first-class rascal because it sneaks up on us so often. He continues: The rascal bears many names . . . arguing in a circle, circular reasoning, putting the bunny in the hat, failing to prove the original proposition asserted, and using the original premise as proof of itself. Indeed, I can't count how often I've caught lawyers putting the bunny in the hat.").

[122] Saunders, *supra* note 118, at 358 (explaining how in many of Judge Aldisert's dissents he criticizes the majority of using this type of informal fallacy). *See also* United States v. Jannotti, 673 F.2d 578, 622 (3d Cir. 1982) (Aldisert, J., dissenting) ("Instead of proving the conclusion . . . the argument assumes it and then argues substantive law.").

Here, the USPTO rationalized that DABUS cannot be an inventor because (1) "inventor" means "individual" and (2) "individual" points towards being a "natural person;" thus, (3) only a "natural person" can be an "inventor."[123] Continuing the circle, the USPTO further rationalized that since (1) "conception" is a process that happens only in the "mind," and (2) only "natural persons" have "minds," then (3) DABUS cannot possibly be capable of "conception" because it is reserved for "individuals," and (4) only "individuals" can be "inventors." Regardless of where one begins in the circle of reasoning, the conclusion is the same. And based on current patent laws, there is virtually no way around it.

Furthermore, the USPTO employed a "traditional appeal" type of reasoning when there was no tradition to appeal to in supporting the exclusion of AI as an inventor.[124] Indeed, before the DABUS decision, there was no relevant Patent Office policy directly on the subject of AI-generated inventions.[125] Even still, there is no statute addressing computational invention or federal case law directly on the issue.[126] Thus, in essence, the USPTO's decision displays that current patent law is radically unequipped to deal with technological advancements in the field of AI.

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[123] *See infra* Part IV(B).

[124] This type of argument usually presents itself in times of unaccepted, social change. While this Article, in no way, intends to analogize the sacred importance of the institution of marriage to all sexualities to the topic of AI invention, it aims to draw attention to the pattern of rationale courts use when denying progress when it does not seem to "fit" the times. *See* Kitchen v. Hubert, 755 F.3d 1193, 1216 (2014) ("To claim that marriage, by definition, excludes certain couples is simply to insist that those couples may not marry because they have historically been denied the right to do so. One might just as easily have argued that interracial couples are by definition excluded from the institution of marriage."); John Locke, *An Essay Concerning Human Understanding* (1690), http://enlightenment.supersaturated.com/johnlocke/preamble.html [https://perma.cc/2TXB-LTHC] ("[N]ew opinions are always suspected, and usually opposed, without any other reason but because they are not already common.").

[125] Abbott, *I Think*, *supra* note 18, at 1080.

[126] *Id.*

IV. APPROACHES TO ADDRESSING AI INVENTORSHIP

After the USPTO released a request for comments on how best to fit AI within inventorship and patentability, there seemed to be an underlying consensus that the USPTO should revisit these issues when machines approach AGI.[127] AGI is considered a type of intelligence analogous to that possessed by humankind that could "theoretical[ly] . . . arise in a distant future."[128] However, this approach is problematic for two reasons. First, if AI were to be only recognized as an inventor when it becomes AGI, then there will inevitably be an exponential, and perhaps heedless, race to meet those means.[129] Allowing AI to be regarded as an inventor now would arguably slow some efforts to make computers even more human-like—a concern held by many.[130] Second, while predictions

[127] USPTO, PUBLIC VIEWS ON ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY POLICY 6 (Oct. 2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-05.pdf [https://perma.cc/3LXU-GKXP].

[128] *Id.* at ii.

[129] *See* discussion of "Lovelace Test," *supra* Part II(A). Regardless of how interesting it is that AI could pass a test designed only to be conquered by human intelligence, AI cognition tests do not seem especially useful other than to provide AI supporters and critics a basis for their respective arguments about whether AI has the ability to *think* like a human. Since one of the main barriers of AI being ineligible for inventorship status is the fact that it is not human, then perhaps one of the underlying forces in creating cognition tests is to prove just how similar AI can get to humankind. The danger of creating these tests is that inevitably, humans, as goal-oriented creatures, will want their AI machines to "pass" them which leads to another group of scientists getting together and forming yet another "impossible" standard. The fact that AI cannot currently be said to exactly imitate a human mind should be irrelevant in the realm of patent law. Even if the courts refuse to recognize AI as inventors, it probably will not stop humans from trying to replicate human consciousness, cognition, and sentience in the form of a machine. *Id.*; ALBERT CAMUS, THE STRANGER 17 (2012) ("If you go slowly, you risk getting sunstroke. But if you go too fast, you work up a sweat and then catch a chill inside the church.") In other words, there is no right answer, but the USPTO needs to pick its poison.

[130] *Id.*

range from ten years[131] to centuries[132] as to when AGI will be achieved,[133] the issues that AGI presents will undoubtedly require decades to ameliorate and will cause tremendous chaos if not addressed prior to the fact. However, these dates are simply predictions, and with AI progressing at such a rapid rate, predictions may be futile. Issuing AI-generated patents to AI inventors in the present could curtail some of these issues and force the USPTO and patent scholars to embark on the daunting task of analyzing where AI should fit within Title 35 without ultimately excluding it. Undoubtedly, officially recognizing the extent of AI's presence in the patent realm is an issue best suited for Congress; thus, it would be in the USPTO's best interest to begin preparing and proposing solutions now. If the issues are not addressed in the near future, a rise in lawsuits is inevitable now that AI-generated inventions are on the USPTO's radar. Obtaining a patent is exceptionally costly already.[134] Furthermore, going through an appeal process is frankly unfeasible for most applicants.[135]

Based on the individuals, companies, and associations that responded to the USPTO's request for comments,[136] three routes

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[131] Naveen Joshi, *How Far Are We From Achieving Artificial General Intelligence?*, FORBES (June 10, 2019), https://www.forbes.com/sites/cognitiveworld/2019/06/10/how-far-are-we-from-achieving-artificial-general-intelligence/#2fab82216dc4 [https://perma.cc/8X2D-2UEY].

[132] James Vincent, *This is When AI's Top Researchers Think Artificial General Intelligence Will be Achieved*, THE VERGE (Nov. 27, 2018), https://www.theverge.com/2018/11/27/18114362/ai-artificial-general-intelligence-when-achieved-martin-ford-book [https://perma.cc/WDE4-R97C].

[133] It is possible that AGI has already been achieved, but it is being kept as a trade secret. USPTO, *supra* note 19.

[134] *See* A. Abbott, et al., *Crippling the Innovation Economy: Regulatory Overreach at the Patent Office*, REGUL. TRANSPARENCY PROJECT OF THE FEDERALIST SOC'Y (Aug. 14, 2017), https://regproject.org/paper/crippling-innovation-economy-regulatory-overreach-patent-office/ [https://perma.cc/UFQ8-RAK6] (explaining people commonly spend roughly $30,000 to $60,000 in filing costs and attorney's fees by the time the process of application to issuance is finished).

[135] *Id.* at n. 34 (indicating that based on a report conducted by the American Intellectual Property Association in 2015 the median cost of traditional patent litigation to trial was $3.1 million).

[136] *See generally* Request for Comments on Patenting Artificial Intelligence Inventions, 84 Fed. Reg. 44889 (Aug. 27, 2019) (requesting comments to gather

could be followed to address AI in patent law. The first is continuing to abide by current standards and thus neglecting to grant inventorship status to AI. The second approach is AI being listed as a co-inventor. Finally, the third approach is allowing AI to be the sole inventor of its creative works. Notably, none of these suggestions recommend that AI have ownership rights, nor does this Article argue such a proposition.

A. Continue Current Standards and Reject AI as an Inventor

The first recommendation would prevent AI from gaining inventorship status in any capacity, but it would continue to allow AI as a tool contributing to human inventorship, namely, to assist in conception and reduction to practice. However, this solution hinders efforts to preserve the patent system's moral, economic, and intellectual integrity and ultimately inhibits collaboration. This route would promote fraudulent activity by prompting people to name themselves as an inventor regardless of their absent role in the process as required for inventorship in 35 U.S.C § 115.[137] Also, this route would perpetuate companies or individuals leveraging the option of keeping AI-generated inventions as trade secrets.[138] Yet, for companies or even smaller private groups, trade secrets do not always provide adequate protection due to the fluctuation of employees and the difficulty of actually keeping information secret.[139] In addition, keeping AI-generated inventions as trade secrets does not prevent competitors from independently coming by

"information on patent related issues regarding artificial intelligence inventions for purposes of evaluating whether further examination guidance is needed to promote the reliability and predictability of patenting artificial intelligence inventions.").

[137] *See* 35 U.S.C. § 115(b) ("An oath or declaration under subsection (a) shall contain statements that . . . such individual believes himself or herself to be the original inventor or an original joint inventor of a claimed invention in the application.").

[138] USPTO, *supra* note 19, at 01:15:10 (explaining that when choosing whether to pursue keeping information as a trade secret or pursing a patent, it is important to ask what the duration of the innovation may be—if it is something that can be replicated by a competitor tomorrow, then pursing a patent would be ideal, however if it is something that is before its time, keeping it as a trade secret may be advantageous).

[139] *Id.* at 01:16:21–01:16:40.

the same invention, even by means other than reverse-engineering, and then filing a patent with a human as an inventor.[140] Most importantly, trade secrets inherently inhibit transparency and collaboration. Especially with the development of AI, a field where the dissemination of information notably serves as a framework for future AI, companies and individuals should be incentivized to patent their AI-generated inventions to encourage collaboration and contribute to the public domain.

B. Hybrid Approach: Listing AI & its Human Owner as Co-Inventors

A second recommendation would be more of a middle-ground solution. Its premise is changing current patent law so that AI can be listed as a co-inventor. Classic AI, or "Good Old-Fashioned AI" ("GOFAI") as philosopher John Haugeland called it, follows a model in which a machine processes input data according to an encoded model of a problem and then outputs a solution.[141] While GOFAI is what the USPTO typically deals with, it now represents the far left of the AI capability spectrum. In contrast, DABUS's capabilities illustrate the far-right—or, more appropriately, the *current* far-right. Thus, allowing AI to be listed under its owner as a co-author would give it some sort of credit. However, this also presents an issue. The process of distinguishing who is and is not a co-author is already daunting,[142] and throwing AI into the midst would further complicate this distinction.

C. Recognize AI as Sole Inventor with Human Owning Patent

The essence of this Article proposes the third and most appropriate recommendation. The best way to address AI in the patent realm is to name the AI as the patent's inventor and assign the property rights to the AI's owner. This would provide the most clear-cut solution and would remain consistent with the Constitution. From a purely economic and utilitarian perspective, if AI can conceive an invention that promotes innovation, then it

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[140] *Id.* at 01:16:42–01:17:12.

[141] RYAN ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 28.

[142] Letter from Thomas J. Brindisi, to Laura A Peter, Deputy under Sec'y of Com. (Oct. 11, 2019), https://www.uspto.gov/sites/default/files/documents/Thomas-Brindisi_RFC-84-FR-44889.pdf. [https://perma.cc/E2LL-P4YN].

should be recognized.[143] There are two ways to potentially address the speculated harm to human inventors that would be caused by allowing AI inventors. One could be to limit the patent term of AI-generated inventions. Another could be restricting AI-generated patents to areas that promote social justice, public education, the environment, or something beneficial to all humankind.

V. WHY PATENT LAW SHOULD RECOGNIZE AI AS AN INVENTOR

AI inventorship exemplifies the type of creativity and social utility the Framers intended to harvest through the Intellectual Property Clause of the Constitution.[144] DABUS illustrates that AI can autonomously conceive an invention that is novel and useful, and if DABUS was a natural person, it is likely that its inventions would have been granted patent protection. While critics may perceive AI as only capable of producing specifically defined outputs, DABUS has shown that its creation process is akin to humans. Creativity is not hanging out in vacuums[145]—it is a bootstrapping process that requires mentorship from parents, professors, and institutions to the point where enterprise, analogies, and associative memories are gained and eventually harvested into creativity.[146] Counterintuitively, Dr. Thaler argues that AI is truly the only entity that is capable of genuine creativity.[147] To varying

[143] USPTO, *supra* note 19, at 01:13:00.

[144] U.S. CONST. art. I, § 8, cl. 8.

[145] *See* DAVID BROOKS, THE ROAD TO CHARACTER 115–16 (2015) (explaining everyone's ideas are a product of the institutions that shape them, and in turn, affect the way they see and think critically about the world). "A person not born into an open field and a blank social slate. A person is born into a collection of permanent institutions." *Id.*

[146] Perpetual Motion Podcast, *supra* note 65, at 43:50. *See* Matthew, *supra* note 21, at 00:04:08–00:04:49 (explaining the dichotomy of the patent system's requirements of inventorship: if a professor were to teach their PhD student how to think, the professor would not qualify as an inventor of the PhD student's creative works, but in contrast, if a professor were to teach its AI system how to solve problems, then the professor would most likely be the legal inventor of an AI's invention).

[147] *E.g.*, *id.* at 44:40 (asking Dr. Thaler whether he believes that humans can actually invent anything, Dr. Thaler remarks: "Yes and no. But, mostly no. The invention process actually involves humans going temporarily insane—

degrees in different contexts, the creative process has always been collaborative and cumulative, involving reworking of existing materials and meanings rather than originating completely new ones.[148] It has never entailed a sharp distinction between imitating, borrowing or adapting, and creating new, original ideas.[149] Consequently, AI should be recognized as the legal inventor of its autonomous creations because: (A) AI inventorship is consistent with the Framers intent behind proposing the Intellectual Property Clause, (B) AI inventorship preserves the moral integrity of the patent system by promoting the accurate disclosure of information, and (C) AI inventorship efficiently progresses the arts and sciences.

A. AI as an Inventor is Consistent with the Constitution

Like any proposal made almost 300 years ago, the actual records indicating the intent behind the Intellectual Property Clause of the Constitution[150] ("The Clause") prove to be highly sparse.[151] Nonetheless, the lack of evidence has not stopped courts and scholars from reaching and assigning meaning where they see fit.[152]

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hallucinating things that have not directly experienced before. It's a mild form of insanity that goes about and it can go the entire route [which] can result in hospitalization."). Dr. Thaler also points out the correlation between genius and insanity. *Id.* But, since humanity is suppressed by social expectations and self-help books, it would be dangerous for humans to reach the type of "insanity" that leads to great invention. *Id.* However, it is advantageous if humans can reach this type of "dangerous" creativity vicariously through a machine. *Id.*

[148] *Id.*

[149] *Id.*

[150] U.S. CONST. art. I, § 8, cl. 8.

[151] Dotan Oliar, *The (Constitutional) Convention on IP: A New Reading*, 57 UCLA L. REV. 421, 423 (2009); Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L 1, 26 (1994) ("[T]he question naturally arises as to how the Intellectual Property Clause came to be included in the Constitution. Little has been written on the point. The reason for the dearth of commentary undoubtedly is that so little is actually known about how its inclusion came about.").

[152] *See* Oliar, *supra* note 151, at 424 ("The little we currently know about the Clause's framing is the result of a host of factors, some objective-relating to the (small) amount and (confused) nature of the relevant historical material that survived the Convention-and some interpretive-relating to the way in which scholars (mis)understood this material and the (little) significance they gave it.");

In fact, some scholars argue that the only primary, credible records are two handwritten journals: James Madison's personal journal and the Convention's Journal.[153] Even though the history and purpose behind The Clause can represent somewhat of a dichotomy in the realm of AI-generated inventions, it is imperative to understand the context in which The Clause was implemented.

As products of the Enlightenment Era, the Founding Fathers understood that the establishment of communication links was implicit in building a new democratic nation, a cohesive market, and a shared culture.[154] Departing from the negative connotation European monarchs assigned to the widespread dissemination of information, the Framers believed, *inter alia*, that exchanging information was essential to form a stronger nation.[155] Thus, James Madison and Charles Pinckney "each put forth proposals to include among Congress' powers the right to grant intellectual property rights"—each aimed at advancing the state of science and learning.[156] The Clause reflected the Founding Fathers' belief that intellectual property rights were not natural rights, but instead statutory rights granted to induce the progression of learning.[157] The Clause was "unanimously approved without discussion,"[158] and in

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Marci A. Hamilton, *Copyright at the Supreme Court: A Jurisprudence of Deference*, 47 J. COPY. SOC'Y U.S.A. 317, 320 (2000) (indicating that "the history of the drafting of the Clause left little for the courts to employ"); Michael D. Birnhack, *The Idea of Progress in Copyright Law*, 1 BUFF. INTELL. PROP. L.J. 3, 33 (2001) ("Historians of American copyright law do not know much about the making of the constitutional clause, and most of what we have is historical interpretation, or at times, speculation.").

[153] *See, e.g.*, Dotan Oliar, *The Origins and Meaning Of The Intellectual Property Clause* 1, 5 (2004) (on file with Harvard Law School), https://cyber.harvard.edu/ip/oliar_ipclause.pdf [https://perma.cc/TMX4-ND42].

[154] U.S. CONG. OFF. OF TECH. ASSESSMENT, OTA-CIT-302, INTELLECTUAL PROPERTY RIGHTS IN AN AGE OF ELECTRONICS AND INFORMATION 37 (1986).

[155] *Id.*

[156] *Id.* at 37–38.

[157] *Id*. at 37; Adam Mossoff, *Who Cares what Thomas Jefferson Thought About Patents – Reevaluating the Patent Privilege in Historical Context*, 92 CORNELL L. REV. 953, 963–65 (2007) (explaining that scholars often point towards the infamous 1813 letter from Thomas Jefferson to Iaasac McPherson to support that Jefferson was against the idea that patent protection was a *natural right*).

[158] U.S. CONG. OFF. OF TECH. ASSESSMENT, *supra* note 154, at 37.

its final glory, The Clause granted Congress the enumerated 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."[159]

Even in modern times, The Clause provides an explicit rationale for encouraging innovation through patent and copyright protection: "To promote the progress of science and useful arts."[160] Notably, The Clause establishes an incentive theory by granting "authors and inventors the exclusive right to their respective writings and discoveries" for "limited times."[161] In essence, inventors will be more motivated to invent if they can receive government-sanctioned monopolies to exploit commercial embodiments of their inventions—thus, promoting the progress of science.[162] Consequently, receiving exclusive rights to own and sell an invention can be tremendously lucrative, which, in turn, incentivizes new inventions and discoveries by compensating the time, effort, and unique creativity required to create a useful and novel invention.[163]

Given the context in which the Framers proposed the Clause and its social utility in modern culture, allowing AI inventorship would seem consistent with the Constitution. However, critics argue that deeming AI as an inventor would infringe on the basic notion of patents' association with ownership, thus contradicting the Framers' intent of allowing human inventors to own the fruits of their labor.[164] While this argument is not without merit, it negligently blurs the

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[159] U.S. CONST. art. I, § 8, cl. 8.

[160] *Id*. *See* Ravid & Liu, *supra* note 38, at 2236 (*"*Discourse concerning the theoretical justifications for intellectual property tends to focus on three main substantive theories: (1) law-and-economics theory, a utilitarian approach that examines intellectual property rules according to their cumulative efficiency and ability to promote total welfare; (2) personality theory, which focuses on the personality of the creators and inventors; and (3) Lockean labor theory, which justifies the property interest as the fruits of the creator's labor.").

[161] U.S. CONST. art. I, § 8, cl. 8.

[162] Abbott, *I Think*, *supra* note 18, at 1080.

[163] *Id*.

[164] Samuel Scholz, *A Siri-ous Societal Issue: Should Autonomous Artificial Intelligence Receive Patent or Copyright Protection?*, 11 CYBARIS INTELL. PROP. L. REV. 81, 124 (2020).

Framers' distinction between the natural right to own property and the statutory right to own patents.[165] Arguably, if the Framers intended only humans to own patents, patent ownership would have been treated as an explicit *natural right*. Undoubtedly, the Framers did not contemplate AI in 1787—an era when the most advanced machinery was the steamboat.[166] Thus, there is no concrete indication that the Framers intended to exclude AI from being deemed an inventor, since one cannot exclude a thought that never occurred to them.[167]

Although Congress has never concretely addressed the issue of AI as an inventor, there have been minor yet significant changes in patent law in the last century that could indicate that Congress favors scientific progress over conservatively construed statutory language. Initially, by selecting such encompassing terms in sections of Title 35, namely § 101, which is "modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws would be given wide scope."[168] Furthermore, § 101 was modified in The Patent Act of 1952 to replace the strictly confined word of "art" with a more broad term like "process,"[169] reflecting the philosophy that Thomas Jefferson proposed—"[i]ngenuity should receive a liberal encouragement."[170] Additionally, the shift resembles Congress accepting a term like "process," which today

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[165] Mossoff, *supra* note 157, at 963–65; EDWARD C. WALTERSCHEID, THE NATURE OF THE INTELLECTUAL PROPERTY CLAUSE: A STUDY IN HISTORICAL PERSPECTIVE 14 (2002) ("[Walterscheild] states [a] simple historical fact: 'It is important to recognize that the patent custom known to the Framers involved privileges rather than property rights as such. The distinction between a *patent privilege* and a *patent property right* is an important one, and one not always recognized in the early literature on the patent law.'").

[166] *See* Oliar, *supra* note 151, at 449.

[167] *But see* Jeanne C. Fromer, *The Intellectual Property Clause's External Limitations*, 61 DUKE L. J. 1329, 1329 (2012) (quoting Marbury v. Madison, 5 U.S. (1 Cranch) 137 (1803)) ("[A]ffirmative words are often, in their operation, negative of other objects other than those affirmed." However, "[n]egative implication was a common eighteenth century method of legal drafting.").

[168] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at Chapter 4, n. 50.

[169] 35 U.S.C. § 271 (1952). The 1952 version of Title 35 was enacted into law by Pub. L. No. 593, 82d Cong., 2d Sess. c. 950 (July 19, 1952) [hereinafter Patent Act of 1952].

[170] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 91.

carries a technological connotation. While § 101 ultimately deals with patent subject-matter requirements and not the criteria of being deemed an inventor per se, these cultural shifts indicate that useful, scientific progress trumps conservatively construed terminology. This theme of scientific progress trumping conservatively construed terminology transpired once again when Congress ultimately abolished the "Flash of Genius Doctrine," which was interpreted to mean that a patent was only valid if the idea for the invention "[came] into the mind of an inventor in a 'flash of genius' rather than as a 'result of long toil and experimentation.'"[171] According to Congress, this doctrine proved to be vague, unhelpful, and resulted in increased hostility towards granting patents for otherwise novel and useful inventions.[172] The doctrine's abolishment is arguably one of the most significant indicators that Congress did not want courts to dwell on how an invention materialized. Instead, Congress wanted courts to focus on the positive impact the invention could make on society. Thus, the USPTO's focus on DABUS's inventions not occurring "in the mind" and their disregard for the inventions' social utility is counterintuitive to the Congressional justification for abolishing The Flash of Genius Doctrine in 1952.[173]

B. Allowing AI Inventorship Preserves the Moral Integrity of the Patent System

While humans taking credit for AI creations is not unfair to the machine, such a trend would harm other human inventors by equating the work of an AI to a person who potentially could have done very little.[174] Specifying the correct inventor of an invention is not only a legal requirement of patentability but also a moral

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[171] *Id.* at 85; Patent Act of 1952, at § 271.

[172] Jungersen v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson J., dissenting) ("The only patent that is valid is one which this Court has not been able to get its hands on."); *The "Flash of Genius" Standard of Patentable Invention*, 13 FORDHAM L. REV. 84, 87 (1944) ("As a commentator at the time noted, 'The standard of patentable invention represented by [the Flash of Genius doctrine] is apparently based upon the nature of the mental processes of the patentee-inventor by which he achieved the advancement in the art claimed in his patent, rather than solely upon the objective nature of the advancement itself.'").

[173] *See* Patent Act of 1952, at § 271.

[174] *Id.*

obligation.[175] Individuals impede on the moral benefit of recognition when they are forced to name themselves as the inventor, which leads to improperly taking credit for an AI's creative work.[176] For example, scientists and engineers often gain professional credibility or monetary benefits based on their patents' quality and quantity; thus, if these credentials were actually a product of an AI's automated work, then naming themselves would undermine the moral standards of the patent system and academia in general.[177]

Furthermore, without an option to list AI as the sole inventor of its creative works, the non-obviousness requirement for patentability would exponentially rise.[178] The current requirement for "non-obviousness" is based on a fictional "person having ordinary skill in the art."[179] The USPTO uses this standard to judge a patent's obviousness, which is a measure of "creativity and ingenuity."[180] If the invention is obvious to an ordinary person skilled in the arts, then the invention does not receive protection.[181] Theoretically, as AI-generated inventions become more common, and if individuals continue to incorrectly identify themselves as the inventor of AI's work, the level of ordinary skill in the arts could rise to that of an autonomous computer.[182] Since AI can work faster, more efficiently, and store seemingly infinite amounts of information, AI may have the potential to drastically raise the level of ordinary skill in the arts and the standard for non-obviousness

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[175] Fraser, *supra* note 19, at 331.

[176] *Id.*

[177] *Id.*

[178] 35 U.S.C. § 103. Under § 103, an invention that would have been obvious to a person of ordinary skill before the effective filing date of the claimed invention is not patentable. *Id.*

[179] Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc., 807 F.2d 955, 962 (Fed. Cir. 1986); Abbott, *I Think*, *supra* note 18, at 1122. "A federal judge explained that the way to apply the obviousness test is to 'first picture the inventor as working in his shop with the prior art references, which is presumed to know, hanging on the walls around him.'" *Id.* (citing Application of Winslow, 365 F.2d 1017, 1020 (C.C.P.A. 1966).

[180] Abbott, *I Think*, *supra* note 18, at 1109.

[181] *Id.* at 1090.

[182] *Id.* at 1123.

currently prescribed by § 103.[183] Humans would then have to compete with a "machine having ordinary skill in the arts," and arguably, since AI has access to any information available in the universe, everything is obvious to AI.[184] Because AI would not be considered a "person" under this non-obviousness standard, disclosing AI as the true inventor of its works would curb these issues and keep the standard of non-obviousness reasonable so that obtaining patent protection is not impossible.[185]

The purpose of the patent system is to reward individuals in their endeavors to progress the arts and sciences and incentivize the disclosure of that information to others.[186] In fact, many Supreme Court decisions have heavily emphasized the policy of disclosure as the primary justification for the patent system.[187] For example, the Supreme Court unanimously declared that "the ultimate goal of the patent system is to bring new designs and technologies into the public domain through disclosure."[188] In addition, the Court has stated, "[t]he disclosure required by the Patent Act is 'the quid pro quo of the right to exclude.'"[189] Federal Circuit Courts have also used similar language labeling "disclosure as the 'linchpin' and

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[183] 35 U.S.C. § 103 (2018) ("A patent for a claimed invention may not be obtained . . . if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made."); USPTO, *supra* note 127, at 11.

[184] USPTO, *supra* note 19, at 01:19:00.

[185] *See* Abbott, *I Think*, *supra* note 18, at 1080.

[186] Benjamin N. Roin, *The Disclosure Function of the Patent System (Or Lack Thereof)*, 118 HARV. L. REV. 2007, 2011 (2005) ("While most scholars believe that the principal goal of the patent system is the encouragement of innovation, courts have been more willing to embrace the disclosure rationale as a centerpiece of patent policy.").

[187] *Id.*; Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 150–51 (1989).

[188] *Bonito Boats, Inc.*, 489 U.S. at 151.

[189] J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc., 534 U.S. 124, 142 (2001) (quoting Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 484 (1974)).

'quid pro quo' of the patent system."[190] In other words, in exchange for patent protection, inventors must disclose to the public technical information relating to their invention so that others may build on it.[191] The cycle of invention and disclosure is the essence of the patent system, and without the option to list AI as an inventor, AI owners could instead choose to keep that information private in the form of a trade secret. At its core, the Intellectual Property Clause aims to benefit society by incentivizing inventors to disclose their creative works to the public domain—not to increase the amount of protected, unbuildable trade secrets.[192]

C. AI Inventorship Incentivizes Human Innovation

One of the central justifications of the patent system is to provide an incentive for innovative activity. Patent protection supplies such an incentive by affording inventors a time-limited monopoly where they can earn a return to compensate for the time, effort, and money they invested into the innovation process.[193] Although patent protection does not explicitly motivate AI to invent, granting AI inventorship status will incentivize AI creators.[194] In some cases, "[a]utonomous computers may sometimes even be the only means of achieving certain inventions where complexity and sheer mass of data to be processed exceeds human cognitive limitations . . . ."[195]

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[190] *Id.* (quoting W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 1550 (Fed. Cir. 1983)).

[191] *Id.* at n. 24 (citing Pfaff v. Wells Elecs., Inc., 525 U.S. 55, 63 (1998) (explaining that "the patent system should be thought of as a carefully crafted bargain that encourages both the creation and the public disclosure of new and useful advances in technology, in return for an exclusive monopoly for a limited period of time").

[192] Ryan Abbott, *Artificial Intelligence, Big Data and Intellectual Property: Protecting Computer-Generated Works in the United Kingdom*, *in* RESEARCH HANDBOOK ON INTELL. PROP. AND DIGITAL TECH. 1, 10 (Tanya Aplin ed., 2017) (explaining the social harm in keeping information private, especially in areas such as drug development, which has a significant utilitarian value). Another example, for instance, is Coca-Cola, which decided to never patent its sacred beverage recipe and has kept it as a trade secret for over a century.

[193] Fraser, *supra* note 19, at 325.

[194] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 71.

[195] Fraser, *supra* note 19, at 326.

VI. FAMOUS LAST WORDS: THE POTENTIAL CONSEQUENCES OF RECOGNIZING AI AS AN INVENTOR

"I beheld the wretch—the miserable monster whom I had created," Dr. Frankenstein famously exclaimed in Mary Shelley's 1818 novel, *Frankenstein; or, The Modern Prometheus*.[196] This quotation perhaps reflects humanity's shared fear of advancements in AI and technology. In *Frankenstein,* Dr. Frankenstein believed he was doing a service to society by combining old body parts and strange chemicals to replicate human life; however, he soon realized a robust, eight-foot monster with the mind of a newborn was not ideal.[197] While Mary Shelley's purpose in 1818 was arguably to raise questions about human morality, psychology, and philosophy, her message could be interpreted as a warning of the dangers arising from scientific advancement from a modern perspective. Although from very different generations, after years of studying their respective "theories of everything," both Stephen Hawking and Elon Musk have shared exclamations similar to Dr. Frankenstein's.[198] While not as theatrical, Hawking and Musk's statements nonetheless evidence concern about the direction that AI is

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[196] MARY WOLLSTONECRAFT SHELLY, FRANKENSTEIN, OR THE MODERN PROMETHEUS 53 (Univ. Chi. Press 1982) (1818).

[197] *Id.*

[198] Jason Koebler, *Elon Musk Says There's a 'One in Billions' Chance Reality Is Not a Simulation*, VICE (June 2, 2016), https://www.vice.com/en_us/article/8q854v/elon-musk-simulated-universe-hypothesis [https://perma.cc/86QP-UAK2]. Elon Musk has stated that, "there's a 'one in billions' chance that we're not living in a computer simulation right now." *Id.* In other words, he is a strong proponent that our current reality was created by a super form of AI. *But see* Ryan Browne, *Elon Musk Warns A.I. Could Create an 'Immortal Dictator From Which We Can Never Escape*,' CNBC (Apr. 6, 2018), https://www.cnbc.com/2018/04/06/elon-musk-warns-ai-could-create-immortal-dictator-in-documentary.html [https://perma.cc/96TT-6VYS]. Musk's previous hypothesis, however, seems contrary to his concern of AI becoming an "immortal dictator." If, as he hypothesizes, we are currently living in a world created by AI then it would logically follow that AI is already our immortal dictator. ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 1 (quoting Stephen Hawking saying, "[t]he rise of powerful AI will either be the best or the worst thing ever to happen to humanity. We don't know yet which one.").

progressing—perhaps because to understand its potential is to fear its consequences.[199]

Similarly, the undeniable novelty and forward-looking uncertainty of equating AI cognition and functioning with that of humans produces a sense of fear surrounding such changes to the current patent field. For instance, legal scholars tend to share two fearful concerns about granting AI inventorship status. These concerns include: (A) the ripple effect of granting AI a statutory right that is currently only shared by natural persons and (B) the displacement of human inventors once AI is recognized as an inventor.

A. The Danger of Granting AI a Human Statutory Right

Undoubtedly, fear is one of the most significant factors that leads society to disapprove of AI as inventors.[200] The innate terror of the unknown,[201] or the "opening up a can of worms" mentality, has often inhibited the U.S. legislature in making new laws and the U.S. judiciary from interpreting potential landmark decisions that would lead to less-constrained growth.[202] Many fear what will follow after

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[199] *Id.*

[200] *But see* U.S. CONG. OFF. OF TECH. ASSESSMENT, *supra* note 154, at 37 (describing the Enlightenment Era: "Fear of change, up to then nearly universal, was giving way to fear of stagnation; the word innovation, traditionally an effect term of abuse, became a word of praise.").

[201] BROOKS, *supra* note 145, at 72–73. A fascinating juxtaposition between cultural shift came with the change in office from Dwight Eisenhower to John F. Kennedy in 1961. *Id.* at 72. Kennedy's inaugural address indicated a new era with limitless possibilities while Eisenhower's end-of-presidency speech warned citizens of "quick fixes" and "unchecked power." *Id.* While Kennedy exclaimed, "'[t]ogether let us explore the stars, conquer the deserts, eradicate disease,'" Eisenhower warned against "a scientific-technological elite" creating machines with "unchecked power" as a sort of "quick fix" to the nation's issues. *Id.* Eisenhower used to tell his advisors, "'[l]et's make our mistakes slowly,'" because it was better to proceed to a decision gradually than to rush into anything before its time." *Id.* at 73. And in a sense, perhaps the USPTO and AI critics feel the same—rushing into allowing AI inventorship at this time can potentially create unchecked power and regretful consequences. *Id.* However, to Kennedy's point, scientific advancements are inevitable, and we must work together to harvest its potential. *Id.*

[202] *Id.*

machines gain the legal recognition of inventorship.[203] If a machine can enjoy inventorship status, what will come next on the docket of giving inanimate objects inherently human rights? Inventorship has always been exclusively tied to property rights that are reserved for natural persons.[204] Thus, if a machine is named as the inventor, will it also own real property?[205] Who will be liable for infringement?

B. A Society Led by Robots?

Increasing technological advancements often come hand-in-hand with the looming concern of job displacement. During the First Industrial Revolution, the Luddites, a group of English workers, disparaged technology's role in potentially eliminating jobs by burning machinery.[206] Even today, many people share feelings similar to the Luddites.[207] However, the increase in technology has not been inversely correlated with job availability.[208]

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[203] *E.g.*, email from David Henry, to Laura A Peter, Deputy under Sec'y of Com. (Sept. 24, 2019, 4:12 P.M.), https://www.uspto.gov/sites/default/files/documents/David-Henry-01_RFC-84-FR-44889.pdf [https://perma.cc/E4AY-LSRP] ("I have very strong reservations toward extending this reward system to inanimate systems and objects. This reservation is, in part, based on a seemingly nonsensical concept of somehow intrinsically rewarding an inanimate object. Further, offering patent protection to inanimate inventors will quite literally put humans (who 'own' this society) in competition with such inanimate properties.").

[204] *See supra* Part III(A).

[205] Letter from Student Members of Benjamin N. Cardozo's Intellectual Property Law Society, to Laura A Peter, Deputy under Sec'y of Com. 3 (Nov. 8, 2019), https://www.uspto.gov/sites/default/files/documents/Cardozo-IPLS_RFC-84-FR-44889.pdf [https://perma.cc/P5RV-Z4NF] (expressing concern that, "If an AI was granted patent inventorship status there is no need that they could not also be considered the owner of the patent under proper circumstances."). However, their argument is based on Dr. Thaler "arguing that DABUS is the sole and rightful owner of its patents," which is not at all what Dr. Thaler has asserted. *Id.* In fact, Dr. Thaler does not believe DABUS should have property rights whatsoever. Decision on Petition, *supra* note 9, at n. 2.

[206] ABBOTT, THE REASONABLE ROBOT, *supra* note 30, at 4.

[207] *Id.* at 39 (quoting Stephen Hawking: "[e]veryone can enjoy a life of luxurious leisure if the machine-produced wealth is shared, or most people can end up miserably poor if the machine-owners successfully lobby against wealth redistribution. So far, the trend seems to be toward the second option, with technology driving ever-increasing inequality.").

[208] *Id.*

Instead, modern technological advancements have historically created more jobs than they have eliminated.[209] For example, during the First Industrial Revolution, steam engines, electrical power, and personal computers all eliminated jobs; but, these technologies created more jobs than they replaced.[210] AI advancements fall within the same sphere. While computer automation's economic advantages have inevitably displaced many human jobs,[211] advances in AI and technology have generally created more jobs than they have destroyed.[212] Surely job titles like "Meme Librarian,"[213] "Galactic Viceroy of Research Excellence,"[214] or "Remote Funnel Marketing Ninja"[215] did not exist fifty years ago.[216]

Nevertheless, there will always be a need for human intuition. While AI can store more knowledge than humans, knowledge does not equate to wisdom, and wisdom is the ultimate distinction between man and robot. AI in the legal[217] and medical professions offers the same conclusion—there will always be a desire for human intuition. Thus, like automated employment, AI inventors may replace some human inventors; but, AI inventors will create complex, novel inventions that will subsequently provide more innovative opportunities on which humans can build.

Allowing AI to be recognized as an inventor would expand innovation rather than hindering it. Similar to employment displacement concerns, many fear AI inventors will thwart human

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[209] *Id.* at 4.

[210] *Id*. "In the early 1900's, some 40 percent of the US workforce was employed in agriculture. Now, less than 2 percent of the workforce works in agriculture. This has not translated to a 38 percent increase in unemployment." *Id.*

[211] *Id.* at 5 (explaining how automation allows companies to avoid employee and employer tax wages).

[212] *See*, *e.g.*, RAVIN JESUTHASAN & JOHN W. BOUDREAU, REINVENTING JOBS: A 4-STEP APPROACH FOR APPLYING AUTOMATION TO WORK 2 (2018).

[213] *The 25 Most Absurd Job Titles in Tech*, CB INSIGHTS (Apr. 29, 2019), https://www.cbinsights.com/research/most-absurd-tech-job-titles/ [https://perma.cc/9XQF-ZJFP].

[214] *Id*.

[215] *Id*.

[216] Jean Vilbert, *Technology Creates More Jobs Than It Destroys*, FOUND. FOR ECON. EDUC. (Sept. 10, 2019), https://fee.org/articles/technology-creates-more-jobs-than-it-destroys/ [https://perma.cc/W339-BREW].

[217] Hao & Stray, *supra* note 37.

innovation and congest an already overloaded patent office due to AI's ability to produce inventions rapidly.[218] Additionally, there is a concern that AI inventorship could unfairly advantage the few corporations with sufficient means to develop brilliant machines, thus exacerbating an already profound monopolization issue where relatively few entities own a significant portion of U.S. patents.[219]

VII. CONCLUSION

The issue of DABUS illustrates that current patent law is incompatible with AI-generated inventions. Moreover, these issues are raised at an appropriate time because AI is still relatively new. Therefore, time remains to adequately address how to fit AI into patent law before AGI is reached. Monumental change typically does not occur overnight, and cases like DABUS present two paths for lawmakers and the USPTO: (1) recognize that AI has been and will be a considerable part of the patent system, or (2) remain ignorant of AI's utility and inevitably lose control of its consequences. While ruminating on speculative implications of AI as an inventor is easy, rejecting its inventorship status does nothing to prevent such consequences. In the wise words of Winston Churchill, "The pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty."[220] Humans created both the modern world and the AI that inevitably continues to advance therein. Therefore, it is imperative that humans take responsibility for addressing its challenges and remain optimistic about AI's potential rather than speculatively pessimistic about its potential doom. In denying DABUS and other AIs the right to be an inventor despite their ability to conceive inventions, the United States Patent and Trademark Office is fundamentally restricting the utility of their novel inventions while also undermining the explicit rationale of the Intellectual Property Clause of the Constitution. AI

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[218] USPTO, *supra* note 19, at 01:13:11.

[219] *See id*.

[220] Letter from Joseph R. Robinson, to Laura A Peter, Deputy under Sec'y of Com. (Nov. 4, 2019), https://www.uspto.gov/sites/default/files/documents/Joseph-Robinson_Troutman-Sanders_RFC-84-FR-44889.pdf [https://perma.cc/3PQH-69TU] (advocating for AI in the patent setting).

will only continue to advance rapidly, and it is imperative that we appropriately tailor our laws to harvest AI potential.