ARTIFICIALLY OBVIOUS BUT GENUINELY NEW: HOW ARTIFICIAL INTELLIGENCE ALTERS THE PATENT OBVIOUSNESS ANALYSIS

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I. INTRODUCTION

Imagine you walk out to the self-driving Tesla in your driveway and ask Siri to calculate the directions to your destination. After mapping its route, your car begins to drive itself to where you want to go. Alternatively, imagine you finished a whole series on Netflix, enjoyed it immensely, and now want to find something similar, so you use the recommendation feature to find similar shows. Both instances in today's world are not entirely uncommon, and surprisingly—against what most people might initially believe—both are instances of interaction with artificial intelligence. The first typical thought that tends to emerge with the idea of artificial intelligence is robots who can act entirely human, but there is so much more to the concept.

Now, imagine that you are an inventor. You just had your breakthrough idea for an invention that could change the market. It took you years to piece it all together and finally create something entirely new. What do you do when suddenly your patent application is denied because a computer somewhere across the world could have created, or assisted in creating, the same idea?[1]

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[1] Various concerns from highly educated and respected individuals about the thinking capacity of computers are already present in the field. *See* Liana B. Baker, *Tech Moguls Declare Era of Artificial Intelligence*, REUTERS (June 2, 2016, 9:06 PM), https://www.reuters.com/article/us-tech-ai-conference/tech-moguls-declare-era-of-artificial-intelligence-idUSKCN0YP035 (explaining how Elon Musk predicts that "[a]rtificial intelligence and machine learning will create computers so sophisticated and godlike that humans will need to implant 'neural laces' in their brains to keep up"); *see also* Rory Cellan-Jones, *Stephen Hawking Warns Artificial Intelligence Could End Mankind*, BBC (Dec. 2, 2014), https://www.bbc.com/news/technology-30290540 (discussing Stephen Hawking's position that artificial intelligence can, and will, advance to such a point as to possibly eliminate the human race and his fear of the consequences of computers that can surpass humans).

Artificial intelligence (AI), while gaining popularity and publicity in recent years, has been around since at least the mid-twentieth century.[2] It did not start out as the development of computers with complex emotional responses that mirror those of humans, but rather as an idea that an intelligent system, similar to a neural network, is capable of being built.[3] In 1943, a paper written by Warren McCullough and Walter Pitts pitched the first ever mathematical model for building a neural network.[4] Later in 1950, Alan Turing published a method which simply "specifie[d] that computers need to complete reasoning puzzles as well as humans in order to be considered 'thinking' in an autonomous manner" and used this method to determine if a machine was intelligent or not; this became known as the Turing Test.[5] It was not until 1965 that inventors developed the first successful expert systems.[6] After almost eighty years of innovation, today scientists and inventors use AI in countless ventures, including to predict the RNA sequence of the SARS-CoV-2 virus and run the notorious self-driving cars.[7] Artificial intelligence has progressed from executing complex mathematical calculations and analyzing large amounts of data to composing music, writing poetry, and developing software.[8] Because of the consistent development and improvement of AI, a narrative arose that "AI creativity is limitless."[9]

This Comment addresses the issues with AI inventorship in relation to patent law's current obviousness analysis and proposes possible solutions to combat the introduction of AI into patent law.

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[2] *See* Darrell M. West, *What Is Artificial Intelligence?*, BROOKINGS (Oct. 4, 2018), https://www.brookings.edu/
research/what-is-artificial-intelligence.

[3] *See Artificial Intelligence. What Is Artificial Intelligence? How Does AI Work?*, BUILT IN, https://builtin.com/artificial-intelligence (last visited July 18, 2022) [hereinafter *What Is Artificial Intelligence?*].

[4] *Id.*

[5] West, *supra* note 2.

[6] *What Is Artificial Intelligence?*, *supra* note 3; *see also* B.J. Copeland, *Dendral: Expert System*, BRITANNICA, https://www.britannica.com/technology/DENDRAL (last visited July 18, 2022) (discussing DENDRAL, the chemical analysis expert system developed in the 1960s used to hypothesize molecular structures in both the industry and academia).

[7] *What Is Artificial Intelligence?*, *supra* note 3; Connor Romm, *Putting the Person in PHOSITA: The Human's Obvious Role in the Artificial Intelligence Era*, 62 B.C. L. REV. 1413, 1414 (2021).

[8] Romm, *supra* note 7.

[9] *Id.* at 1414–15.

Part II of this Comment defines AI and introduces the relevant aspects of patent law. Part III addresses the issues of the current obviousness analysis and the consequences of its structure's presumption that humans are, and will continue to be, the only form of inventors. Part IV illustrates what current scholars and patent offices are doing to combat this issue and proposes possible solutions to help fill the gaps in the obviousness analysis. Part V concludes by arguing that the obviousness analysis must incorporate a new subset of elements to accommodate AI inventors.

II. A Brief History of AI in Patent Law and the Progression to the Obviousness Analysis

A. *Defining Artificial Intelligence[10]*

Numerous definitions of AI have surfaced since its discovery.[11] While no definition is yet universally accepted, most definitions mention that AI is the ability of machines, typically computer systems, to "perform tasks commonly associated with intelligent beings."[12] The largest flaws in the AI definition are the word, "intelligent," and what it means to make a machine intelligent.[13] Some definitions define intelligence, in terms of human intelligence, as the ability to perform speech recognition, visual perception, decision-making, and language translation.[14] There is not yet a definition of intelligence that does not depend on the relativity to human intelligence.[15] To help illustrate, a few common examples of AI which are not classified as having emotion

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[10] In terms of this Comment, artificial intelligence is defined broadly. This Comment does not distinguish between the various definitions that are in the field today, including "machine learning," "neural networks," or "big-data analytics." This Comment does, however, summarize the main characteristics of artificial intelligence to assist in illustrating their correlation to patent law.

[11] *See* Ed Burns, *What Is Artificial Intelligence? (AI)*, SEARCH ENTER. AI (Feb. 23, 2022), https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence.

[12] B.J. Copeland, *Artificial Intelligence*, BRITANNICA (Aug. 24, 2022), https://www.britannica.com/technology/artificial-intelligence.

[13] *What Is Artificial Intelligence?*, *supra* note 3.

[14] Bernard Marr, *The Key Definitions of Artificial Intelligence (AI) That Explain Its Importance*, FORBES (Feb. 14, 2018, 1:27 AM), https://www.forbes.com/sites /bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/?sh=1cf813b64f5d.

[15] John McCarthy, *What Is Artificial Intelligence?*, STAN. U. COMPUT. SCI. DEP'T, http://jmc.stanford.edu/artificial-intelligence/what-is-ai/index.html (last visited Sept. 17, 2022).

of any sort include Apple's Siri, Amazon's Alexa, Netflix recommendations, and email spam filters.[16]

Artificial intelligence can be broken down into four distinct types.[17] The first category is reactive machines, which react solely to the world as it perceives it in the moment.[18] This type is unable to store memory, and therefore it cannot rely on any past experiences in order to guide its reactions, nor does it possess the capacity to "learn."[19] The second type is limited memory, which makes up almost all of today's AI systems and describes machines trained to analyze and utilize new data consistently.[20] These computers can use knowledge from past experiences to guide future decisions.[21] A theoretical line can be drawn here separating current AI systems and AI systems of the future.[22] The other two categories of AI that have not yet been developed—theory of mind and self-awareness—are those that possess emotions and consciousness.[23] Theory of mind machines recognize that the emotions of others affect our own behavior, and thus can react appropriately to the behavior of others.[24] Self-awareness machines take theory of mind one step further by integrating consciousness to allow machines to understand their own feelings.[25]

Using these categories as a baseline, AI focuses on three main cognitive abilities—learning, reasoning, and self-correction processes.[26] Learning processes include acquiring data, forming algorithms, and turning the collected data into instructions on how to

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[16] *What Is Artificial Intelligence?*, *supra* note 3.

[17] *Id.*

[18] *Id.*

[19] Naveen Joshi, *7 Types of Artificial Intelligence*, FORBES (June 19, 2019, 10:54 PM), https://www.forbes.com/ sites/cognitiveworld/2019/06/19/7-types-of-artificial-intelligence/?sh=d019ff9233ee. An example of a reactive machine is IBM's Deep Blue, which had the capability of beating humans in chess matches through its understanding of chess pieces and their respective movements. Arend Hintze, *Understanding the Four Types of Artificial Intelligence*, GOV. TECH. (Nov. 14, 2016), https://www.govtech.com/computing /understanding-the-four-types-of-artificial-intelligence.html.

[20] *What Is Artificial Intelligence?*, *supra* note 3; Joshi, *supra* note 19.

[21] *What Is Artificial Intelligence?*, *supra* note 3.

[22] *See* Hintze, *supra* note 19.

[23] *What Is Artificial Intelligence?*, *supra* note 3.

[24] Hintze, *supra* note 19.

[25] *Id.*

[26] Burns, *supra* note 11.

complete a certain task.[27] AI learning can occur in a variety of ways, from listening and hearing or remembering sequences of events witnessed, to recognizing previous stimuli and behaving properly in response.[28] Next, reasoning processes involve choosing the proper algorithm to produce the desired outcome.[29] Lastly, self-correction processes involve continuous fine-tuning to ensure the most accurate results.[30] Due to the skill level associated with AI, there are two main benefits: the high ability of its use for detail-oriented jobs, which would reduce timing in data-heavy tasks,[31] and the potential to quickly and accurately review—much faster than a human ever could—a wide variety of prior art.[32] Other advantages of AI systems include their ability to work steadily for long hours while also delivering consistent results.[33] AI systems possess many benefits that, at least on the surface, appear to be highly advantageous to the patent field.

B. *Inventorship and Artificial Intelligence*

Using both the definition and known capabilities of AI as a baseline, it is important to understand what defines an inventor for the purposes of patent law. Under the Title 35 of the United States Code (the Patent Act), an inventor is defined as an "individual . . . who invented or discovered the subject matter of the invention."[34] While the definition does not appear helpful on its face because of its use of the word "invented" in the definition of invention, recent interpretation of the statute helps to clarify who qualifies as an inventor.[35] The statutory interpretation issue for invention, while

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[27] *Id.*

[28] Goran Dragosavac, *Artificial Intelligence Overview*, BIG DATA ANALYTICS, http://www.bigdatanalysis.com/artificial-intelligence-overview (last visited Aug. 30, 2022).

[29] Burns, *supra* note 11; *see also* Shagufta Mulla, *Everything You Should Know About Artificial Intelligence*, GLOB. CAREER COUNS. CERTIFICATION (Aug. 3, 2021), https://www.globalcareercounsellor.com/blog/everything-you-should-know-about-artificial-intelligence.

[30] Mulla, *supra* note 29.

[31] *Id.*

[32] *See* Erica Fraser, *Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law*, 13 SCRIPTED 305, 319 (2016).

[33] *See* Mulla, *supra* note 29.

[34] 35 U.S.C. § 100(f).

[35] *See* Susan Decker, *Only Humans, Not AI Machines, Get a U.S. Patent, Judge Says*, BLOOMBERG (Sept. 3, 2021, 3:06 PM), https://www.bloomberg.com/news/articles/2021-09-03/only-humans-not-ai-machines-can-get-a-u-s-patent-judge-rules

continuing to be prevalent and controversial, appears to be leaning towards the overall disallowance of AI inventors.[36]

Another ambiguity in the definition of an inventor is joint inventors. When filing as joint inventors, it does not matter if each inventor did not make an equal contribution, did not contribute to every claim, or did not physically work together.[37] This, again, may leave open the question of AI as a joint inventor, but based on the recent judicial and patent office decisions,[38] it appears that AI will be unable to be named at all.[39] To be analyzed later in this Comment, it

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(explaining the ruling under a federal judge that stated only humans can be named inventors on patents); *see also* Patrick G. Gattari, *Determining Inventorship for US Patent Applications*, 17 INTELL. PROP. & TECH. L.J. 16, 16 (2005) (laying out the framework to determine inventorship in patent applications and interpreting the word individual to refer to a "person").

[36] For the purposes of this Comment, the author will not address the argument of whether AI is an individual or not. The issue is currently still disputed. It appears that the United States Patent and Trademark Office (USPTO), the European Patent Office (EPO), and the United Kingdom Court of Appeals do not deem AI to be considered an individual. *See* Sean Hollister, *AI Computers Can't Patent Their Own Inventions—Yet—US Judge Rules*, THE VERGE (Sept. 3, 2021 2:10 PM), https://www.theverge.com/2021/9/3/22656039/ai-inventor-patent-copyright-uspto-federal-court-ruling (explaining that earlier in 2020, the USPTO "ruled that only 'natural persons' could be credited as the inventor of a patent"); *EPO Publishes Grounds for Its Decision to Refuse Two Patent Applications Naming a Machine as Inventor*, EUR. PAT. OFF. (Jan. 28, 2020), https://www.epo.org/news-events/news/2020/20200128.html [hereinafter *EPO Refusal*] (discussing the reasons behind the EPO's refusal of patent applications in which the named inventor was an AI system); Andrew McGettrick, *UK Court of Appeals Rejects AI Inventor Claim*, MONDAQ (Sept. 24, 2021), https://www.mondaq.com/uk/patent/1114596/uk-court-of-appeal-rejects-ai-inventor-claim (stating that the UK Court of Appeals rejected an appeal on a patent application that listed AI as the inventor). South Africa has granted a patent to the AI inventor. *See* Meshandren Naidoo, *In a World First, South Africa Grants a Patent to an Artificial Intelligence System*, QUARTZ AFR. CREATIVITY MACHS. (Aug. 9, 2021), https://qz.com/africa/2044477/south-africa-grants-patent-to-an-ai-system-known-as-dabus/ (discussing South Africa's approval and the backlash of the decision, which some have labeled a mistake by the patent office). This issue is more of a prerequisite as to whether AI can be considered an inventor. This Comment will assume, for purposes of argument, that AI is deemed a proper inventor of a patent.

[37] Michael K. Henry, *Patent Ownership vs. Inventorship: Who Really Controls the Rights to a Patent?*, HENRY PAT. L. FIRM (June 14, 2018), https://henry.law/blog/patent-ownership-vs-inventorship.

[38] *See* Hollister, *supra* note 36; *EPO Refusal*, *supra* note 36; McGettrick, *supra* note 36; Naidoo, *supra* note 36.

[39] *See* Decker, *supra* note 35; *see also* Hollister, *supra* note 36. As this Comment argues, disclosure of the use of AI systems as both inventors and assistants must be mandated to determine the correct application of the obviousness standard. This will apply equally to sole and joint inventors.

is important to mention a few key points of who/what is not deemed an inventor.[40] An inventor is not someone who contributes an obvious element, someone who performs experiments, or someone who discovers a problem without offering a solution.[41] To further illustrate, in *Board of Education ex rel. Board of Trustees of Florida State University v. American Bioscience, Inc.*, Chunlin Tao was deemed a coinventor of three compounds analogous to taxol, which is an anti-cancer drug.[42] Tao was named a coinventor because he introduced the idea of incorporating three different molecular groups and the point of attachment of each of those groups to the newly patented compounds.[43] Tao, as the definition states, contributed to the conception of the invention. On the other hand, in *Ex parte Smernoff*, Robert Auld was not considered a coinventor of a multi-channel tonometer, a device which equilibrates a gas and a liquid.[44] The evidence in the record showed that Auld assisted in presenting a framework and the previously noticed drawbacks.[45] The Patent Trial and Appeals Board determined that "one who suggests an idea of a result to be accomplished, rather than the means of accomplishing it, is not a coinventor."[46]

Because patent law is structured only to accommodate human inventors, it is important to note the key comparisons between AI and humans. First, AI systems have the capability to process data more accurately, efficiently, and rapidly than any human brain ever could.[47] In addition, AI can maintain its full capability while performing tedious and monotonous jobs continuously for extended periods of

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[40] Determination of who is an inventor relies heavily on who is involved in the conception of the idea. Gattari, *supra* note 35. The definition of conception involves the "complete performance of the mental part of the inventive act." Townsend v. Smith, 36 F.2d 292, 295 (C.C.P.A. 1929). 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." *Id.* The same logic follows for joint inventors, in which both must contribute to the conception of the invention. Burroughs Wellcome Co. v. Barr Lab'ys, Inc., 40 F.3d 1223, 1227–28 (Fed. Cir. 1994).

[41] Gattari, *supra* note 35.

[42] Bd. of Educ. *ex rel.* Bd. of Trustees of Fla. State Univ. v. Am. Bioscience, Inc., 333 F.3d 1330, 1332 (Fed. Cir. 2003).

[43] *Id.* at 1339.

[44] *Ex parte* Smernoff, 215 U.S.P.Q. 545, 1982 WL 52066, at *1–2 (P.T.A.B. Aug. 17, 1982).

[45] *Id.* at *3–4.

[46] *Id.* at *3.

[47] Shlomit Yanisky Ravid & Xiaoqiong (Jackie) Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era*, 39 CARDOZO L. REV. 2215, 2225 (2018).

time, and thus, they do not exhaust in the same way human brains do.[48] The opposite is also true. While AI systems excel at tedious jobs, human intelligence, with all of its depth, beats AI with its adaptive and learning powers.[49] Humans have the edge of common sense and the ability to understand cause and effect, which AI cannot match.[50] For example, AI systems surpass humans with their memory capacity and processing power.[51] These systems continuously outperform humans in rule-based games, complicated mathematical calculations, and data storage.[52] Everyday examples include chess, math, and even Jeopardy.[53] AI systems are no match for humans, however, where tasks are not narrow and specific.[54] Consider the first time a human plays a video game in a virtual environment.[55] Humans can take their real life knowledge and apply it to the game, "such as staying away [from] pits, ledges, fire and pointy things . . . dodg[ing] bullets and avoid[ing] getting hit by vehicles."[56] AI systems, however, would treat this environment as wholly new and would need to learn each task and action individually.[57] The major comparison is that humans rely on their brain, experiences, and memories to function while AI strictly uses the data that is accessible.[58] Although humans have an edge on the self-awareness and consciousness front, AI systems still highly compete with humans on the patent front.

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[48] *See* Sakshi Gupta, *Artificial Intelligence vs. Human Intelligence: Who Will Build the Future?*, SPRINGBOARD (Oct. 11, 2021), https://www.springboard.com/blog/ai-machine-learning/artificial-intelligence-vs-human-intelligence.

[49] *Id.*

[50] Pavan Vadapalli, *AI vs Human Intelligence: Difference Between AI & Human Intelligence*, UPGRAD (Sept. 15, 2020), https://www.upgrad.com/blog/ai-vs-human-intelligence.

[51] Derek Thompson, *The Spooky Genius of Artificial Intelligence*, THE ATLANTIC (Sept. 28, 2018), https://www.theatlantic.com/ideas/archive/2018/09/can-artificial-intelligence-be-smarter-than-a-human-being/571498.

[52] *Id.*

[53] *Id.*

[54] Ben Dickson, *There's a Huge Difference Between AI and Human Intelligence—So Let's Stop Comparing Them*, TECHTALKS (Aug. 21, 2018), https://bdtechtalks.com/2018/08/21/artificial-intelligence-vs-human-mind-brain.

[55] *Id.*

[56] *Id.*

[57] *See id.*

[58] Riya Kumari, *7 Differences Between Artificial Intelligence and Human Intelligence*, ANALYTICS STEPS (Jan. 3, 2021), https://www.analyticssteps.com/blogs/7-differences-artificial-intelligence-ai-human-intelligence.

Patent law was structured with the idea that humans are, and will continue to be, the only inventors, which is explicitly demonstrated through both the interpretation of the word "individual" in 35 U.S.C § 100 as well as the "person" of ordinary skill in the art involved in obviousness analysis.[59] Both interpretations push toward the idea that "individual" and "person" are meant to represent a natural person—one who is human.[60] It is not a new circumstance, however, that AI is being used to assist in patent innovation.[61] The issues begin to arise when AI can be named an inventor. The current patent framework speculatively cannot accommodate the type of innovation that these artificial thought processes bring to the scene.[62] While multiple sectors of patent law may be impacted, this Comment will focus on the implications of the obviousness analysis, which is completed by identifying the differences between the new invention and the prior art and determining if the invention itself would have been obvious in light of that prior art.[63]

Artificial intelligence in patent law is mostly unclear and has only recently begun to progress as AI evolves its capabilities. Essentially, there is no concrete law on inventions created by AI; most jurisdictions, however, have placed the requirement of disclosure of an inventor who is a natural person.[64] While the named inventor must be a natural

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[59] *See* Matthew Bultman, *Patents and Artificial Intelligence: An 'Obvious' Slippery Slope*, BLOOMBERG L. (Oct. 8, 2021, 8:03 AM), https://news.bloomberglaw.com/ip-law /patents-and-artificial-intelligence-an-obvious-slippery-slope.

[60] *See id.*; *see also* Thaler v. Hirshfeld, 558 F. Supp. 3d 238, 246 (E.D. Va. 2021).

[61] *See* Bernard Marr, *How BMW Uses Artificial Intelligence and Big Data to Design and Build Cars of Tomorrow*, FORBES (Aug. 1, 2017, 12:28 AM), https://www.forbes.com/sites /bernardmarr/2017/08/01/how-bmw-uses-artificial-intelligence-and-big-data-to-design-and-build-cars-of-tomorrow/#450c6f2a2b91 (discussing how the use of artificial intelligence allows BMW to build "cars of today," which are able to self-drive and "bringing to reality the cars of tomorrow"); *see also The Story of AI in Patents*, WORLD INTELL. PROP. ORG., https://www.wipo.int/ tech_trends/en/artificial_intelligence/story.html (last visited Aug. 13, 2022) (discussing the usage of artificial intelligence to sift through data of patterns of combinations of raw materials to formulate fragrances).

[62] *See AI and Patents: A Machine Cannot Be an Inventor (Yet)*, ALLEN & OVERY (Apr. 9, 2020), https://www.allenovery.com/en-gb/global/news-and-insights/publications /ai-and-patents-a-machine-cannot-be-an-inventor-yet.

[63] *2141 Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 [R-10.2019]*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/web/offices/pac /mpep/s2141.html (last visited Aug. 14, 2022) [hereinafter *Examination Guidelines*].

[64] Ryan Abbott, *The Artificial Inventor Project*, WIPO MAG.. (Dec. 2019), https://www.wipo.int/wipo_magazine/en/2019/06/article_0002.html.

person, there is a lack of a disclosure requirement of AI overall.[65] The identical standard of disclosure is used for both inventions produced by AI and those produced by a human without the use of AI.[66] Inventors have claimed to have secured patents for AI-generated inventions for decades,[67] but no one has ever disclosed an AI's role in the patent application.[68] Such applicants usually do not disclose the role of AI due to legal uncertainty.[69]

C. *DABUS – the Newest Inventor*

The Device for the Autonomous Bootstrapping of Unified Sentience ("DABUS") is an AI machine that generates new ideas without any human assistance.[70] A human—DABUS's creator Stephen Thaler—"taught" DABUS how to use the same thought processes as those of a human, but DABUS has since used its learned skills to develop new inventions.[71] DABUS employed its learned skills, data, and algorithms to invent a beverage container based on fractal

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[65] *See* Tabrez Y. Ebrahim, *Artificial Intelligence Inventions & Patent Disclosure*, 125 PENN ST. L. REV. 147, 204 (2020).

[66] *Id.*

[67] Abbott, *supra* note 64; *see also* ROBERT PLOTKIN, THE GENIE IN THE MACHINE: HOW COMPUTER-AUTOMATED INVENTING IS REVOLUTIONIZING LAW AND BUSINESS 51–61 (1st ed. 2009) (discussing a variety of inventions that have been conceived using the assistance of AI systems including an Oral-B toothbrush, an electronic controller, and a NASA antenna designed for use in space).

[68] Ebrahim, *supra* note 65; *see also* Ben Hattenbach & Joshua Glucoft, *Patents in an Era of Infinite Monkeys and Artificial Intelligence*, 19 STAN. TECH. L. REV. 32, 44 (2015) (citing U.S. Patent Nos. 4,908,773; 6,847,851; 7,521,463; 7,915,245; 8,053,477; 8,338,464; 8,445,537; 8,450,368; 8,476,273) ("Of a sampling of issued patents that were conceived wholly or in part by computers, none have ever been subject to litigation.").

[69] W. Michael Schuster, *Artificial Intelligence and Patent Ownership*, 75 WASH. & LEE L. REV. 1945, 1948 (2018).

[70] Tina G. Yin Sowatzke, *Meet DABUS: An Artificial Intelligence Machine Hoping to Maintain Two Patent Applications in Its Own Name*, LEXOLOGY (Aug. 22, 2019), https://www.lexology.com/library/detail.aspx?g=c8362459-4735-43af-b744-4495e239fd0e; *see also* Romm, *supra* note 7.

[71] *See* Ed Conlon, *DABUS: South Africa Issues First-Ever Patent with AI Inventor*, MANAGINGIP   (July   29,   2021),   https://www.managingip.com/article /b1sx9mh1m35rd9/dabus-south-africa-issues-first-ever-patent-with-ai-inventor; David Nicklaus, *In a World First, St. Charles Scientist's Machine Gets Credit for an Invention of its Own*, ST. LOUIS POST (Aug. 2, 2021), https://www.stltoday.com/business/columns /david-nicklaus/nicklaus-in-a-world-first-st-charles-scientists-machine-gets-credit-for-an-invention-of/article_9223d4cd-a113-5003-bb60-7f2489be5e3f.html; Yin Sowatzke, *supra* note 70.

geometry as well as a flare-type device used to attract attention.[72] Thaler filed patent applications for both devices, wherein he listed DABUS as the inventor and "invention generated by artificial intelligence" as the family name.[73] Thaler explained to the USPTO that DABUS—the sole inventor who made the creations without human intervention—was not specifically trained in the field and worked entirely independently.[74] In response, the USPTO asked for the inventor to be identified by his or her legal name, and since DABUS was the inventor, the USPTO denied the patents on the grounds that inventors must be natural persons.[75] The USPTO cited to case law[76] to support the underlying theme that mental processes underlie patents, not simply the act of creating the invention itself.[77] Subsequently, the European Patent Office and the United Kingdom Intellectual Property Office rejected the patents using the same reasoning that an inventor must be a person.[78] Finally, on July 28, 2021, South Africa issued the patent with DABUS as the inventor and Thaler as the owner.[79]

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[72] *How an AI System Called DABUS Received a Patent for Its Own Invention*, IT Brief Austl. (Aug. 5, 2021), https://itbrief.com.au/story/how-an-ai-system-called-dabus-received-a-patent-for-its-own-invention; *see* Yin Sowatzke, *supra* note 70.

[73] Douglas Goldhush, *DABUS Denied: Only Natural Persons Can Be Named as Inventors on US Patents*, Squire Patton Boggs: Glob. IP & Tech. L. Blog (Apr. 28, 2020), https://www.iptechblog.com/2020/04/dabus-denied-only-natural-persons-can-be-named-as-inventors-on-us-patents.

[74] *Id.*

[75] *Id.*

[76] *See* Univ. of Utah v. Max-Planck-GesellSchaft zur Forderung der Wissenschaften E.V., 734 F.3d 1315, 1323 (Fed. Cir. 2013) (discussing the finding that inventors must be natural persons through the use of the definition of conception and emphasizing that it is formation in the mind, and therefore, a mental act); *see also* Beech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248 (Fed. Cir. 1993) (explaining that the distinction between inventorship and ownership in the patent context boils down to the fact that "only natural persons can be 'inventors'").

[77] *Univ. of Utah*, 734 F.3d at 1323.

[78] Jane Croft, *AI System Cannot Be Named as the Inventor on a Patent, UK Court Rules*, Fin. Times (Sept. 22, 2021), https://www.ft.com/content/1c79e834-f1c8-40ef-8d64-84e9cd00be47; *see also* Christian E. Mammen & Carrie Richey, *AI and IP: Are Creativity and Inventorship Inherently Human Activities?*, 14 FIU L. Rev. 275, 286 (2020) (detailing that both the European Patent Office and the UK Intellectual Property Office found DABUS's inventions to be patentably novel).

[79] Conlon, *supra* note 71. It is important to note that while South Africa issued the patents naming DABUS as the inventor, the registration could face opposition in the future. South Africa does not formally examine patents in the way the US, Europe,

There is currently a lot of controversy as to whether AI should be allowed to be the named inventor of a patent. One law review article suggests that there are three different approaches that can be taken while viewing this issue: reject AI as an inventor, list AI and its human owner as joint inventors, or recognize AI as the inventor with a human as the owner.[80] The article argues that allowing patent law to recognize AI as an inventor comports with the Constitution, preserves the moral integrity of the patent system, and incentivizes human innovation.[81] On the other hand, United States District Judge for the Eastern District of Virginia, Judge Leonie Brinkema, ruled that the "individual" mentioned in the patent law, who must take an oath that he or she is the inventor, must be a natural person.[82] Judge Brinkema, in her decision, cited to Federal Circuit court cases that rejected corporations—again, not a natural person—being named inventors.[83] Even others, including David Opderbeck, an Associate Professor at Seton Hall University School of Law, are not convinced that AI should be listed as named inventors due to considerations in autonomy and ethics.[84]

D. *Patentability*

The first inquiry to determine if an invention is patentable is to assess its patentability.[85] Patentability is defined as the option to obtain a patent subject to the conditions and requirements of 35 U.S.C. § 101

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and the UK do, but rather simply requires that the applicant complete the filing forms. *Id.*

[80] *See generally* Anna Carnochan Comer, *AI: Artificial Inventor or the Real Deal?*, 22 N.C. J.L. & TECH. 447 (2021).

[81] *See generally id.*

[82] Decker, *supra* note 35. The judge relied heavily in her decision on both the legal and dictionary definition of individual, making it the first United States decision that is part of the global AI inventor debate. *Id.*

[83] *Id.*

[84] David W. Opderbeck, *Artificial Intelligence, Rights and the Virtues*, 60 WASHBURN L.J. 445, 445–46 (2021) (exploring the question of whether artificial intelligence maintains rights typically given to humans, including that of ownership).

[85] Before assessing patentability, it may be of consequence to discuss the protection patents grant and the term limits of such patents. Patents grant the right of the inventor "to exclude others from making, using, offering for sale, or selling the invention throughout the United States." 35 U.S.C. § 154(a)(1). As long as the fees on such patent remain paid, the term begins on the date the patent is issued and ends twenty years from the filing date for utility patents. *Id.* § 154(a)(2). For design patents, the term beginning and ending dates are structured the same, but the term lasts only fifteen years. *Id.* § 173.

by "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."[86]   The USPTO clarified the subject matter eligibility through statutory interpretation. Breaking down the language of the statute, there are four requirements.[87] The first is the word "a"—"a" patent—which signifies only one patent can be obtained for each invention, and no double patenting will be accepted.[88] Next, the word "useful" leads to the utility requirement,[89] which states that the invention must have a substantial and specific use.[90] The third requirement is "whoever invents or discovers," meaning the patent is only entitled to the person who made the invention.[91]

Finally, the last requirement is subject-matter eligibility.[92] The four categories of subject-matter eligibility are defined in the plain language of the statute: process, machine, manufacture, or composition of matter and improvements thereof.[93] While the USPTO interpreted the plain language, it also noted that courts have interpreted the statute to exclude three categories of inventions.[94] In *Association for Molecular Pathology v. Myriad Genetics, Inc.*,[95] a group of plaintiffs—including medical organizations, researchers, and patients—brought suit against a patent holder, Myriad, and the USPTO.[96] The patent holder discovered and obtained patents for the location of two human genes that increased the risk of breast and ovarian cancer.[97] The Court faced the question of whether naturally occurring DNA sequences, even when separated from the entire gene, are patentable under § 101.[98] The Court carved out three implicit

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[86]   *Id.* § 101.

[87]   *Id.*

[88]   U.S. PAT. & TRADEMARK OFF., 35 USC § 101: STATUTORY REQUIREMENTS AND FOUR CATEGORIES OF INVENTION 1 (2015), https://www.uspto.gov/sites/default/files/101 _step1_refresher.pdf [hereinafter STATUTORY REQUIREMENTS].

[89]   *Id.*

[90]   MPEP § 2107 Guidelines for Examination of Applications for Compliance with the Utility Requirement (9th ed. Rev. 10.2019, June 2020).

[91]   STATUTORY REQUIREMENTS, *supra* note 88, at 6.

[92]   MPEP § 2106 Patent Subject Matter Eligibility (9th ed. Rev. 10.2019, June 2020).

[93]   STATUTORY REQUIREMENTS, *supra* note 88, at 6.

[94]   *Id.*

[95]   569 U.S. 576 (2013).

[96]   *Id.* at 586.

[97]   *Id.* at 579–80.

[98]   *Id.* at 580.

exclusions from section 101—"laws of nature, natural phenomena, and abstract ideas."[99] The court held that the Myriad's patents fell under the "naturally occurring" category because separating them from the original gene did not create a "nonnaturally occurring molecule."[100] The Court reasoned that these exceptions are "the basic tools of scientific and technological work" and, therefore, exceed the scope of patent protection.[101]

E. *Obviousness*

Next, after determining that an invention has satisfied the four elements of patentability, one must analyze its obviousness. "[I]f 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,"[102] the invention will not be patentable despite not being "identically disclosed or described as set forth in" section 102.[103] "Patentability shall not be negated by the manner in which the invention was made."[104] A patent must be non-obvious in order to be obtained because it is deemed to be within the reach of the public if it is obvious.[105] To clarify the statutory language of section 103, just because a patent is not identically disclosed previously does not mean that the current invention may be patented.[106] The differences between the current invention and the prior art must, as a whole, have been non-obvious to a person having ordinary skill in the art (PHOSITA) before the filing date of the current invention.[107]

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[99] Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66, 70 (2012).

[100] *Ass'n for Molecular Pathology*, 569 U.S. at 592–93.

[101] *Id.* at 589.

[102] *Id.* § 103.

[103] 35 U.S.C. § 103. An inventor will be entitled to a patent unless the claimed invention is already patented or if the patent is not novel. *Id.* § 102(a)(1)–(2).

[104] *Id.*

[105] *See* Jonathan J. Darrow, *The Neglected Dimension of Patent Law's PHOSITA Standard*, 23 HARV. J.L. & TECH. 227, 231 (2009).

[106] *See id.*

[107] *See id.*

A PHOSITA is the standard used when making obviousness determinations.[108]   Not only does a PHOSITA assist in the determination of whether an invention is patentable, but it is also a key factor in determining the scope of claims during a patent infringement analysis.[109] A PHOSITA is "presumed to have known the relevant art at the time of the invention."[110]   The Court in *KSR International v. Teleflex Inc.* noted that a "person of ordinary skill [in the art] is also a person of ordinary creativity, not an automation."[111] The factors used to determine level of ordinary skill in the art include:

> (1) educational level and any specialties of the applicants; (2) types of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; (6) educational level and any specialties of active workers in the field; [and] (7) nature of any testing described in the patent (and skills required of those doing such testing).[112]

A judge described the comparison of a PHOSITA to an inventor as "pictur[ing] the inventor working in his shop with the prior art references—which he is presumed to know—hanging on the walls around him."[113]

The framework for determining obviousness comes from the Supreme Court's decision in *Graham v. John Deere Co.*[114] The Court first set out that patent validity is a question of law with underlying questions of fact.[115] The Court identified three factual inquiries that underlie obviousness: (1) determining the scope and content of the prior art, (2) ascertaining the differences between the claimed invention and the prior art, and (3) resolving the level of ordinary skill in the pertinent art.[116] One of two tests determine the first inquiry, the scope of the prior art.[117] First:

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[108] *Person Having Ordinary Skill in the Art ("PHOSITA")*, PAT. DEFS., https://patentdefenses.klarquist.com/person-having-ordinary-skill-in-the-art-phosita (last visited Aug. 14, 2022).

[109] Darrow, *supra* note 105, at 227–28.

[110] *Examination Guidelines, supra* note 63.

[111] KSR Int'l v. Teleflex Inc., 550 U.S. 398, 421 (2007).

[112] *Person Having Ordinary Skill in the Art ("PHOSITA"), supra* note 108.

[113] *In re* Winslow, 365 F.2d 1017, 1020 (C.C.P.A. 1966).

[114] 383 U.S. 1 (1966).

[115] *Id.* at 17.

[116] *Id.*

[117] Tim W. Dornis, *Artificial Intelligence and Innovation: The End of Patent Law as We Know It*, 23 YALE J.L. & TECH. 97, 128 (2020).

> [A] court may ask whether the art is from the same field of endeavor, regardless of the problem addressed. If the reference is not within the field of the inventor's endeavor, the court "may ask whether it is still reasonably pertinent to the particular problem with which the inventor is involved".[118]

The Court also explained that the inquiry should be completed on a case-by-case basis, such as with negligence, because the test cannot always be applied with uniformity of thought.[119] Following the requirements in as strict of a manner as possible will produce the sought after result—conforming with Congress's intent in passing Title 35 of the United States Code.[120] Secondary considerations may also be evaluated to assist in determining obviousness, but such considerations are not dispositive.[121] This evidence can include commercial success, long-felt but unsolved needs, failure of others, and unexpected results.[122] But it is not enough that these factors simply exist; there must also be a nexus connecting the secondary considerations to the claimed invention either via direct result or coextensive features.[123] For instance, in *Shoes by Firebug, LLC v. Stride Rite Children's Group, LLC*,[124] the court accorded minimal weight to the evidence of commercial success ($1.3 million in sales) because the success was not only tied to the challenged patents, but to the business as a whole.[125] On the other hand, in *Sanofi-Aventis U.S., LLC v. Dr. Reddy's Laboratories, Inc.*,[126] Sanofi presented evidence of the failure of others—showing that many other research groups attempted to develop the same cancer treatments, but Sanofi was still the third to obtain FDA

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[118] *Id.*; *see also* Darrow, *supra* note 105, at 247 (speculating that the interpretation of the Graham Court makes the term "art" synonymous with "field" of endeavor); Daryl Lim, *AI & IP: Innovation & Creativity in an Age of Accelerated Change*, 52 AKRON L. REV. 813, 862 (2018) (explaining that analogous prior art only includes that within the field of endeavor or deals with the same problem that could be solved by the invention).

[119] *Graham*, 383 U.S. at 17.

[120] *Id.*

[121] *Examination Guidelines*, *supra* note 63.

[122] *Id.*

[123] Jason E. Stach & Michelle G. Rice, *An 'Obvious' Time to Take Secondary Considerations Seriously*, WESTLAW 1 (Aug. 31, 2020), https://www.finnegan.com/a/web/319287/PUBLISHED-Westlaw-Today-An-Obvious-Time-to-Take-Secondary.pdf.

[124] 962 F.3d 1362, 1372–73 (Fed. Cir. 2020).

[125] *Id.*

[126] 933 F.3d 1367, 1377–78 (Fed. Cir. 2019).

approval—which the court weighed heavily in the determination of obviousness.[127]

Prior to *KSR International*, the Court used a "teaching, suggestion, or motivation" test (TSM) to determine a patent's obviousness.[128] In this case, the Court challenged the use of the TSM test.[129] The TSM test finds patents obvious if "'some motivation or suggestion to combine the prior art teachings' can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art."[130] If a person having ordinary skill in the art is able to conceive a predictable variation of design incentives in another field of endeavor, obviousness under "§ 103 likely bars the invention's patentability."[131] Additionally, if a patent is composed of several elements, it is "not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art."[132] Rather, the combination of these elements must be nonobvious.[133] "One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims."[134]

F. *A Quick Note on Novelty*

Along with obviousness, AI inventors will struggle with patent novelty. While not a direct assessment under the obviousness analysis, the novelty of patents, due to their obviousness, will decrease with AI.[135] This is because AI uses algorithms in order to guide its thought

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[127] *Id.*

[128] *See Examination Guidelines, supra* note 63.

[129] *See* KSR Int'l v. Teleflex Inc., 550 U.S. 398, 417–18 (2017).

[130] *Id.* at 407.

[131] *Id.* at 408.

[132] *Id.* at 418.

[133] *See id.* at 420. The Court noted the dangers of allowing a patent based on a simple combination of elements from the prior art and the factors that may lead to such a patent being deemed obvious. *See id.* at 415–16. For instance, in a prior case, the Court stated that a simple combination of known elements is obvious if it yields predictable results, such as when the combination substitutes one element for another known in the field. *See* United States v. Adams, 383 U.S. 39, 49–52 (1966).

[134] *KSR Int'l*, 550 U.S. at 419–20.

[135] *See* SABINE JACQUES, *PATENTING AI: RETHINKING ELIGIBLE SUBJECT-MATTERS AND THE NOVELTY REQUIREMENT IN AN IOT WORLD* 47 (2020), https://ueaeprints.uea.ac.uk/id /eprint/77062/1/2020_SJ_rethinking_eligible_subject_matters_and_the_novelty _requirement_in_an_IoT_world_Final_after_corrections.pdf.

processes.[136] For example, if the AI being employed is similar to a reactive machine, one that only uses a small set of data to create a learning process, the intelligent machine will continuously use the same algorithm in all of its inventions.[137] Artificial intelligence must use algorithms that incorporate a degree of randomness in order to invent anything new.[138] Without this variation, AI will only reach the obviousness analysis in the first instance, and then it will create a variety of obvious inventions undeserving of patent protection.[139]

This Comment illustrates the need for the current patent obviousness analysis to dive deeper and add sub elements to accommodate the new capabilities that will present themselves if AI systems are deemed proper inventors. Specifically, Part III addresses the issues with the obviousness analysis and the consequences of presuming that humans will forever be the only inventors.

III. PROBLEMS AND CONSEQUENCES OF THE CURRENT OBVIOUSNESS ANALYSIS FOR AI INVENTORS

Judge Learned Hand once wrote in an opinion, "as the law stands, the inventor must accept the position of a mythically omniscient worker in his chosen field. As the arts proliferate with prodigious fecundity, his lot is an increasingly hard one."[140] His words, in combination with current technological advancements, seem to reach toward a dead end for humans. One lingering question remains: when will the need for humans in the invention process be eliminated or beaten by computers? More recent literature speculates that "[a]t some point in the near future, when AI transitions from automating human researchers to automating inventive activity on a broad scale, inventive AI might even *represent* the skilled person."[141] Is patent law prepared to rid itself of the PHOSITA and introduce the AI PHOSITA?

Artificial intelligence in patent law is a double-edged sword. On one hand, patent protection for AI-generated works will incentivize innovation and motivate those who develop, use, and own AI, rather

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[136] Burns, *supra* note 11.

[137] *See What Is Artificial Intelligence?*, *supra* note 3; Burns, *supra* note 11; Fraser, *supra* note 32, at 319–20.

[138] *See* Ravid & Liu, supra note 47, at 2224–25.

[139] *See id.* at 2225.

[140] Merit Mfg. Co. v. Hero Mfg. Co., 185 F.2d 350, 352 (2d Cir. 1950).

[141] Abbott, *supra* note 64.

than AIs themselves.[142] Patents incentivize innovation by providing a limited monopoly on the invention until the patent's expiration.[143] It has even been argued that "[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."[144] On the other hand, however, with its great potential and skill level, AI has the ability to begin pushing humans out of the field.

Many commentators understand that the introduction of AI into the patent field will shift a variety of elements in its framework. The first problem encountered with the current obviousness standard is the competition between humans and machines. As AI expands into the field and begins to patent its inventions, the risk of humans being replaced with machines heightens.[145] Humans and computers—even when designed to mimic the human thought process—have relatively different thought processes. With the competition rising between human and machine, there comes an issue with comparison to the theoretical "person having ordinary skill in the art."[146] The PHOSITA is the reference point—much like the "reasonable person" in the negligence standard—of whether an invention is patentable.[147] Importantly, the PHOSITA does not refer to an inventor's specific knowledge and capacity.[148] If the PHOSITA would be able to discern the difference between the prior art and the new invention, it would be considered obvious and non-patentable.[149] While it is nearly impossible for a PHOSITA to actually possess, understand, and remember all of the prior art in her designated field, the incorporation of AI into the inventor universe is introducing a skilled machine that can possess, understand, and remember all of the prior art stored in its database.[150] This, in turn, would effectively replace the *person* in

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[142] *Id.*; *see also* Comer, *supra* note 80, at 480 (discussing how patent protection for AI-created inventions will incentivize AI creators to continue to enhance software).

[143] Comer, *supra* note 80, at 480.

[144] *Id.*; Fraser, *supra* note 32, at 326.

[145] Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. Rev. 1079, 1117 (2016).

[146] *See id.* at 1122–23.

[147] *Person Having Ordinary Skill in the Art ("PHOSITA"), supra* note 108.

[148] Dornis, *supra* note 117, at 127.

[149] Abbott, *supra* note 145, at 1122–23.

[150] *See id.* at 1124.

PHOSITA with the skilled computer.[151] Expanding the scope of prior art to almost an infinite collection greatly raises the non-obviousness and, therefore, the patentability bar.[152] AI inventors would beat a human every time under this analysis. It is not feasible to expect a human to maintain such extensive knowledge of the prior art in his or her designated field.[153] Additionally, the skilled computer may have access to prior art across fields and, through its artificial thought process, invent something by combining references from a variety of fields.[154] Again, a human in the PHOSITA analysis is not expected to be familiar with prior art across fields, or for that matter, consider combining references from two fields that seem unrelated—for instance, cooking recipes and medical science.[155] Ryan Abbott, a Professor at University of Surrey School of Law and Health Sciences and an Adjunct Assistant Professor of Medicine, goes as far as to argue that the introduction of AI into the obviousness analysis and its substitution as the PHOSITA would result in everything being obvious in comparison.[156]

On the other hand, the opposite can also be true. If AI is doing a majority of the inventing, but the underlying human who owns the computer is taking the credit, the obviousness standard will be far too lenient.[157] As patent law is currently laid out, there is no requirement to disclose the use of AI.[158] Another law review articled expressed worry that human inventors will file patents that were invented strictly using the skilled computer and be able to reap the benefits of patent protection.[159] Artificial intelligence has an advantage over humans in the scope of prior art relied upon and the PHOSITA comparison.[160] This would allow AI to complete the work while also only being

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[151] *See id.* Other commentators have argued that the person in PHOSITA should be replaced with a person "equipped with AI." Enrico Bonadio et al., *Artificial Intelligence as Inventor: Exploring the Consequences for Patent Law*, INTELL. PROP. QUARTERLY, 2021, at 48, 54. This change would raise the skills of a person to that of a skilled computer. *Id.* The author notes that the routine use of AI by a skilled person would become an important aspect of the obviousness analysis. *Id.* at 54–55.

[152] Abbott, *supra* note 145, at 1124.

[153] *Id.* at 1124–25.

[154] *See id.* at 1125.

[155] *Id.*

[156] *Id.* at 1083.

[157] *See* Romm, *supra* note 7, at 1440.

[158] *Id.* at 1441.

[159] *Id.* at 1440.

[160] *See id.*

exposed to the lower standard of the PHOSITA.[161] These patents may be deemed obvious when viewed in light of an elevated standard based upon AI, but when filed with human inventors, they will be worthy of patent protection.[162]

Will AI inventors eventually push out the need for human inventors?[163] While commentators argue that AI may be limited due to expanding technology, AI is ever evolving.[164]

IV. SOLUTIONS: WHAT IS BEING DONE AND WHAT COULD BE DONE

The idea of AI becoming a named inventor on a patent received backlash since that notion's initial introduction. Commentators of law review articles, legal scholars, patent offices across the world, and even courts are opposed to this drastic change.[165] As of today, the only—albeit essentially unreviewed—acceptance of an AI inventor is in South Africa, which is not subject to the same rigorous application approval as in other countries.[166]

Patent law may be headed in the direction where AI inventors are an inevitable piece of the future.[167] As demonstrated throughout this Comment, the fear of AI creating a world where everything is obvious is impending, if not already at least partially present. The result is that increasingly fewer inventions are patentable. While not a practical

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[161] *Id.*

[162] *See id.*

[163] *See* Emna Chikhaoui & Saghir Mehar, *Artificial Intelligence (AI) Collides with Patent Law*, 23 J. LEGAL, ETHICAL & REG. ISSUES 1, 8 (2020).

[164] *See id.* at 2, 8 (expressing that artificial intelligence is only capable of outputting data that was previously entered into its database); Ralph D. Clifford, *Creativity Revisited*, 59 IDEA 25, 37 (2018) (explaining that artificial intelligence can use its previous training to evolve, and while humans must input the base knowledge, artificial intelligence "changes the domain" and combines information from various fields to answer whatever question is thrown in its direction). One commentator goes as far as to argue the opposite, wanting to include AI inventions within patent law, and argues that the unexpected outcomes of AI systems are not results of autonomous creation. Dan L. Burk, *AI Patents and the Self-Assembling Machine*, 105 MINN. L. REV. HEADNOTES 301, 304 (2021).

[165] *See* Hollister, *supra* note 36; *EPO Refusal, supra* note 36; McGettrick, *supra* note 36; Naidoo, *supra* note 36.

[166] *See* Winstead Intell. Prop. Prac., *Recent Developments in Artificial Intelligence and IP Law: South Africa Grants World's First Patent for AI-Created Invention*, NAT'L L. REV. (Aug. 3, 2021), https://www.natlawreview.com/article/recent-developments-artificial-intelligence-and-ip-law-south-africa-grants-world-s.

[167] *See, e.g.*, Fraser, *supra* note 32, at 319 (detailing AI's ability to quickly and accurately review prior art references more efficiently than a human).

solution, the first option is for the legal system to do absolutely nothing. This would lead to the issuance of fewer patents because everything would be considered obvious, and humans would be unable to outperform machines on the same scale. Perhaps, the incentives for obtaining a patent will increase, and inventors will work harder to get out ahead of the herd. Since there may be a limitation of available patents, inventors may work more tirelessly to find that needle in the haystack. But, on the other hand, doing nothing seems to be more problematic. Patents are granted to protect the work of inventors and incentivize the sharing of inventions with the world in exchange for a small, time-limited monopoly.[168] This Comment lays out a few solutions to combat the AI issue and ensure inventors continue to publicly disclose their inventions.

A. *Requirement of Disclosure*

The prerequisite to solving the overarching issues in the obviousness analysis is the requirement of disclosing the use of AI in the invention process and, subsequently, in the patent application. Currently, there is no such requirement to disclose the use of AI in patent applications.[169] The requirement, however, would be consistent with the idea that inventors should not be able to enjoy the exclusivity of patent rights without sharing useful information about the invention.[170] Several courts have recently rejected the idea of an AI inventor, which could lead to this requirement being put into place.[171] The disclosure requirement can cut in two different ways. First, when AI is used in the invention process but is unable to be a named inventor, it cuts the application off at the knees. There will be no need to analyze the obviousness of the patent since the improper inventor will prevent issuance of the patent.[172] Second, assuming that AI is termed a proper inventor, it allows the application to move forward, and courts can then apply a proper standard to the obviousness analysis, which will be further clarified in Section B.

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[168]   *See* 35 U.S.C. § 154(a)(1).

[169]   Romm, *supra* note 7, at 1440; *see also* Abbott, *supra* note 64, at 1097 (stating that many AI-created inventions were patented without the disclosure of the role of AI due to both lack of knowledge on the law and attorney recommendation).

[170]   *See In re* Gay, 309 F.2d 769, 772 (C.C.P.A. 1962).

[171]   *See, e.g.*, Decker, *supra* note 35.

[172]   *See* Gattari, supra note 35, 16–17 (discussing that the word "individual" in the definition inventor refers to a natural person).

Following the disclosure of AI in the invention process, two possible outcomes arise, both of which involve looking to the AI's scope of the work performed. First, the AI can be used as simply a tool that assisted in the process by either computing complex calculations or performing experiments.[173] These are both tasks that humans can easily complete, but AI merely assists in a time-saving manner.[174] Because the AI does not add in a manner that surpasses human capabilities or thought processes, it would be fair to apply the base level, current obviousness standard. Because the inventive step—or invention itself—is still undertaken by a human, it is reasonable to continue to compare the inventor to a human PHOSITA. Similarly, if a human specifically programmed a set of prior art references into a skilled computer in hopes that it would find a novel combination, the current obviousness standard will properly analyze the patent application. In this example, the scope of the prior art is narrowly defined, much in the way it is defined for human inventors.[175] Without additional access to the various fields and vast prior art references available, the preset database would be highly comparable to that which is defined for a human inventor.[176] The second possibility is that the AI acts almost entirely on its own and is the named inventor on the patent application.[177] Depending on the acceptance of the AI inventor, two outcomes are possible: either a heightened obviousness analysis must be applied to compensate for the increased capabilities, or the overall analysis ends because AI cannot invent.

This solution, however, could easily lead to some pushback from inventors. The AI used in the development invention is a trade secret. To be considered a trade secret, three elements must be met: (1) it "is information that has either actual or potential independent economic value by virtue of not being generally known," (2) it "has value to others who cannot legitimately obtain the information, and" (3) it "is

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[173] *See* Burns, *supra* note 11.

[174] *See* Fraser, *supra* note 32, at 319.

[175] *See* Abbott, *supra* note 145, at 1124.

[176] *See id.* at 1124–25.

[177] For example, DABUS, discussed earlier, used its own creative functionality to output two new inventions. Jackie O'Brien & Isobel Taylor, *The Year That Was for DABUS, the World's First AI 'Inventor,'* INSIDE TECH L. (Dec. 13, 2021), https://www.insidetechlaw.com/blog/the-year-that-was-for-dabus-the-worlds-first-ai-inventor. According to DABUS's inventor, DABUS was the sole inventor on these novel ideas, and therefore, the sole inventor on the patent application. *Id.*

subject to reasonable efforts to maintain its secrecy."[178]   Patent applications require disclosures that wholly explain what the invention is, how it is created, and how it is subsequently reproduced.[179] In turn, for these disclosures, the inventors get the right to exclude others from making or selling that invention for a given period of time—a type of limited-term monopoly.[180]   Trade secrets, however, maintain their value through lack of disclosure.[181] Inventors are already reluctant about patenting their AI technology, especially those that are undetectable.[182] Having to disclose specifics about the AI used in patent applications, due to their public nature, opens the door for anyone to recreate and use such technology.[183] To combat this issue, the disclosure of AI in patent applications can be subject to specialized rules. Instead of describing in detail the algorithm used or how to recreate the AI technology itself, the USPTO can simply require disclosure that such technology was used without requiring specifics. For instance, AI-assisted patent applications will have to disclose which piece of the invention the AI was used to assist and an idea of how the system completed the action but will not have to reveal the *exact* algorithm in which it did so. The USPTO may exercise some leniency in the disclosure requirement so as not to overly expose and destroy the value of trade secrets, but still allow enough information for others to understand how the invention can be recreated. This seems most well suited for AI technology that can be reverse engineered or that does not require difficulty in development. For those inventors who are worried about this disclosure requirement must decide whether to patent the invention or maintain the explicit secrecy of the AI technology.   In some cases, inventors may deem the tradeoff

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[178] *Trade Secrets / Regulatory Data Protection*, U.S. PAT. & TRADEMARK OFF. (July 18, 2022), https://www.uspto.gov/ip-policy/trade-secret-policy.

[179] Roman Kopytko, *The Basics of Invention Disclosures*, WELLSPRING (Feb. 5, 2018), https://www.wellspring.com/
blog/the-basics-of-invention-disclosures.

[180] 35 U.S.C. § 154(a)(1).

[181] *See Trade Secrets / Regulatory Data Protection, supra* note 178.

[182] *See* Steven R. Daniels & Sharae' L. Williams, *So You Want to Take a Trade Secret to a Patent Fight? Managing the Conflicts Between Patents and Trade Secret Rights*, A.B.A. (Aug. 5, 2019), https://www.americanbar.org/groups/intellectual_property_law /publications/landslide/2018-19/july-august/so-you-want-take-trade-secret-patent-fight.

[183] Patent applications are published after a period of eighteen months after the earliest filing date. 35 U.S.C. § 122(b)(1). Prior to the expiration of this period, patent applications are kept confidential unless an applicant requests the patent application be published before the expiration of the period. *Id.*

worthwhile, while in others, the value of the trade secret may outweigh the perks of a patent.

Another possible pushback to the idea of exposing trade secrets is a tradeoff. If inventors disclose their use of AI and its exact algorithm, the chances of that inventor getting a patent could increase by loosening the obviousness standard. The USPTO and the public win by gaining the disclosure of AI technology used in a patent, while the inventor still gets to reap the benefits of patent protection. If the standard was a bit less stringent and inventions were not as easily deemed obvious due to the ever-expanding knowledge of AI technology, inventors would be incentivized to disclose their usage of AI and its algorithm. If the USPTO is willing to go this far, the same obviousness standard will continue to apply, and the heightened standard would be moot. This is similar to the tradeoff discussed earlier between obtaining a patent and maintaining the secrecy of a trade secret. In this case, however, the inventor may more easily lean toward disclosing the trade secret after balancing the benefits of a granted patent.

B. *Addition of Sub-Elements to the Current Obviousness Analysis*

After requiring the disclosure of the use of AI in patent applications, the next step is defining two standards of obviousness for courts to impose; one that will apply to AI inventors and one that will apply to human inventors. Again, obviousness breaks down into three elements: scope and content of the prior art, the differences between the claimed invention and the prior art, and the level of ordinary skill in the art:

> As a rule of thumb, an invention should not be regarded as groundbreaking once (1) the PHOSITA is considered to "commonly" or "typically" use supporting AI in inventive activities of that kind and (2) the AI support enhances the PHOSITA's skills up to a point where inventions of this kind are obvious to the hybrid human-AI PHOSITA.[184]

Each element must be revised to accommodate for the allowance of AI inventors. The first element is the scope and content of the prior art. The capabilities of AI far exceed those of humans. Artificial intelligence inventors will have a much broader scope of the prior art. These AI systems have the ability to access and analyze prior art references across varying fields in minutes.[185] Humans, on the other

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[184] Dornis, *supra* note 117, at 127.

[185] *See* Abbott, *supra* note 145, at 1124.

hand, must expend both time and energy researching in various fields. Unlike AI, humans may not see connections across fields as easily. Most human inventors are highly familiar with their field of endeavor, but not always those outside of its scope. While it may be obvious to AI that combining science and cooking is obvious, a human inventor may not consider such an option and begin researching a helpful overlap.[186]

Within this first element, an argument may arise for the type of AI being used including applications and algorithms. Courts should recognize that, regardless of the application or algorithm used, AI greatly exceeds the capabilities of humans.[187] The scope of prior art for AI inventors will be much broader than that of humans regardless of the type of AI used. Therefore, AI systems require a heightened standard of obviousness in order to broaden both the scope and content of the prior art. The analysis for a human inventor may remain unchanged.

The second element of the obviousness analysis is the differences between the claimed invention and the prior art. If courts amend the analysis of the scope and content of prior art, this element does not need to be drastically revised. Because courts would broaden the scope of the prior art to accommodate AI, deciphering the differences between the prior art and the claimed invention will parallel the first element. The scope will be much larger for AI and remain unchanged, and therefore less sweeping, for human inventors.

The final element of the obviousness analysis is the person having ordinary skill in the art. This element can be revised in a similar fashion as the first. Unlike those who argue that the PHOSITA should just be replaced with the "skilled machine" in the arts, the court should again lean back on the prerequisite of disclosure and look at whether AI or a human is the inventor. To begin with, if AI is the inventor, the application of a new PHOSITA is required—the AI PHOSITA. Again, applications and algorithms should not be a pretext. If AI is capable of invention without human intervention, each system should be held to the same standard. Commentators have argued that courts should look to what is the most commonly used AI and apply that across the board.[188] The author disagrees with this suggestion because it is clear

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[186] *See id.* at 1125.

[187] *See* Roman Steinberg, *6 Areas Where Artificial Neural Networks Outperform Humans*, VENTURE BEAT (Dec. 8, 2017, 4:10 PM), https://venturebeat.com/ai/6-areas-where-artificial-neural-networks-outperform-humans.

[188] Dornis, *supra* note 117, at 132.

that the most commonly used AI, which could be in the finance field, would not correlate properly to the most commonly used AI in the science field. If the court were to impose a "standard," it should impose one "standard" type of AI per field. The court could look specifically to the field in which the patent is being filed and create the "most commonly used" standard for that field.

On the flip side, the court should not jump to the current PHOSITA standard because an inventor is human. The court should recognize the human inventor and her specified field and determine whether someone in this specified field would have access to AI systems and whether it is commonplace in that field. If AI is commonly used, it would be extremely difficult for a human to surpass the skills of a computer inventing in the same sector. Here, there would be concern that simply applying the current PHOSITA standard would be too low of a bar and allow patents for inventions that are deemed obvious. But without drawing a line to provide for the heightened standard in these cases, there will be either a large influx of patenting obvious inventions or a risk that those without AI access in a field that commonly uses it will have to face hardship.

C. *Term Tradeoff*

The use of AI to assist in the inventive process will always be a relevant factor in patent applications as technology progresses. Again, a disclosure of AI requirement will be a prerequisite of another possible solution to the inevitable "everything is obvious" fate. Instead of the addition of sub-elements to the current obviousness analysis, courts could consider granting a new type of patent, one which is specially designed for AI inventions. Courts could decrease the term of the patent of the invention that is discovered using AI technology in exchange for the expanded definition of obviousness. Patents, as they stand today, hold a twenty-year term from the date the patent application is filed.[189] Typical patents can maintain this standard, but patents issued for AI inventions could decrease in the term length by five years, thus, creating a term of fifteen years. Perhaps courts could give inventors a choice: either face the heightened obviousness standard discussed in Part IV.B. or compare to the current obviousness standard in exchange for a lesser term. This change will allow inventors to both combat the broadening obviousness analysis, while still receiving the benefits of patent protection. As already mentioned,

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[189] 35 U.S.C. § 154(a)(2).

the lucrative nature of the limited-term monopoly that patents provide is the incentive for disclosing the invention.[190] Allowance of a more lenient standard to obtain a patent in exchange for a shortened term limit is likely more than enough to incentivize inventors to disclose AI technology for patent protection.

V. CONCLUSION

The current standard for the obviousness analysis in patent law must be revised to accommodate for the addition of AI as inventors. While some commentators argue that the current framework is satisfactory due to its flexibility,[191] it can go further. Specifically, courts must determine the type of inventor at hand and alter the analysis as applicable. The capabilities of AI compete highly with the human brain to the point of a human's inability to keep up. Employing two varying standards depending on the inventor facilitates the most equal playing field in patent obviousness. Humans and AI cannot be compared evenly. For now, and hopefully into the future if patent offices continue trends, the patent world is safe because AI systems cannot be named inventors; however, once they are accepted, changes must follow.

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[190] *See* Bojan Pretnar, *Patents and the Economic Incentive to Invent, in* PATENTS AND TECHNOLOGICAL PROGRESS IN A GLOBALIZED WORLD 841, 842 (Wolrad Prinz zu Waldeck und Pyrmont et al. eds., 2009).

[191] *See* Romm, *supra* note 7, at 1442.