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HOW ARTIFICIAL INTELLIGENCE MACHINES CAN LEGALLY BECOME INVENTORS: AN EXAMINATION OF AND SOLUTION TO THE DECISION ON DABUS

*Justyn Millamena**

With proliferation of Artificial Intelligence research and development, it is foreseeable that these machines will invent many new patentable technologies. However, the United States Patent and Trademark Office recently deemed a patent application incomplete for listing an AI machine as the inventor. If the USPTO's decision is not corrected, the patent system will be in danger because many fraudulent patent applications that list incorrect inventors will be filed. This would drastically change existing and settled inventorship jurisprudence and might endanger the patent protection over such patents. This Note argues that the USPTO's reasons for not allowing the Artificial Intelligence machine to be listed as an inventor are erroneous. First, AI machines with internal neural networks that allow for continual self-training to develop novel ideas satisfy the Conception Requirement. Second, the language of Title 35 of the U.S.C. does not inherently suggest a national person is required to be the inventor; it only requires a legal person to be the inventor. Therefore, this Note calls for the limited legal personhood of AI to serve the purpose of inventorship eligibility.

INTRODUCTION

A patent is a type of intellectual property that provides inventors with protection over new ideas and incentivizes investments in

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innovation by granting a limited monopoly over a patented product or method.¹ As mandated by Article I, Section 8, Clause 8, of the United States Constitution, the United States Patent and Trademark Office (“USPTO”) is employed by the legislative branch to “promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”² This right conferred by the Constitution allows owners of a patent to use, exclude, and transfer ownership of this intellectual property. With this system in place, American industry flourishes with new products and employment opportunities that contribute to the strength of the U.S. economy.³ In order to obtain a patent, an inventor must file an application through the USPTO.

The general requirements for patent protection are laid out by Title 35 of the United States Code (“U.S.C.”); § 101 states: “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvements thereof, may obtain a patent thereof, subject to the conditions and requirements of this title.”⁴ The USPTO interprets this broad declaration to impose four requirements: (1) Double Patenting Prohibited; (2) Naming of the Inventor; (3) Subject Matter Eligibility; and (4) Utility.⁵

Additionally, an application data sheet (“ADS”) may be attached to a provisional and nonprovisional patent application to provide necessary bibliographic data in a single document.⁶ The ADS must

¹ *Patents*, WORLD INTELL. PROP. ORG. (WIPO), <https://www.wipo.int/patents/en/> (last visited Oct. 17, 2021).

² See U.S. CONST. art. I, § 8, cl. 8.

³ *About Us*, U.S. PAT. AND TRADE OFF., <https://www.uspto.gov/about-us> (last updated Feb. 9, 2021).

⁴ 35 U.S.C. § 101 (1952).

⁵ See U.S. PATENT AND TRADEMARK OFF., MANUAL OF PATENT EXAMINING PROCEDURE § 2104 (9th ed., rev. 10, June 2020) [hereinafter MPEP] (stating that Double Patenting Prohibited limits the number of obtainable patents on an invention to one; Naming of the Inventor requires the naming of the inventor(s) on the application; Subject Matter Eligibility requires that the invention (a) falls into one of the statutory categories of invention, and (b) must be directed towards a patent-eligible subject matter; Utility provides that the invention must have a utility that is specific, substantial and credible.).

⁶ 37 C.F.R. § 1.76 (2018).

contain inventor information including the legal name, residence, and mailing address of the inventor or each joint inventor.⁷ The inventor listed in the ADS of a nonprovisional application is granted inventorship of the patent.⁸

If the application meets these basic requirements, the patent may be granted.⁹ Title 35 of U.S.C. § 131 states that “[t]he Director shall cause an examination to be made of the application and the alleged new invention; and if on such examination it appears that the applicant is entitled to a patent under the law, the Director shall issue a patent thereof.”¹⁰ When a nonprovisional application is deemed incomplete under 35 U.S.C. § 111(a)—which details the general contents of an application—then “a Notice of Incomplete Application is prepared and mailed by” the Office of Patent Application Processing (“OPAP”).¹¹ An application is considered incomplete by the OPAP if it does not contain the applicable filing fees, the surcharge, or a signed ADS providing the inventor information.¹² In these circumstances, the OPAP will give the applicant time, usually two months, to respond to the Notice to File Missing Parts and remedy the application.¹³ If an applicant lists an incorrect inventor on their application, he or she is permitted to file a correction of inventorship by amendment.¹⁴ Unlike the other application defects, when the application lists the incorrect inventor and “the applicant has not filed a request to correct inventorship under 37 C.F.R. § 1.48, the [OPAP] should reject the claims under 35 U.S.C. § 101 and 115.”¹⁵

On July 29, 2019, Stephen L. Thaler filed a patent application for an invention that disclosed “Devices and Methods for Attracting

⁷ *Id.*

⁸ 37 C.F.R. § 1.41 (2018) (“The inventorship of a nonprovisional application under 35 U.S.C. § 111(a) is the inventor or joint inventors set forth in the application data sheet in accordance with § 1.76 filed before or concurrently with the inventor’s oath or declaration.”).

⁹ 35 U.S.C. § 101; *see* MPEP, *supra* note 5.

¹⁰ 35 U.S.C. § 131.

¹¹ *See* MPEP, *supra* note 5, at 506.

¹² *Id.*

¹³ *Id.*

¹⁴ 35 U.S.C. § 116.

¹⁵ MPEP, *supra* note 5 at 2104.

Enhanced Attention.”¹⁶ Specifically, the invention utilizes rhythm and optimal fractal dimensions to “attract[] enhanced attention.”¹⁷ The ADS attached to the application listed an Artificial Intelligence (“AI”) named “DABUS” as the sole inventor.¹⁸ On August 8, 2019, the USPTO issued a Notice to File Missing Parts of Nonprovisional Application, which stated that the ADS did not identify “each inventor by his or her legal name.”¹⁹ After Thaler’s petition seeking supervisory review and to vacate the Notice was dismissed, he petitioned for reconsideration of the decision on January 20, 2020.²⁰ In his petition, Thaler argued that the AI system, DABUS, was the inventor.²¹ The USPTO denied Thaler’s petition to vacate its Notice, effectively holding that an application is incomplete when it only lists an AI as the inventor.

This Note argues that AI machines like DABUS should be eligible to satisfy the inventorship requirement necessary to obtain patents. Part I of this Note explains the two requirements for patent inventorship: the Conception and the Natural Person Requirements. Part II analyzes Stephen Thaler’s patent application on behalf of the “creativity machine” named DABUS, the decision of the USPTO,

¹⁶ See *In re* Application of Application No.: 16/524,350 Dec. Comm’r Pat., at 1–2 [hereinafter *USPTO Decision on Petition*] (Final decision by the USPTO denying Stephen L Thaler’s request for the USPTO to reconsider its prior denial of his petition to vacate the agency’s August 8, 2019 Notice to File Missing Parts of Nonprovisional Application), <https://www.uspto.gov/sites/default/files/documents/16524350.pdf>.

¹⁷ EUR. PAT. OFF., *Amended Description with Annotations for Devices and Methods for Attracting Enhanced Attention*, EUR. PAT. REG., at 4 <https://register.epo.org/application?number=EP18275174> (last visited Oct. 2, 2021) (To access the cited information, one has to click on the “All Documents” under the box entitled “About this File” on the upper left hand corner of the webpage containing information on Stephen L. Thaler’s European patent application. After clicking “All Documents” you will be directed to a different page with a registry of all the different documents that were submitted in connection with this European patent application. Click on the document entitled “Amended Description with Annotations for Devices and Methods for Attracting Enhanced Attention,” to find a lengthy discussion on the unique information processing mechanism of the invention.).

¹⁸ *USPTO Decision on Petition*, *supra* note 16, at 1.

¹⁹ *Id.* at 2.

²⁰ *Id.*

²¹ *Id.* at 3–4.

and the dilemma that his patent application poses to inventorship jurisprudence. This Part presents how the USPTO used the Conception Requirement and the Natural Person Requirement to deny inventorship credit to DABUS. Part III of the Note argues that the USPTO and previous case law erroneously read the Natural Person Requirement from the statutory language, which only outlines a Legal Person Requirement. Part IV argues that DABUS' neural nets and novelty filters met the Conception Requirement, because they enabled it to conceive of the invention. Part V of this Note highlights the necessity of granting AI systems such as DABUS inventorship credit and demonstrates how AI machines can be granted inventorship credit, specifically by designating artificial personhood to AI and allowing AI to qualify as legally incapacitated persons. Importantly, this Note focuses solely on the barriers to AI satisfying the USPTO's inventorship requirement on applications. It is not within the scope of this Note to consider the other barriers that AI inventions face in obtaining patents—namely, the Double Patenting, Subject Matter Eligibility, and Utility requirements.

I. THE TWO REQUIREMENTS OF INVENTORSHIP

An inventor is defined by 35 U.S.C. § 100(f) as “the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.”²² Courts have interpreted this definition to require two elements: (1) that the inventor actually conceived the invention (“Conception Requirement”); and (2) that the inventor be a natural person (“Natural Person Requirement”).²³ While related, each requirement has been independently derived by courts from the statute.

²² 35 U.S.C. § 100.

²³ See generally *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315 (Fed. Cir. 2013); *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237 (Fed. Cir. 1993).

A. *The Conception Requirement*

At its core, the question of inventorship “is a question of who actually invented the subject matter claimed in a patent.”²⁴ Inventorship is determined by the individual or individuals who contributed to the conception of the invention,²⁵ as conception is considered “[t]he threshold question in determining inventorship.”²⁶ Conception is “the touchstone of inventorship, the completion of the mental part of the invention.”²⁷ This “mental part” is “the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.”²⁸ An idea is considered definite and permanent “when the inventor has a specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan he hopes to pursue.”²⁹ Conception is established “when the idea is so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.”³⁰ If an individual does not “contribute[] to the conception of the invention, he is not an inventor.”³¹

Proving complete conception is a factual matter and therefore “must be clearly established by proof.”³² “[U]nsupported evidence of the alleged inventor . . . [cannot] be received as sufficient proof of the fact or prior conception.”³³ Proof of conception can be shown by:

Any full and accurate description of the invention,
either in words or drawings or by model, if it be of a

²⁴ Beech Aircraft Corp., 990 F.2d at 1248.

²⁵ See MPEP, *supra* note 5, at 2100-18.

²⁶ *In re Hardee*, 223 U.S.P.Q. 1122, 1123 (Dec. Comm’r Pat. 1984).

²⁷ *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223, 1227–28 (Fed. Cir. 1994).

²⁸ *Id.* at 1228 (quoting *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1367 (Fed. Cir. 1986)).

²⁹ *Id.*

³⁰ *Id.*

³¹ *In re Hardee*, 223 U.S.P.Q. at 1123.

³² *Mergenthaler v. Scudder*, 11 App. D.C. 264, 276 (1897).

³³ *Id.* at 278.

machine, or even an unsuccessful effort to embody the conception when the effort discloses that the idea was complete, will suffice, although the attempt to represent it may have failed.³⁴

Such a disclosure is sufficient to “enable the inventor or others skilled in the art to reduce the conception to practice without any further exercise of inventive skill.”³⁵ The conception analysis thus looks at whether the inventor can “describe his invention with particularity.”³⁶ Such particularity would allow others skilled in the art to develop the invention or use the method from the inventor’s disclosure alone. This ensures that the inventor has a developed idea of the “complete mental picture of the invention.”³⁷

After definiteness has been established, “all that remains to be accomplished, in order to perfect the act or instrument, belongs to the department of construction, not invention.”³⁸ In other words, the invention does not need not to be constructed in order for conception to be complete.³⁹ Additionally, conception can be complete even if the inventor does not know whether his invention works.⁴⁰ Therefore, reduction to practice—the construction of an item subject to patent or the carrying of a process for a patent—is irrelevant in defining an inventor.⁴¹ This is essential because, otherwise, someone who merely constructs the claimed material, rather than the original innovator herself, would be rewarded.⁴² Therefore, reduction to practice can be accomplished by another without the inventor losing patent rights.

³⁴ *Id.* at 279.

³⁵ *Id.*

³⁶ *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994).

³⁷ *Id.*

³⁸ *Mergenthaler v. Scudder*, 11 App. D.C. at 276.

³⁹ *Id.*

⁴⁰ *See Applegate v. Scherer*, 332 F.2d 571, 573 (C.C.P.A. 1964).

⁴¹ *In re Hardee*, 223 U.S.P.Q. 1122, 1123 (Dec. Comm’r Pat. 1984).

⁴² *Applegate*, 332 F.2d at 573.

B. *The Natural Person Requirement*

In several court decisions, the Federal Circuit has limited “individuals” in the statutory inventor definition to mean “natural persons.”⁴³ Under Black’s Law Dictionary (“BLD”), a “natural person” is “a human being, naturally born, versus a legally generated juridical person.”⁴⁴ A “juridical person,” as defined by BLD, is an “entity . . . that is not a single natural person . . . recognized as a legal authority having a distinct identity, a legal personality.”⁴⁵ The juridical person is also referred to as an artificial person or legal person.⁴⁶ In general, legal personality means that persons have the ability to obtain legal rights and duties within a legal system.⁴⁷ Both natural persons and artificial persons possess legal personality.⁴⁸

There are distinct differences and similarities between how the law treats natural persons versus artificial persons. Natural persons have biological and human markers such as birth, death, and reproduction, all of which, in turn, lead to separate rights such as parental and reproductive rights.⁴⁹ Additionally, natural persons are “embodied subjects,” subject to physical experiences like incarceration and in-person voting.⁵⁰ Legal persons lack these characteristics but are still extended many of the same rights that natural persons are afforded.⁵¹ For instance, legal persons retain the

⁴³ See *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013); see also *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223 (Fed. Cir. 1994).

⁴⁴ *Definition of Natural Person*, BLACK’S LAW DICTIONARY (2d. ed. 1910).

⁴⁵ *Definition of Juridical Person*, BLACK’S LAW DICTIONARY (2d. ed. 1910).

⁴⁶ *Id.*

⁴⁷ See Britta van Beers, *The Changing Nature of Law’s Natural Person: The Impact of Emerging Technologies on the Legal Concept of the Person*, 18 GERMAN L.J. 559, 559-61 (2017) (discussing that both natural persons and artificial persons bear legal rights and duties).

⁴⁸ See *id.*

⁴⁹ *Id.* at 563–64.

⁵⁰ *Id.* at 562.

⁵¹ *Id.* at 564 (“[T]he rights of artificial persons are expanding to include rights that were formerly attributed exclusively to natural persons.”).

right to enter into contracts, to sue or be sued, and to equal protection under the Fourteenth Amendment.⁵²

The Federal Circuit has exclusive jurisdiction over patent infringement appeals and has dealt with various cases involving contested inventorship.⁵³ In *Beech Aircraft Corp. v. EDO Corp.*, the court held that a corporation could not be declared an inventor because “only natural persons can be ‘inventors.’”⁵⁴ In several cases, the court reasoned that the Conception Requirement demands that inventors must be natural persons because only natural persons can manifest ideas of an invention sufficient to satisfy that element.⁵⁵ Pointing to the necessity of conception, the court in *Univ. of Utah* stated that “[t]o perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns.”⁵⁶ In sum, the modern jurisprudence of inventorship prohibits legal persons from obtaining inventorship.

Instead of leaning on the Conception Requirement, the court in *Beech* interpreted 35 U.S.C. §§ 115–118 to limit inventorship to natural persons.⁵⁷ However, on their face, these statutes contain no reference to natural persons.⁵⁸ 35 U.S.C. § 115 requires that a patent application: (1) name an inventor; and (2) have the inventor “execute an oath or declaration in connection with the application.”⁵⁹ 35 U.S.C. § 116 provides clarification on who can qualify as a joint inventor and permits amendments when an application contains an erroneous or missing inventor.⁶⁰ 35 U.S.C.

⁵² *Santa Clara Cnty. v. S. Pac. R.R. Co.*, 118 U.S. 394, 396 (1886) (highlighting Justice Waite’s statement that the Fourteenth Amendment gives equal protection of laws to all persons, even corporations).

⁵³ See *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013); see also *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993).

⁵⁴ *Beech Aircraft Corp.*, 990 F.2d at 1248 (referencing 35 U.S.C. §§ 115–118).

⁵⁵ *Univ. of Utah*, 734 F.3d at 1323. See *Burroughs Wellcome Co. v. Barr Lab’ys, Inc.*, 828 F. Supp. 1208, 1214 (E.D.N.C. 1993), *aff’d in part, vacated in part*, 40 F.3d 1223 (Fed. Cir. 1994).

⁵⁶ *Univ. of Utah*, 734 F.3d at 1323.

⁵⁷ *Beech Aircraft Corp.*, 990 F.2d at 1248.

⁵⁸ See 35 U.S.C. §§ 115–118 (2015).

⁵⁹ 35 U.S.C. § 115.

⁶⁰ 35 U.S.C. § 116.

§ 117 permits legal representation of “deceased inventors and those under legal incapacity” for patent applications.⁶¹ 35 U.S.C. § 118 permits filings by those other than inventors.⁶²

Virtually no cases have elaborated on the reading of these statutes to mean that inventorship is limited to natural persons. Subsequently, however, courts have emphasized the Conception Requirement to hold that legal persons cannot be inventors.⁶³ In *Florida Power & Light Company v. LIXI, Inc., et al.*, the court denied inventorship to a corporation stating that “it is well settled that ‘only natural persons can be inventors’ because only ‘individuals, not corporations create inventions.’”⁶⁴ In *Univ. of Utah*, the court held that “a State has no core sovereign interest in inventorship It is axiomatic that inventors are the individuals that conceive of the invention.”⁶⁵ After citing this Conception Requirement, the court held that conception can only be performed by natural persons, and therefore, no non-natural person can be an inventor.⁶⁶ These holdings have been used to deny inventorship to legal persons including corporations, states, the government, and now Artificial Intelligence.⁶⁷

II. THE DABUS APPLICATION AND USPTO DECISION

On January 20, 2020, Thaler petitioned for a reconsideration of the USPTO’s late December 2019 decision, in which the Office refused to vacate the Notice to File Missing Parts on Thaler’s

⁶¹ 35 U.S.C. § 117.

⁶² 35 U.S.C. § 118.

⁶³ See *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013) (distinguishing between patent ownership and patent inventorship and reasoning that because conception requires a mental act, “inventors must be natural persons and cannot be corporations or sovereigns”); see also *Fla. Power & Light Co. v. Lixi, Inc.*, No. 11-80847-Civ-Hopkins, 2012 WL 12868740, at *3 (S.D. Fla. July 12, 2012) (finding that a breach of contract claim accrued only upon the necessary assignment of rights by investors to a corporation).

⁶⁴ *Fla. Power & Light Co.*, at *8 n.5 (emphasis added).

⁶⁵ *Univ. of Utah*, 734 F.3d at 1323.

⁶⁶ *Id.*

⁶⁷ *USPTO Decision on Petition*, *supra* note 16, at 6.

Nonprovisional Application.⁶⁸ In particular, the Office flagged Thaler’s attached ADS—which listed DABUS as the sole inventor of the patent—as incomplete because it did not identify “each inventor by his or her legal name.”⁶⁹ In response, Thaler argued that he did identify the inventor because DABUS created the invention.⁷⁰ While most AI today are machine learning and generally require a human to interpret the results,⁷¹ the petitioner asserted that “DABUS” was “not created to solve any particular problem” and “recognized the novelty and salience” of the invention.⁷² Additionally, Thaler argued that inventorship should not be limited to natural persons and should extend to who or what actually invented the invention.⁷³ On April 22, 2020, the USPTO denied Thaler’s petition for reconsideration and rested its decision on the Conception and Natural Person Requirements.⁷⁴

A. *The USPTO’s Use of the Natural Person Requirement*

In response to the petitioner’s call to extend inventorship beyond natural persons, the USPTO said that both Title 35 of the United States Code and federal case law preclude such a broad interpretation.⁷⁵ Not only did it follow previous courts and read 35 U.S.C. § 100 and 35 U.S.C. §§ 115–118 to limit inventorship to natural persons, but the USPTO also read the language of 35 U.S.C. § 101, Title 37 of the Code of Federal Regulations (“CFR”) and the Manual of Patent Examining Procedure (“MPEP”) to imply the same limitation.⁷⁶ By including these statutes and regulations in its interpretation, the USPTO attempted to codify the Natural Person Requirement.

⁶⁸ *Id.* at 1–2.

⁶⁹ *Id.* at 3–4.

⁷⁰ *Id.*

⁷¹ Stephanie Skaff et al., *Artificial Intelligence Can’t Patent Inventions: So What?*, IP WATCHDOG (July 13, 2020), <https://www.ipwatchdog.com/2020/07/13/artificial-intelligence-cant-patent-inventions/id=123226/>.

⁷² *USPTO Decision on Petition*, *supra* note 16, at 4.

⁷³ *Id.*

⁷⁴ *Id.* at 8.

⁷⁵ *Id.* 6–7.

⁷⁶ *Id.*

Using Title 35 of the U.S.C., the USPTO argued the existence of the Natural Person Requirement. Specifically, the USPTO argued that the inclusion of the words “persons,” “individuals,” “whoever,” and “himself/herself” suggest that the statute only applies to natural persons. 35 U.S.C. § 115(a) requires that an inventor be listed on a claimed application:

An application for patent that is filed under section 111(a) or commences the national stage under section 371 shall include, or be amended to include, the name of the inventor for any invention claimed in the application. Except as otherwise provided in this section, each individual who is the inventor or a joint inventor of a claimed invention in an application for patent shall execute an oath or declaration in connection with the application.⁷⁷

Construing other provisions within the U.S.C., the USPTO determined that the term “inventor” in this section refers to natural persons.⁷⁸

The USPTO took the word “person” in several provisions of Title 35 of the U.S.C. to mean that AI machines are ineligible for inventor status.⁷⁹ Additionally, the USPTO highlighted the oath and declaration requirement of 35 U.S.C. § 115(a), which states that the inventor “shall execute an oath or declaration in connection with the application.”⁸⁰ Relying on 35 U.S.C. § 115(h)(1),⁸¹ the USPTO determined that this oath must be executed by a “person.”⁸² To further emphasize its point, the USPTO also pointed to “person” included in Title 37 of the CFR and the MPEP.⁸³ For example, 37 C.F.R. § 1.27(a)(1) states, “A *person*, as used in paragraph (c) of this section, means any *inventor* or other individual.”⁸⁴ In their

⁷⁷ 35 U.S.C. § 115(a).

⁷⁸ *USPTO Decision on Petition*, *supra* note 16, at 5.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.* at 4 (“[a]ny person making a statement required under this section may withdraw, replace, or otherwise correct the statement at any time” (quoting 35 U.S.C. § 115(h)(1))).

⁸² *Id.*

⁸³ *Id.* at 5.

⁸⁴ 37 C.F.R. § 1.27(a)(1) (emphasis added).

reading, USPTO has declared that the term “persons” inherently suggests only natural persons.⁸⁵

Additionally, the USPTO has interpreted the term “whoever” within 35 U.S.C. § 101 to suggest that an inventor must be a natural person.⁸⁶ 35 U.S.C. § 101 states, “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter . . . may obtain a patent therefore, subject to the conditions and requirements of this title.”⁸⁷ Citing Merriam Webster’s Collegiate Dictionary, the USPTO held that the term suggests a natural person without any further explanation.⁸⁸ To the USPTO, this term by itself also means that only natural persons are eligible to be inventorship.⁸⁹

Finally, the USPTO referred to the language in 35 U.S.C. § 115(b) referencing “individuals” and “himself” or “herself” to suggest that eligibility only extends to natural persons.⁹⁰ 35 U.S.C. § 115(b) states, “[a]n 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.”⁹¹ Without more within the statute to supplant this idea, the USPTO justifies limiting inventorship to natural persons with these terms and pronouns.

B. The USPTO’s Use of the Conception Requirement

Citing decisions by the U.S. Court of Appeals for the Federal Circuit, the USPTO further asserted in its denial of Thaler’s petition that an inventor must be a natural person because of the Conception Requirement.⁹² The USPTO cited *Univ. of Utah v. Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.*,⁹³ which found that a state could not be an inventor because invention requires

⁸⁵ *USPTO Decision on Petition*, *supra* note 16, at 4.

⁸⁶ *Id.* at 4.

⁸⁷ 35 U.S.C. § 101 (emphasis added).

⁸⁸ *USPTO Decision on Petition*, *supra* note 16, at 4.

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ 35 U.S.C. § 115(b) (emphasis added).

⁹² *USPTO Decision on Petition*, *supra* note 16, at 6.

⁹³ *Id.* at 4–5.

conception.⁹⁴ The court emphasized the mental act involved in conceiving the invention⁹⁵ and reasoned,

Conception is the touchstone of inventorship, the completion of the mental part of invention . . . Conception is complete only when the idea is so clearly defined in the inventor's mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.⁹⁶

In short, the court held that “[t]o perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns.”⁹⁷ Additionally, the USPTO cited the *Beech* decision, which held that a corporation could not be an inventor.⁹⁸ In *Beech*, the Federal Circuit pointed to the provisions in 35 U.S.C. §§ 115–118 to assert that “only natural persons can be ‘inventors.’”⁹⁹ The USPTO reasoned that by using terms referring to a mind and a mental act, the court intended that conception “must be performed by a natural person.”¹⁰⁰

The ideas of “conception” and “mental act” are also invoked in the MPEP, which defines “conception” as “the complete performance of the mental part of the inventive act.”¹⁰¹ Citing the manual, the USPTO argued in its denial against the petition that only a natural person can be an inventor.

Ultimately, the USPTO asserted that inventorship is limited to natural persons and the application submitted therefore did not “comply with 35 U.S.C. § 115(a).”¹⁰² In its decision, the USPTO

⁹⁴ *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013).

⁹⁵ *USPTO Decision on Petition*, *supra* note 16, at 5.

⁹⁶ *Univ. of Utah*, 734 F.3d at 1323 (quoting *Burroughs Wellcome Co. v. Barr Lab'ys.*, 40 F.3d 1123, 1227–28).

⁹⁷ *Id.*

⁹⁸ *USPTO Decision on Petition*, *supra* note 16 at 5 (citing *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993)).

⁹⁹ *Beech Aircraft Corp.*, 990 F.2d at 1248.

¹⁰⁰ *USPTO Decision on Petition*, *supra* note 16, at 6.

¹⁰¹ *Id.*

¹⁰² *Id.*

rejected all arguments raised by the petitioner.¹⁰³ First, the petitioner argued that finding any application incomplete when it lists an AI inventor would “compel an applicant to name a natural person even where the person does not meet the inventorship criteria.”¹⁰⁴ The USPTO rejected that concern because an application that lists a natural person who did not invent or discover the invention “would be in conflict with the patent statutes.”¹⁰⁵ With this justification, the USPTO effectively denied that AI could ever meet the Conception Requirement—ignoring DABUS’ capabilities. Next, Thaler asked the USPTO to consider that the European Patent Office (“EPO”) and the UK Intellectual Property Office (“UKIPO”) recognize that DABUS created the invention at issue—although both offices did not permit DABUS to be listed as the inventor.¹⁰⁶ In response, the USPTO distinguished U.S. patent laws from those enforced by the EPO and UKIPO.¹⁰⁷ Thaler then claimed that by “refusing to accept the naming of an AI system as an inventor, the USPTO set a further test for patentability that is not provided for in law, and contradicts the generally held principle that inventorship should not be a substantial condition for the grant of patents.”¹⁰⁸ The USPTO replied that inventorship “has long been a condition for patentability.”¹⁰⁹ Additionally, the USPTO cited the Leahy-Smith American Invents Act (“AIA”), codified at 35 U.S.C. §§ 101 and 115, which includes listing an incorrect inventor on a patent application as grounds for rejection.¹¹⁰ To Thaler’s argument that patents granted on the DABUS machine “implicitly legalized the process by which DABUS arrives at an invention,” the USPTO

¹⁰³ *Id.* at 7.

¹⁰⁴ *Id.* at 6.

¹⁰⁵ *Id.*

¹⁰⁶ Douglas Goldhush, *DABUS Denied: Only Natural Persons Can Be Named as Inventors on US Patents*, SQUIRE PATTON BOGGS (Apr. 28, 2020), https://www.iptechblog.com/2020/04/dabus-denied-only-natural-persons-can-be-named-as-inventors-on-us-patents/#_ftnref1 (The EPO’s rejection focused on the implications of granting inventorship, while the UKIPO’s focused on the lack of legislative history allowing AI to be inventors.).

¹⁰⁷ *USPTO Decision on Petition*, *supra* note 16, at 6.

¹⁰⁸ *Id.* at 7.

¹⁰⁹ *Id.*

¹¹⁰ *Id.* (citing 35 U.S.C. §§ 101, 115).

responded that granting a patent on an invention does not qualify the invention itself—in this case, DABUS—to be an inventor.¹¹¹ Finally, the USPTO dismissed Thaler’s policy concerns and found that the policy considerations do not trump the clear language of the patent statutes.¹¹²

III. REBUTTING THE NATURAL PERSON ARGUMENT

Simply put, the Natural Person argument asserts that the language in the United States Code, court decisions in the Federal Circuit, and language in the CFR and the MPEP limits inventorship to natural persons.¹¹³ These provisions contain the terms “whoever,” “individuals,” “himself,” “herself,” “oath or declaration,” and “person.”¹¹⁴ However, use of these terms in other cases and contexts¹¹⁵ warrants reconsideration of the USPTO’s limiting of their meaning.

In their decision on DABUS, the USPTO used language contained in the U.S.C., CFR, and the MPEP to limit the extension of inventorship rights to natural persons.¹¹⁶ However, several cases and statutes have demonstrated that constraining these terms to the USPTO’s interpretation is improper.¹¹⁷ First, the USPTO cites a collegiate dictionary to assert that “whoever” suggests a natural person.¹¹⁸ But a review of Title 1 of the U.S. Code shows that “the

¹¹¹ *USPTO Decision on Petition*, *supra* note 16, at 7 (citing 35 U.S.C. § 151).

¹¹² *Id.*

¹¹³ *Id.* at 5–6.

¹¹⁴ *Id.* at 4 (citing 35 U.S.C. §§ 101, 115(b), 115(h)(1)).

¹¹⁵ *See generally* *Gulf, C. & S.F. Ry. Co. v. Ellis*, 165 U.S. 150, 154 (1897) (noting that corporations, although artificial entities, are “persons” within the meaning of the Fourteenth Amendment); *Citizens United v. Fed. Election Comm’n*, 558 U.S. 310, 342–43 (2010) (noting that corporations are “individuals” within the meaning of the First Amendment); 1 U.S.C. § 1 (defining “person” and “whoever” to include “corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals” and oath to mean “affirmation”); U.S. CONST. amend. I; U.S. CONST. amend. XIV, § 1.

¹¹⁶ *USPTO Decision on Petition*, *supra* note 16, at 7.

¹¹⁷ *See, e.g., Gulf, C. & S.F. Ry. Co.*, 165 U.S. at 154; *Citizens United*, 558 U.S. at 342–43 (2010); 1 U.S.C. § 1.

¹¹⁸ *USPTO Decision on Petition*, *supra* note 16, at 4 (citing 32 U.S.C. §§ 101, 151).

words ‘person’ and ‘whoever’ include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals.”¹¹⁹ Because of this distinct line drawn between “artificial persons,” such as corporations and “natural persons,” this statute indicates that “whoever” does not strictly indicate natural persons and may also include legal persons, as well.¹²⁰

Additionally, the USPTO asserted that the use of the term “individuals” limits inventorship to natural persons.¹²¹ According to Black’s Law Dictionary, the term “individual” may not necessarily be limited to natural persons: “[a]s a noun, this term denotes a single person as distinguished from a group or class, and also, very commonly, a private or natural person as distinguished from a partnership, corporation or association; but it is said that this restrictive signification is *not necessarily inherent* in the word, and that it may, in proper cases, include artificial persons.”¹²² Attached to this definition are a string of cases that expand the use of “individual” beyond natural persons.¹²³ Therefore, the USPTO erroneously limited the meaning of a word that has not necessarily been interpreted to contain that limit.

The USPTO also noted the use of reflexive pronouns “himself” and “herself” to assert that the statute only applies to natural persons.¹²⁴ However, this limitation was most likely not the legislature’s intent. When 35 U.S.C. § 115 was first codified in 1952, it did not contain any feminine pronouns.¹²⁵ The term “himself” served as an identifier placeholder, used in the absence of more precise and inclusive language. Such language did not

¹¹⁹ 1 U.S.C. § 1.

¹²⁰ *See id.*

¹²¹ *USPTO Decision on Petition*, *supra* note 16, at 6.

¹²² *Individual*, BLACK’S LAW DICTIONARY (2d ed. 1910); *Corporation*, BLACK’S LAW DICTIONARY (2d ed. 1910) (emphasis added).

¹²³ *Id.*

¹²⁴ *USPTO Decision on Petition*, *supra* note 16, at 4 (citing 32 U.S.C. § 115(b)).

¹²⁵ 35 U.S.C. § 115 (1952) (at the time, this section of the statute stated, “[t]he applicant shall make oath that he believes himself to be the original and first inventor of the process, machine, manufacture, or composition of matter, or improvement thereof . . .”).

automatically mean that female inventors or other legal parties could not be listed as inventors. It wasn't until the statute was amended in 2011 that the female pronouns were added.¹²⁶ Given the antiquated language that enshrined American law with masculine pronouns¹²⁷ and the tardy push by Congress to include female pronouns and identifiers in the law,¹²⁸ it would be improper to assume that the intent behind the inclusion of "herself" was to limit inventorship to natural persons. Therefore, the USPTO's attempt to use these pronouns, without more, to promote the Natural Person Requirement was erroneous.

The USPTO further contends that "the inventor who executes an oath or declaration must be a 'person.'"¹²⁹ The USPTO also notes the use of the term "person" elsewhere in 35 U.S.C. and the CFR as a marker of ineligibility for DABUS' inventorship.¹³⁰ However, the word "person" does not necessarily imply "natural persons." As previously cited, 1 U.S.C. § 1 allows for the word "person" to "include corporations, companies, associations, firms, partnerships, societies, and joint stock companies . . ."¹³¹ Additionally, constitutional protections under the First and Fourteenth Amendments extend to corporations, even though the language within such amendments contain the terms "people" and "persons" respectively.¹³² Therefore, to read in "natural persons" from the word "person" alone, without citing the legislature's intent when drafting the patent statutes, erroneously assumes that "person" is restricted to natural persons.

Before the USPTO issued its opinion, the Natural Person Requirement was firmly established by the Federal Circuit, but that

¹²⁶ 35 U.S.C. § 115 (2011).

¹²⁷ Ben Zimmer, *Dealing With Gender in the Pronouns of Law and Public Life*, WALL ST. J. (July 31, 2020), <https://www.wsj.com/articles/dealing-with-gender-in-the-pronouns-of-law-and-public-life-11596213703>.

¹²⁸ See 1 U.S.C. § 1 (including definition of female pronouns).

¹²⁹ *USPTO Decision on Petition*, *supra* note 16, at 4.

¹³⁰ *Id.*

¹³¹ 1 U.S.C. § 1.

¹³² See U.S. CONST. amend. I; see also U.S. CONST. amend. XIV, § 1.

holding is rebuttable.¹³³ For instance, the court has used the definition of inventors under 35 U.S.C. § 100(f) to limit eligible inventors to natural persons.¹³⁴ However, that provision doesn't explicitly say that only natural persons can be inventors; rather, it explains that an inventor is "the individual . . . who invented or discovered the subject matter of the invention."¹³⁵ The term "individual" should not be read to automatically mean a natural person, because it has also been applied to mean an artificial person and there is no indication from the plain reading of the statute that it was intended to be understood this way.¹³⁶ Moreover, while the Federal Circuit has referred to its *Beech* holding several times to assert that inventors can only be natural persons,¹³⁷ *Beech's* holding only rests on the patent statutes, 35 U.S.C. §§ 115–118.¹³⁸ These patent statutes do not contain explicit language about limiting inventorship to natural persons.

Substantively, the statutes cited in *Beech* do not invalidate artificial persons—their requirements may be executed by a substitute. For example, the "inventor's oath or declaration" requirement of § 115 can be executed by a legal representative in extenuating circumstances.¹³⁹ Additionally, § 118 allows a patent to be filed by someone other than the patent owner.¹⁴⁰ Therefore, the actions required by these statutes do not necessarily make a legal person patent-ineligible, since the statutes allow for a third person to assist with the same requirements that an AI inventor would be unable to fulfill on its own. The court's reasoning in *Beech* failed to provide a thorough explanation for why the statutes necessarily

¹³³ See *Burroughs Wellcome Co. v. Barr Lab'ys., Inc.*, 40 F.3d 1223, 1232 (Fed. Cir. 1994); see also *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013).

¹³⁴ See *Burroughs Wellcome Co.*, 40 F.3d at 1232; see also *Univ. of Utah*, 734 F.3d at 1323.

¹³⁵ 35 U.S.C. § 100.

¹³⁶ *Individual*, BLACK'S LAW DICTIONARY (11th ed. 2019).

¹³⁷ See *Burroughs Wellcome Co.*, 40 F.3d at 1227–28; see also *Univ. of Utah*, 734 F.3d at 1323.

¹³⁸ *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 (Fed. Cir. 1993).

¹³⁹ 37 C.F.R. § 1.64.

¹⁴⁰ 35 U.S.C. § 118.

require inventors to be natural persons when the statutes also permit a legal representative to execute the application on behalf of the inventor.¹⁴¹

The court’s interpretation of the terms in §§ 115–118 can be rebutted. 35 U.S.C. § 115 contains the terms “individual,” “himself,” and “herself,” which, as Part III explained, have not been understood to strictly mean natural persons.¹⁴² 35 U.S.C. § 116 contains the terms “persons,” “he,” and “himself.” The term “he” is not so different from himself, and similar arguments can be made against it. 35 U.S.C. § 117 mentions “deceased inventors,” which could be used to argue that the inability for AI systems to die invalidates them, but this reasoning holds little weight.¹⁴³ 35 U.S.C. § 118 contains the term “person,” which, Part III also explained, does not inherently suggest natural persons.¹⁴⁴ Accordingly, the Natural Person Requirement that USPTO purports to underlie patent inventorship is not as inherent in the patent statutes as the USPTO suggests.

IV. REBUTTING THE CONCEPTION REQUIREMENT

The USPTO’s DABUS decision stressed the importance of inventors conceiving an invention.¹⁴⁵ In prior cases, the Federal Circuit used the Conception Requirement to invalidate a state’s and a corporation’s grant of inventorship.¹⁴⁶ For instance, in *Univ. of Utah*, the Federal Circuit stated that “[i]t is axiomatic that inventors are the individuals that conceive of the invention To perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns.”¹⁴⁷ Because the state was not “the individual . . . who invented or discovered the subject matter of the invention,”¹⁴⁸ it was ineligible to receive inventor credit. At the

¹⁴¹ See *Beech Aircraft Corp.*, 990 F.2d at 1248.

¹⁴² 35 U.S.C. § 115.

¹⁴³ 35 U.S.C. § 117.

¹⁴⁴ 35 U.S.C. § 118.

¹⁴⁵ *USPTO Decision on Petition*, *supra* note 16, at 5.

¹⁴⁶ *Id.*

¹⁴⁷ *Univ. of Utah v. Max-Planck-Gesellschaft Zur*, 734 F.3d 1315, 1323 (Fed. Cir. 2013).

¹⁴⁸ 35 U.S.C. § 100(f).

time, however, the Federal Circuit did not foresee that “creativity machines,” such as DABUS, would be able to “perform the mental act.”¹⁴⁹

DABUS is a particularly sophisticated type of AI and therefore should be able to satisfy the Conception Requirement, since it conceived the invention in its own mind.¹⁵⁰ Using artificial neural networks, similar to the biological neural networks that make up the human brain, DABUS is able to achieve brain-like functions.¹⁵¹ In general, creativity machines have at least two neural nets: an idea generator and a critic.¹⁵² The critic provides feedback to the generator in order to “‘steer’ its artificial ideation in the direction of useful, novel, or valuable notions.”¹⁵³ DABUS, however, is more advanced than typical creativity machines because it has “a swarm of many disconnected neural nets, each containing interrelated memories.”¹⁵⁴ These nets of memories constantly combine and detach with “a fraction of these nets [connecting] into structures representing complex concepts.”¹⁵⁵ Instead of the typical generative and critic nets, DABUS utilizes chaining structures that grow if the geometrically represented idea that results from the encounter between two nets “incorporates one or more desirable outcomes.”¹⁵⁶ These “concept chains” tend to connect with chains that represent the anticipated consequence of the concept.¹⁵⁷ If the geometrically represented idea does incorporate one or more desirable outcomes, then the shapes are reinforced and then converted into long term memories.¹⁵⁸ These ideas in long term memories can be “interrogated” for inventions and discoveries.¹⁵⁹ If the geometrically represented idea does not incorporate one or more desirable

¹⁴⁹ *DABUS Described*, IMAGINATION ENGINES INC., http://imagination-engines.com/iei_dabus.php#DABUI (last visited Oct. 3, 2021).

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

outcomes, then the geometry is weakened.¹⁶⁰ Thereafter, the structure fades with others replacing it, “in a manner reminiscent of what we humans consider stream of consciousness.”¹⁶¹

In order to identify ideas that represent desirable outcomes, DABUS employs novelty filters.¹⁶² These filters provide a means “to detect, isolate, and combine worthwhile ideas as they form.”¹⁶³ They do so by “absorb[ing] the status quo within any environment”—“a millisecond by millisecond virtual reality representation of the neural network chaining model”—and “emphasiz[ing] . . . departures” from the status quo.¹⁶⁴ Through this process, DABUS engages in the steps necessary to fulfill the Conception Requirement required for inventorship. Applying *Burroughs Wellcome Co.*, the patents in question in the DABUS action were formed in the “mind” of the inventor—DABUS—because “the idea [was] so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.”¹⁶⁵

The complex chaining structures that manifested the inventions in question were reinforced and isolated by DABUS in its own mind, allowing the ideas to grow and be saved in long term memories.¹⁶⁶ In order for the chaining structure to be reinforced, the idea must have been recognized by DABUS’ novelty filters as having some merit.¹⁶⁷ These filters continuously challenge and strengthen the idea until it is something substantial—as was the case with its patent on “Devices and Methods for Attracting Enhanced Attention.”¹⁶⁸ Therefore, it was clearly defined in DABUS’ mind and should pass the Conception Requirement.¹⁶⁹

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *Id.*

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223, 1227–28 (Fed. Cir. 1994).

¹⁶⁶ *DABUS Described*, *supra* note 149.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

V. THE NEED FOR AI INVENTORSHIP AND HOW TO GRANT IT

A. *Why Should We Allow AI Inventorship?*

Artificial Intelligence systems that conceive of an invention should be recognized as legal inventors. The patent system was created to promote advances in science and engineering by granting a limited monopoly to inventors.¹⁷⁰ With the continuing “exponential growth in computing power,” experts foresee that computers could “overtake human inventors as the primary source of new discoveries.”¹⁷¹ As AI technology, in particular, has improved, the machines that employ artificial neural networks have developed beneficial technology such as lane departure warning, automatic high-beam control, and pedestrian or vehicle detection.¹⁷² Allowing AI systems that conceive of an invention to be eligible inventors on patents will achieve this objective because it will prevent incorrect inventorship which, in turn, would increase innovation through the use of AI by allowing the grant of such patents, given all other patentability requirements are satisfied.

When AI systems are the sole inventors and are subsequently denied inventorship status, the patent filed is unenforceable and no patent protection is provided to the innovation. In short, “errors in inventorship can invalidate a patent.”¹⁷³ In its DABUS decision, the USPTO declared that all patents filed with AI machines as inventors are in error.¹⁷⁴ Because the AI is the only true inventor, these kinds of innovations have no chance of securing patent protection. This will likely open the door to legal and policy problems because AI usage has steadily grown in the past few decades.¹⁷⁵

¹⁷⁰ U.S. CONST. art. I, § 8, cl. 8.

¹⁷¹ Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079, 1079–80 (2016).

¹⁷² See Gordon Cooper, *The Evolution of Deep Learning for ADAS Applications*, SYNOPSISYS (Sept. 24, 2021), <https://www.synopsys.com/designware-ip/technical-bulletin/deep-learning-dwtb-q217.html>.

¹⁷³ Diane Sheiness & Karen Canady, *The Importance of Getting Inventorship Right*, 24 NATURE BIOTECH. 153, 153 (Feb. 2006).

¹⁷⁴ *USPTO Decision on Petition*, *supra* note 16, at 4.

¹⁷⁵ See Abbott, *supra* note 171 at 1079–80.

The current system would create a breeding ground for cancellations as applications that try to list a human as the inventor of an AI-conceived invention would not satisfy the standards demanded for the Conception Requirement. Therefore, many patents would be subject to cancellation proceedings. Imagine if Company *A* owns an AI machine that develops a new method for detecting cancer. Additionally, the AI system, like DABUS, was only trained with general information in the field of endeavor¹⁷⁶ and contains self-learning capabilities that allowed it to innovate the new method. In the interest of gaining protection on this invention and receiving a return on its investment in the AI system, Company *A* files a patent application naming the board member who proposed investing in the AI system and a scientist who checked on the AI system's findings as the inventors of the new cancer detection method in order to get the application through the patent office. Due to the lack of formal examination of the inventors listed on the patent application, the USPTO grants the patent to Company *A* with the Board Member and the Scientist listed as co-inventors.

Now imagine that Company *B* wants to use the cancer detection method but does not want to pay the costly licensing fees to Company *A*. If Company *B* learns that Company *A*'s invention was solely conceived by an AI system, it will be able to invalidate the patent by showing that Company *A*'s patent application did not list a correct inventor. Specifically, because Company *A* will be unable to prove that its listed inventors actually conceived of the invention and because the applicant did not file a request to correct inventorship under 37 C.F.R. § 1.48, the USPTO would "reject the claims under 35 U.S.C. 101 and 35 U.S.C. 115."¹⁷⁷ Invalidating the patent would allow Company *B* to freely use the cancer detection method without fear of suit from Company *A*. Thus, Company *A* would not be rewarded for its investment in its AI machine.

In short, this would provide a loophole for companies looking to use AI generated inventions without paying fees. Additionally, employees of a company with erroneous inventors listed on its patent applications would hold significant bargaining power over the company if said employees are privy to the errors in

¹⁷⁶ *USPTO Decision on Petition*, *supra* note 16, at 4.

¹⁷⁷ *See* MPEP, *supra* note 5.

inventorship. The current review process that presumes the listed inventor on a patent application to be correct is not designed to tackle the challenges of AI-developed inventions. Many approved patents would be unable to survive a closer review, thus providing little protection from infringers.

Under the current system, an AI that produces an invention will not be given any protection. Instead, the first person who discovers or recognizes the work of the machine could become its inventor despite contributing nothing to the innovative process.¹⁷⁸ This would allow many non-inventors to obtain credit, as “the first to person to recognize a patentable result might be an intern at a large research corporation or a visitor in someone’s home. A large number of individuals might also concurrently recognize a result if access to an AI is widespread.”¹⁷⁹ Such a holding goes against the requirements of conception and would allow a person that “does no more than exercise ordinary skill” to be rewarded, while “the innovator would not be.”¹⁸⁰ Without allowing AI systems to invent alone, this practice will only be encouraged.

Additionally, allowing the creator of the AI machine that conceives of an invention to be listed as an inventor would change the meaning of what it means to be an inventor. AI machines, like DABUS, consist of whole neural networks that are able to independently create an invention based on general information in the field of endeavor.¹⁸¹ This means that data provided to an AI machine, like DABUS, can potentially produce an invention across a wide spectrum of areas. Listing the creator of an AI machine as the inventor of the AI-conceived invention would give the creator inventorship credit in areas said creator never intended or had any type of skill or knowledge in. This completely defies the conception standards set forth in patent history that the invention be “so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice.”¹⁸² As a matter of

¹⁷⁸ *Id.* at 1103–04.

¹⁷⁹ *Id.*

¹⁸⁰ *Applegate v. Scherer*, 332 F.2d 571, 573 (C.C.P.A. 1964).

¹⁸¹ *USPTO Decision on Petition*, *supra* note 16, at 3–4.

¹⁸² *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994).

public policy, it would be far easier to allow the listing of AI machines as inventors, rather than changing the well-settled patent standards for invention, namely conception.

Naming the person who feeds specific data to an AI machine, like DABUS, as the inventor would similarly change the meaning of what it means to be the inventor. AI machines, like DABUS, need only general sets of data to potentially conceive of inventions.¹⁸³ Giving inventorship credit to someone who simply inputs data and gets a novel invention based on said data does not satisfy the history of patent inventorship, which requires a “specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan he hopes to pursue.”¹⁸⁴ However, there may be situations in which data sets are narrowly tailored towards achieving specific novel solutions, such that the invention has practically been discovered by the person supplying the data set. However, there would be difficulty drawing the line of when such a person tailored the data set enough to satisfy conception. This could potentially open the floodgates as those seeking to use the patented technology would assert the patent invalid by the erroneous listing of the inventor—an inquiry that would take resources to uncover.

If AI machine inventions are not afforded patent protection, their use will be discouraged in several industries. Although AI machines are not inherently “motivated to invent,” allowing AI machine inventorship would incentivize the development of machines that are capable of inventing.¹⁸⁵ Protecting the inventions created through AI machines would provide financial incentives that would counter the “resource intensive” process to develop this kind of software.¹⁸⁶ Without such incentives, the impetus to develop these AI systems would be weakened given “the logistical, fairness, and efficiency problems such a situation would create.”¹⁸⁷ In simpler terms, if inventorship credit can be obtained by someone who simply discovers the results of an AI system, then developing these systems would not be a safe investment.

¹⁸³ *USPTO Decision on Petition*, *supra* note 16, at 3–4.

¹⁸⁴ *Id.*

¹⁸⁵ *Abbott*, *supra* note 171 at 1098, 1104.

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

Systems such as DABUS, which employ internal neural networks to reinforce and train their own system to find better and more novel ideas, are even adept at conceiving inventions.¹⁸⁸ But if the inventions of these machines are not allowed patent protection because the patent lacks a named inventor—other than the machine itself—two notable problems would arise. First, if the patent applicant leaves out a name, then the patent would be denied and the invention would not receive patent protection. Second, if the patent applicant tries to bypass the inventor requirement by submitting the name of an erroneous or non-deserving inventor, then one who “does no more than exercise ordinary skill” would receive credit.¹⁸⁹ This flies in the face of the intention of the inventorship requirement. Under this current system, those with AI-conceived inventions are coerced to file applications with someone who did not actually conceive the invention or receive no protection at all.

Policy justifications for denying AI machines inventorship credit are unclear and at best weak. If the USPTO wanted to take the stance that DABUS inherently could not be a sole inventor because of data inputs by its programmer, then it should have made that argument. Instead, the USPTO made an absolute declaration that only natural persons can be listed as inventors.¹⁹⁰ This will lead to the inducement of filing erroneous inventors, the stalling of innovation of AI machines, and distrust in the patent system.

B. How Would AI Inventorship Work?

The USPTO decision on the DABUS application must be overturned. Specifically, the Office must recognize that DABUS’ neural nets allowed it to conceive of the invention, as required of any invention. Additionally, the Office must realize that its call for a natural person to be the inventor relies on two assumptions that contain errors. The first assumption is that the statutory language suggests only natural persons qualify. A closer reading of the language reveals that there is only a legal person requirement, not a

¹⁸⁸ See *The Recent Leap from Conscious to Sentient Machines*, IMAGINATION ENGINES INC. (Mar. 25, 2021), <http://www.imagination-engines.com/>.

¹⁸⁹ *Applegate v. Scherer*, 332 F.2d 571, 573 (C.C.P.A. 1964).

¹⁹⁰ *USPTO Decision on Petition*, *supra* note 16, at 5.

natural person requirement. The second assumption is that the Conception Requirement can only be fulfilled by natural persons and thus, inventorship is limited to natural persons. This assumption has only been challenged by non-applicable legal persons—corporations, government entities, and states—which cannot perform conception. AI machines, on the other hand, can arguably perform conception and can plausibly satisfy the Conception Requirement.

After the DABUS decision is overturned, the legal status of AI machines must be reviewed. Currently, AI machines have no legal status,¹⁹¹ however there are no legal barriers preventing AI machines from obtaining legal personhood.¹⁹² Any entity has legal status when it “has rights and obligations in accordance with law.”¹⁹³ Accordingly, “when a legal system confers legal rights and obligations on an entity,” that entity becomes a legal person.¹⁹⁴

The most familiar example of the legal person is a corporation.¹⁹⁵ Although the construction of personhood is fictional—for natural persons and legal persons—it is “intended to be acted upon as though it were a fact.”¹⁹⁶ Using this fictional construction allows for legal rights and obligations to be conferred onto corporations. As a result, corporations have certain rights and are subject to obligations (for example, contractual ones).¹⁹⁷ This legal personhood serves economic interests, and with such consideration, can be justified in having its personhood.¹⁹⁸

While granting all AI systems legal personhood may be a challenge—since AI systems can vary depending on their intended usage and functions¹⁹⁹—creativity machines that use their multiple

¹⁹¹ Roman Dremluga et al., *Criteria for Recognition of AI as a Legal Person*, 12 J. POL. & L. 105, 106 (2019).

¹⁹² *Id.*

¹⁹³ *Id.*

¹⁹⁴ Joanna J. Bryson et al., *Of, For, and By the People: The Legal Lacuna of Synthetic Persons*, 25 ARTIFICIAL INTELLIGENCE AND LAW. 273, 278 (2017).

¹⁹⁵ *Id.* at 278–79.

¹⁹⁶ See *Int'l Shoe Co. v. Washington*, 326 U.S. 310, 316 (1945).

¹⁹⁷ Bryson et al., *supra* note 194 at 279.

¹⁹⁸ *Id.*

¹⁹⁹ Christian E. Mammen et al., *Artificial Intelligence and Patent Law: What Happens After DABUS?*, NAT'L L. REV. (Aug. 13, 2020),

neural nets to develop structures representing complex thoughts, like DABUS, should be granted legal personhood in the interests of inventorship.

The reservations preventing this construction derive from the propensity to think of legal personhood from a human viewpoint.²⁰⁰ Observing legal personhood through a human lens has “le[[d] lawmakers to declare humans to be persons that are incapable of exercising rights or owing duties and refuse to declare nonhumans to be persons,” even if capable of exercising such rights and duties.²⁰¹ Using this humanistic model to shape our idea of personhood “becomes habitual, the forms grow rigid, the behavior patterns are fixed,” so much so that “to work out new forms and theories . . . would severely tax the ingenuity of the [legal] profession.”²⁰² This practice is felt throughout the legal landscape, as “we only confer personhood to nonnatural persons when it serves the interest of natural persons.”²⁰³

If the patent system continues to draw arbitrary requirements for personhood, which stem from our own ideas of a “person,” we prevent ourselves from appropriately regulating behavior. The legal personality of a natural person is as much of a fiction as the legal personality of artificial persons.²⁰⁴ Both attributes of personality are mere creations of a jurist’s mind.²⁰⁵ Such a legal fiction allows the jurist to form “logical coherence to his thought.”²⁰⁶ However, drawing certain restrictions around the fiction of personhood is to make the construction a “master rather than a servant.”²⁰⁷ In other words, finding that “a corporation is a legal person for some purposes” and therefore, that it must “be a legal person for all

<https://www.natlawreview.com/article/artificial-intelligence-and-patent-law-what-happens-after-dabus>.

²⁰⁰ Alexis Dyschkant, *Legal Personhood: How We Are Getting It Wrong*, 2015 U. ILL. L. REV. 2075, 2078 (2015).

²⁰¹ *Id.* at 2080.

²⁰² *Id.*

²⁰³ *Id.* at 2079–80.

²⁰⁴ Bryant Smith, *Legal Personality*, 37 YALE L.J. 283, 293 (1928).

²⁰⁵ WESTEL W. WILLOUGHBY, *THE FUNDAMENTAL CONCEPTS OF PUBLIC LAW* 34 (1924).

²⁰⁶ *Id.*

²⁰⁷ Smith, *supra* note 204, at 298.

purposes” is “to decide legal questions on irrelevant considerations without inquiry into their merits.”²⁰⁸ The purpose of legal personhood is to regulate behavior.²⁰⁹ If a ship becomes a legal person—as one has in the past²¹⁰—it is because it has been decided that “its personality is an effective instrument to control in certain particulars the conducts of its owner or of other human beings.”²¹¹ In general, deciding that all legal persons must conform within similar confines is to attach absolute value to a fictional concept. Allowing legal personality to serve, rather than be served, means to allow personhood to extend to boundaries beyond its current scope.

With respect to AI machines, legal personhood should be employed to serve our interests. This does not come from a desire for social recognition in order to achieve protection over a being’s legal interests, as it does in the form of animal rights.²¹² The legal rights for AI are more similar to the way that corporations’ status as legal persons is derived from the “benefits of local societies, society, or humanity as a whole.”²¹³ In order to serve the impending needs surrounding the field of AI, legal personhood must be granted to AI. In particular, AI machines that conceive inventions should be granted a limited legal personhood that allows them to receive inventorship credit to patents. There would be no further rights conferred to the AI, only those to extent that allow it to be listed on patent applications as the sole inventor or a co-inventor. In other words, the AI machine would not be the assignee—the person who has an ownership interest in the legal rights a patent grants.

Granting AI machines legal personhood status likely will not resolve all the complications of AI inventorship. Questions remain about how AI machines would navigate the legal landscape of patents—such as how, if at all, AI machines could apply for patents, own property, or pursue legal action in the case of infringement. The considerations are far-reaching, and only more questions will arise given the novelty of the situation. Before AI machines obtain more

²⁰⁸ *Id.*

²⁰⁹ *Id.* at 296.

²¹⁰ *Tucker v. Alexandroff*, 183 U.S. 424, 438 (1902).

²¹¹ *Smith*, *supra* note 204, at 296.

²¹² *Roman Dreliuga et al.*, *supra* note 191, at 111 (discussing the socioeconomic necessity of corporate personhood).

²¹³ *Id.* (discussing the socioeconomic necessity of corporate personhood).

sentience, the law of legal incapacity can be applied to AI inventors to extend certain legal rights for patent purposes that would be limited in scope.²¹⁴

Black's Law Dictionary defines "legally incapacitated" as "an impairment or mental or physical deficiency which makes one unable to participate in court proceedings or to form a legally binding agreement. A person who lacks capacity does not possess the ability to make rational decisions."²¹⁵ In other words, a legally incapacitated person is unable "both to understand information relevant to making a decision and to understand the potential consequences of making—or not making—that decision."²¹⁶ One of the most common causes of legal incapacitation for humans is dementia.²¹⁷ In the case of dementia, its effects—severe memory loss, confusion, and the inability to perform tasks independently—call for legal incapacity.²¹⁸ The inability of these persons to exercise their rights does not eliminate all of his or her rights under the Fourteenth Amendment.²¹⁹ Therefore, a legally incapacitated person is still considered a legal person, because they retain some legal rights. Accordingly, AI machines should be classified as legally incapacitated legal persons.

Title 35 of U.S.C. § 117 states that "[l]egal representatives of deceased inventors and of those under legal incapacity may make application for patent upon compliance with the requirements and on the same terms and conditions applicable to the inventor."²²⁰ In addition, 37 C.F.R. § 1.43 allows for the legal representative to make the oath or declaration required in a patent application on behalf of

²¹⁴ *Legally Incapacitated*, BLACK'S LAW DICTIONARY (2d ed. 1910).

²¹⁵ *Id.*

²¹⁶ Kristin Booth Glen, *Changing Paradigms: Mental Capacity, Legal Capacity, Guardianship, and Beyond*, 44 COLUM. HUM. RTS. L. REV. 93, 94 (2012).

²¹⁷ *Understanding Legal Incapacity and How It is Determined*, INDIGO FAM. L., <https://indigofamilylaw.com/understanding-legal-incapacity-and-how-it-is-determined-2/> (last visited Nov. 8, 2020).

²¹⁸ *Id.*

²¹⁹ *Cruzan v. Missouri*, 497 U.S. 261, 280–82 (1990) (emphasizing the state's interest in preserving life of legal persons).

²²⁰ 35 U.S.C. § 117.

the legally incapacitated.²²¹ If AI machines are considered legally incapacitated legal persons, their representatives will be able to file a patent and make an oath or declaration on its behalf. This circumvents the raised objections by the USPTO on DABUS' inability to make an oath or declaration.

There is still a question as to who would serve as the legal representative of AI machines. Legal representatives are those “who represent[] or stand[] in the place of another under authority recognized by law especially with respect to the other’s property or interests.”²²² For example, a legal representative of a legally incapacitated adult is granted the authority to make health care decisions on behalf of the individual.²²³ In general, to become a legal representative of a person who lacks legal capacity, one must petition the local probate court.²²⁴ This petition demonstrates that the person is mentally incapacitated and, if granted, appoints a guardian.²²⁵ However, this process should not necessarily be required for AI machines in the limited legal capacity argued for in this Note. Instead, when AI machines are given legal personhood, they should by default be deemed legally incapacitated, effectively narrowing the scope of rights legally conferred. The owner of the AI machine should automatically become the legal representative of the AI machine when it obtains legal personhood. Since the owner of the AI machine becomes the legal representative of the AI machine, they would be allowed to file a substitute statement in lieu of an oath or declaration under 37 C.F.R. § 1.64.²²⁶ Additionally, the owner of the AI machine should automatically become the assignee over the

²²¹ 37 C.F.R. § 1.43 (2018).

²²² *Legal Representative*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/legal/legal%20representative> (last visited Nov. 8, 2020).

²²³ U.S. DEP’T OF HEALTH AND HUM. SERVS., PERS. REPRESENTATIVES: 45 C.F.R. 164.502(G), <https://www.hhs.gov/hipaa/for-professionals/privacy/guidance/personal-representatives/index.html> (last visited Nov. 8, 2020).

²²⁴ Jim Treebold, *How to Legally Declare Someone as Mentally Incompetent?*, ENCYCLOPEDIA.COM (June 12, 2018), <https://www.encyclopedia.com/articles/how-to-legally-declare-someone-as-mentally-incompetent/>.

²²⁵ *Id.*

²²⁶ 37 C.F.R. § 1.64 (2018).

patent of the invention. This would mean that the owner of the AI receives all the protective rights conferred upon the award of a patent.

Legal personhood status should be conferred onto an AI when it has sufficiently conceived an invention. In other words, when an AI machine invents something that the owner of the AI machine files a patent for, the machine's legal personhood status becomes subject to review. The proposed fact finder would be the USPTO. If the USPTO finds that the AI machine sufficiently conceived of the invention such that is patent worthy, then legal personhood should be conferred upon the AI machine. This would involve changing the prerequisite to inventorship by the USPTO: if an AI machine is listed as an inventor, the patent should be scrutinized to see if there was sufficient conception by the AI machine before the patent is rejected. If there is sufficient conception, then the AI machine's legal status should be permitted. Therefore, the status of personhood for AI machines would be governed by the patent system—the very same system that denied personhood in the first case.

CONCLUSION

AI machines like DABUS should receive inventor credit on inventions they conceive. Policy considerations—such as the expected increase of improper naming of inventors if these AI machines are not allowed to be listed—and the continued development and use of these technologies—and thus, AI-created inventions—demand it so. The USPTO and federal courts would be ill-equipped to deal with the impending implications and costly litigation involving AI-created inventions if the correct inventor—an AI system—was not allowed to be credited. Additionally, allowing DABUS and similar AI machines to be rewarded with a patent from its invention would serve the original intention of the patent statutes.²²⁷ The first codified patent statutes in 1952 held that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition . . . may obtain a patent.”²²⁸ Although, the statute was a rudimentary version of patent law, the

²²⁷ See 35 U.S.C. § 101 (1952).

²²⁸ *Id.*

underlying idea was to reward the patent to whoever actually came up with it. Modern jurisprudence has refined this to require conception by the inventor, obtained when “the idea is so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.”²²⁹

AI machines such as DABUS that contain filters, which challenge and strengthen the idea until it is novel, satisfy this Conception Requirement.²³⁰ In the interests of the integrity of the patent system, inventorship should be satisfied by this condition alone. However, the Federal Circuit and USPTO have set a prerequisite of natural person status to qualify for patents.²³¹ This requirement was implemented based on the language of provisions of the Title 35 of the U.S.C.²³² However, nothing inherent in the language of these patent statutes mandates that inventors be natural persons. In fact, the terms of this language have been used to apply to several legal/artificial persons.²³³ Instead of the Natural Person Requirement, the USPTO and the Federal Circuit must recognize a Legal Person Requirement. In other words, inventorship should be extended to any entity that conceived of the invention and has status as a legal person.

Thus, in order for AI machines to be eligible for inventorship on patents, their legal status must be recognized. Historically, legal status has been conferred onto non-natural persons in order to serve the human interests.²³⁴ The recognition of the proper inventor or inventors on a patent is a sufficient interest to protect the validity and belief in the patent system. Additionally, the consequences of not adopting such a practice would null the enforceability of many patents. Therefore, it is critical that AI machines that conceive inventions are granted legal status. Finally, in order to handle and bypass the complications of these AI machines’ lack of cognitive

²²⁹ *Burroughs Wellcome Co. v. Barr Lab’ys., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994).

²³⁰ *See IMAGINATION ENGINES INC.*, *supra* note 188.

²³¹ *USPTO Decision on Petition*, *supra* note 16, at 5.

²³² *Id.*

²³³ *See Santa Clara Cnty. v. S. Pac. R.R. Co.*, 118 U.S. 394 (1886); *see also McCutcheon v. FEC*, 572 U.S. 185 (2014).

²³⁴ *Smith*, *supra* note 204, at 296.

sentience—such as the ability to give a signature name or make an oath or declaration as required by 37 C.F.R. § 1.64²³⁵—these machines should be declared legally incapacitated persons. This would give AI machines the legal status to be listed as inventors while allowing legal representatives to file and fill a patent application on their behalf. Recognizing DABUS and similar AI machines would change the landscape of the patent system forever, but this step forward is necessary.

²³⁵ 37 C.F.R. § 1.64 (2018).