Can an AI system be named the inventor? In wake of EDVA decision, questions remain

AI OUTLOOK

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Federal statutes and regulations that currently govern how the US Patent and Trademark Office processes applications – namely 35 U.S.C. § 115(a) regarding the inventor's oath – have not kept pace with technology. The original statute governing inventorship, for example, was enacted in 1952.

Artificial intelligence is notable among the new technologies posing fundamental questions about the viability of the inventor's oath. Congress could eventually determine that AI-invented inventions should be patentable, and if so, Congress would need to intervene and propose legislation to include AI as an inventor under the patent laws. Globally, we are seeing a variety of approaches to this fundamental question.

Earlier this month, the Eastern District of Virginia issued the first court opinion in this country addressing whether an AI system can be named as an inventor on a patent.[1] In *Thaler v. Iancu*, the court found that an AI system cannot be named as an inventor on a patent. An inventor, it held, must be a natural person.

The Eastern District of Virginia opinion has added to the cross-border divide on this emergent issue. The opinion is consistent with decisions from the US Patent and Trademark Office, as well as the European Patent Office and the UK's

Intellectual Property Office – but it stands in contrast to decisions from Australia and South Africa, which have both recognized AI systems as inventors. In jurisdictions that have declined to recognize inventorship rights for AI systems, the question remains: who, if not AI, can be properly named as an inventor?

Is DABUS an inventor?

At the heart of this world-wide legal debate is Stephen Thaler, a scientist and inventor, who submitted patent applications in various countries naming as an inventor "DABUS" – an AI system he developed. DABUS, which stands for Device for the Autonomous Bootstrapping of Unified Sentience, is a neural network designed to create and assess novel ideas, including a fractal-based design for food container and method for controlling lights used in a warning system. The USPTO had not been persuaded by arguments that DABUS should be listed as the sole inventor.[2] During prosecution of Application No. 16/524,350, the USPTO issued a Notice to File Missing Parts requiring identification of the inventor. It argued that the law required the inventor to be an individual, citing to a series of decisions finding that only natural persons can be inventors.[3]

Thaler brought suit against the UPSTO in the Eastern District of Virginia, seeking (1) an order compelling Defendants to reinstate the Applications and vacate the prior decision on the petitions filed under 37 CFR 1.181; (2) a declaration that a patent application for an AI-generated invention should not be rejected on the basis that no natural person is identified as an inventor; and (3) a declaration that a patent application for an AI-generated invention should list an AI where the AI has met inventorship criteria.[4]

His complaint alleged that "there is no natural person who meets inventorship criteria and there has been no suggestion by USPTO to the contrary" "[t]herefore, under the Decision's holding, there is no way to remedy the Notices to File Missing Parts and no way to successfully file for patent protection for an AI-generated invention."[5] Thaler further alleged that under the USPTO's decisions "AI-generated inventions will enter the public domain once disclosed" which "is undesirable both as a matter of innovation policy and because there is no evidence that Congress intended to prohibit patents on AI-generated inventions."[6]

Both parties filed early cross-motions for summary judgment.[7] On September 2, 2021, the court issued its decision agreeing with the USPTO and declining to extend inventorship to DABUS.[8] The court found that the plain language of the statute controls and requires a human inventor, as upheld by Federal Circuit case law.[9] The court noted that Thaler's argument was predicated on policy considerations and the purpose of the Patent Clause of the Constitution, and that the decision to expand the scope of inventorship lies with Congress.[10] Thaler is planning to file an appeal with the Federal Circuit.

When AI is involved in the invention process, what does the law say?

The lag between technological developments in artificial intelligence (AI) and the law that governs it is growing as the pace of AI adoption increases. In patent law, open questions have evolved from whether AI is itself patentable to questions surrounding inventorship where AI is involved in the development of an invention. Inventorship is a key inquiry in patent law, as an inventor owns the patent unless and until the inventor assigns the patent to another entity.[11]

AI, an invention itself, is now being used to develop new patentable inventions, notably in the pharmaceutical industry, where it is being used both to discover new drugs and repurpose existing drugs.[12] Two main questions about inventorship arise when AI is involved in the invention process: is AI itself an inventor under current patent law? And who is the proper inventor if not AI itself?

To date, the first question has also been addressed by several patent offices around the world, with varied outcomes. The EPO, IPO, and USPTO have all declined to extend inventorship to AI. Common across these rejections is the requirement that inventors be natural persons. All of these decisions have been issued in response to Thaler's DABUS AI system.

The EPO refused two such applications, finding that an inventor designated in the application has to be a human being, not a machine.[13] In its decision, the EPO noted that there appears to be an internationally applicable standard that the understanding of the term *inventor* refers to a natural person, and that numerous courts have issued decisions consistent with this understanding.[14] These decisions were appealed, and the EPO Board of Appeal issued two preliminary communications on June 21, 2021 agreeing with the EPO's decisions, stating that, under Article 60 of the European Patent Convention (EPC), an inventor on a patent application must have "legal capacity," meaning the "ability, according

to a source of law, to be the subject of rights and duties," as governed by national law. [15]

Similarly, the UK IPO rejected the applicant's argument that DABUS was the properly named inventor as an "inventor and person . . . are one and the same, namely a natural person – a human and not an AI machine."[16] This decision was upheld on appeal.[17]

In contrast to the EPO and UK IPO decisions, the Federal Court of Australia held in July 2021 that DABUS could be an inventor under Australia's Patents Act. The court reasoned that under the Australian act an inventor is an agent, which could include artificial intelligence systems, and the conclusion was consistent with "the reality in terms of many otherwise patentable inventions where it cannot sensibly be said that a human is the inventor," and nothing in the act dictated otherwise.[18]

Similarly, South Africa's Companies and Intellectual Property Commission granted a patent titled "FOOD CONTAINER AND DEVICES AND METHODS FOR ATTRACTING ENHANCED ATTENTION" which lists as an inventor "DABUS," noting "[t]he invention was autonomously generated by an artificial intelligence." [19] The Australian and South African decisions are likely to be appealed.

So who gets the credit?

While it appears to be fairly established that AI cannot itself be listed as a named inventor under the current statutory scheme in the United States, the question of who, if anyone, can take credit for AI's inventions remains unanswered. [20] In rejecting DABUS as an inventor, the USPTO noted that it had not made any determination concerning who or what created the invention claimed in the application. This seems to allow room for an individual to take the credit.

In some instances, AI has allegedly generated inventions that resulted in patents, but the AI's developer's listed themselves as the sole inventors.[21] For example, the Creativity Machine, which Thaler had disclosed in 1994, generated novel ideas through the use of a neural network; it was itself the subject of a patent.[22] Thaler was listed as the inventor of a subsequent patent,[23] the subject matter of which he claims was invented by the Creativity Machine.[24] The Creativity Machine's role was not disclosed to the PTO.

Similarly, John Koza's Invention Machine was allegedly responsible for inventing the subject matter of US Patent No. 6,847,851, which was not disclosed to the USPTO.[25] Ironically, Thaler's complaint in his pending District Court case cautions that "future patent applicants may attempt to circumvent the new standard by inaccurately listing a natural person who does not meet inventorship criteria."[26] Per his complaint, Thaler claimed that he "is in the business of developing advanced AI systems that are capable of generating patentable output in the absence of a person who otherwise meets inventorship criteria."[27] He also noted that if he listed himself as inventor – which he had done before and remained silent on in his complaint – "he would have two issued patents or be well on his way to that outcome" which "would be an undesirable outcome because it would involve misrepresentations and individuals claiming credit for work they did not perform."[28]

Thaler's silence on his "inventorship" for his previous AI-developed patents may be attributed to the severe civil and criminal penalties he cites in his complaint for fraudulently listing an inventor: it is grounds for rejection under 35 U.S.C. Sections 101 and 35 U.S.C. 115, and deliberately misreporting inventorship may result in criminal punishment under 18 U.S.C. Section 1001.[29]

In the United States, "[t]he threshold question in determining inventorship is who conceived the invention." [30] "Unless a person contributes to the conception of the invention, he is not an inventor. … Insofar as defining an inventor is concerned, reduction to practice, per se, is irrelevant."[31] Though "it is not essential for the inventor to be personally involved in carrying out process steps…where implementation of those steps does not require the exercise of inventive skill."[32]

The type of AI may be determinative of inventorship. The USPTO's 2020 AI report notes that many comments addressed the fact that there is no universally recognized definition of AI.[33] Currently available narrow AI systems are designed to perform well-defined tasks, in contrast to artificial general intelligence that has the capacity to learn and perform tasks more like the human mind. Narrow AI systems still require input and training.[34] Who, then, is the proper inventor where narrow AI is involved? Is it the computer programmer, the owner of the data sets that "teach" AI, or the lab scientist looking for the new pharmaceutical compound or drug target? Patent offices and courts have not yet addressed this question.

A parallel example

A parallel can be drawn between the use of narrow AI and therapeutic antibody discovery. In AI drug discovery, AI helps identify compounds, but human input is still required to test the compounds in vitro.[35] Similarly, in therapeutic antibody discovery, animals or cells are infected with an antigen to induce an immune response and generate antibodies, which are then tested and optimized by research scientists.[36] There is no question that antibodies have routinely been patented, and the research scientists who discover them are the named inventors on those patents. There has been no attempt to date to confer inventorship on an animal or cell line involved in the antibody discovery process.

A similar approach could be followed in AI drug discovery, whereby the scientists involved in the final steps of the process are the inventors. While others are involved in developing and training the AI, they do not have a direct role in developing the end drug. "Conception is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice."[37] Those who develop and train the AI do not have an idea as to what the complete and operative drug will be. And those involved in the process of testing compounds identified by AI may not have a hand in the development and training of the AI involved. Inventorship is dependent on the claimed invention. Several inventions may arise, from the AI itself to the drugs identified.

As AI becomes more common, and as general AI becomes a reality, perhaps patent offices around the world will confer inventorship status on AI. For now, natural persons will need to take credit for AI-generated and AI-assisted inventions or risk a finding that their application does not comply with 35 U.S.C. § 115(a).

An open question for Congress

Just who those natural persons should be is an open question remaining for the Congress. Allowing AI to be named as an inventor is not without risk to the litigation process and ought to be carefully considered should Congress wish to expand the scope of inventorship.

For example, when applying for a patent, inventors have a duty to disclose to the USPTO all information known to that individual to be material to patentability. Who would be liable for inequitable conduct if, during prosecution, disclosures were omitted? Unlike a human inventor who can be deposed in connection to a proceeding involving the patent, how would the patent's future challengers be able to discern what art was available to the AI system at the time of the invention? Perhaps artificial general intelligence will advance to a point that these concerns will be mitigated by the time Congress addresses AI inventorship. Until then, the courts and PTO will have to continue to define the contours of inventorship under the existing statutory scheme.

Learn more about the implications of the cross-border divide on this emerging issue by contacting any of the authors.

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[1] *Thaler v. Iancu, et al*., 1:20-cv-00903 D.I. 33 (E.D. Va. April 6, 2021).

[2] 16/524,350, Decision on Petition (July 29, 2019).

[3] *Beech Aircraft Corp. v. EDO Corp.,* 990 F.2d 1237, 1248 (Fed. Cir. 1993) ("only natural persons can be 'inventors'"), *Burroughs Wellcome Co. v. Barr Labs., Inc*., 40 F.3d 1223, 1227-28 (Fed. Cir. 1994) (finding that conception is a "mental act" that must be performed by a natural person), *Univ. of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften*, 734 F.3d 1315 (2013) ("It is axiomatic that inventors are the individuals that conceive of the invention."); *see also* MPEP § 2109.

[4] *Thaler v. Iancu, et al*., 1:20-cv-00903 D.I. 1 (E.D. Va. Aug. 6, 2020).

[5] *Id.* para. 36-37.

[6] *Id.* para. 38.

[7] *Thaler v. Iancu, et al*., 1:20-cv-00903 D.I. 32 (E.D. Va. April 6, 2021).

[8] *Id.* at D.I. 33 (E.D. Va. September 2, 2021).

[9] *Id.* at 9-14.

[10] *Id.* at 14-15, 17-18.

[11] MPEP § 301 (citing *Beech Aircraft Corp. v. EDO Corp*., 990 F.2d 1237, 1248 (Fed. Cir. 1993)); 37 C.F.R. § 3.73(a).

[12] Freedman, David H., *Hunting for New Drugs with AI,* Nature 576, S49-S53 (2019) [doi: https://doi.org/10.1038/d41586-019-03846-0]

[13] https://www.epo.org/news-events/news/2019/20191220.html

[14] https://www.epo.org/news-events/news/2020/20200128.html

[15] *See* EP3564144, F3305 Communication of the Board of Appeal (ex parte/ inter partes) (June 21, 2021); EP3563896, F3305 Communication of the Board of Appeal (ex parte/ inter partes) (June 21, 2021).

[16] UKIPO Decision: BL O/741/19, Appeal No: CH-2019-000339

[17] Thaler v The Comptroller-General of Patents, Designs And Trade Marks [2020] EWHC 2412 (Pat)

[18] Thaler v Commissioner of Patents [2021] FCA 879, Federal Court of Australia, July 30, 2021.

[19] ZA 2021/03242

[20] 16/524,350, Decision on Petition (July 29, 2019).

[21] http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf

[22] U.S. Patent No. 5,659,666 (filed Oct. 13, 1994).

[23] U.S. Patent No. 5,852,815 (filed May 15, 1998).

[24] http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf

[25] https://www.popsci.com/scitech/article/2006-04/john-koza-has-built-invention-machine/

[26] *Thaler v. Iancu, et al*., 1:20-cv-00903 D.I. 1 (E.D. Va. Aug. 6, 2020) at para. 38.

[27] *Id.* at para. 13.

[28] *Id.* at para. 39.

[29] *Id. See also* MPEP Section 602.

[30] Fiers v. Revel, 984 F.2d 1164, 1168, 25 USPQ2d 1601, 1604-05 (Fed. Cir. 1993); *see also* MPEP § 2109.

[31] *Id.*

[32] Fritsch v. Lin, 21 USPQ2d 1737, 1739 (Bd. Pat. App. & Inter. 1991) (The inventor "took no part in developing the procedures…for expressing the EPO gene in mammalian host cells and isolating the resulting EPO product."); *see also In re DeBaun*, 687 F.2d 459, 463, 214 USPQ 933, 936 (CCPA 1982) ("there is no requirement that the inventor be the one to reduce the invention to practice so long as the reduction to practice was done on his behalf").

[33] https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf

[34] https://bdtechtalks.com/2020/04/09/what-is-narrow-artificial-intelligence-ani/

[35] Freedman, David H., *Hunting for New Drugs with AI,* Nature 576, S49-S53 (2019) [doi: https://doi.org/10.1038/d41586-019-03846-0]

[36] https://www.genscript.com/antibody-drug-development-news/microbial-expression-in-antibody-discovery.html

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

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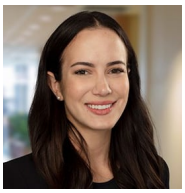

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