— PERSPECTIVE —

Can the US Patent and Trademark Office handle 'artificial inventors'?

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The U.S. Constitution provides the basis for patent law. The founders recognized the importance of patents and copyrights "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." U.S. Constitution, Article I, Section 8, Clause 8. Congress pointed out the policy and objective of the patent system is "to promote the commercialization and public availability of inventions made in the United States by United States industry and labor." 35 U.S.C. Section 200.

Over the past 230 years, patent law has adapted to accommodate new types of technology. The adaptations can be slow, inconsistent, and/or unpredictable, as seen recently with inventions based on computer software. Artificial intelligence creates new issues, and strains the limits of current U.S. patent law. In this note, we (i) identify some of the issues created by AI, (ii) identify some of the issues that are handled well under current U.S. patent law, (iii) propose some changes to patent law to handle inventions where AI is an "inventor," and (iv) point out some aspects of AI inventors that require more investigation.

Artificial intelligence technologies are flourishing throughout the world. Forbes listed the 10 hottest AI technologies, which include natural language generation, speech recognition, virtual agents, machine learning platforms, AI-optimized hardware, decision management, deep learning platforms, biometrics, robotic process automation, and text analytics and natural language processing. Some of these technologies apply directly to people in daily life (e.g., recommendation systems or targeted advertising provided by retailers, speech recognition, and natural language interfaces), some of these technologies are used primarily in industry (e.g., industrial automation), and some of these technologies are under development (e.g., autonomous vehicles). Many corporations are investing heavily in some of these technologies, launching AI-based products (e.g., Amazon's Alexa) and service platforms (IBM's Watson Assistant, Microsoft's Cognitive Services, and Google's Cloud AI services).

Currently, AI is used mostly as a tool, and the U.S. Patent and Trademark Office is able to address this scenario under existing patent law. Human inventors design systems where AI performs some of the tasks. For assessing patentability of a proposed invention, patent examiners look at what the human inventors created, and do not give "bonus points" for utilizing AI tools. Because the AI tools are relatively well-developed at this point, they do not contribute to inventiveness, even if the AI aspects are technically the most sophisticated part of the invention. This is analogous to taking old inventions and implementing them on a computer. Unless the implementation on the computer adds something that is technically novel and non-obvious, just adding "computer-implemented" to patent claims is not enough to be patentable. In the same way, applying AI to one or more steps of an existing process does not create a patentable invention.

To establish a patentable invention, patent practitioners can focus on the non-AI aspects of a new process. As we have explained in presentations, patent claims for inventions that use machine learning should focus on the overall process involved in an AI solution. The overall process includes (i) selecting the appropriate raw data that is used by the AI engine, (ii) preprocessing the input data to create unique features used by the AI engine, and (iii) performing novel tasks according to the output of AI engine.

However, U.S. patent law does not support inventions where AI is an "inventor" rather than a "tool." This is similar to U.S. copyright law, where courts had to address whether a monkey owned a copyright for a "selfie" that the monkey took. The Copyright Office pointed out that "only works created by a human can be copyrighted under United States law, which excludes photographs and artwork created by animals or by machines without human intervention" and that the "Office will not register works produced by nature, animals, or plants." *See* 2017 Compendium of U.S. Copyright Office Practices, Chapter 300, p. 17 (2017). Like copyright law, patent law is inherently based on the work of humans. *See, e.g.*, 35 U.S.C. Section 100(f) ("The term "inventor" means the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention) and 35 U.S.C. Section 101 ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title).

We propose a first step to addressing AI inventors. An AI inventor cannot sign a declaration or assignment as currently required under U.S. patent law, but dropping this requirement would weaken the patent system (e.g., we do not want people to steal patentable inventions and be able to secure patent rights). We propose a requirement that each AI inventor must have a human surrogate who signs the declaration and assignment, and the human surrogate is subject to criminal penalties for perjury. In particular, the human surrogate must declare that the AI inventor did not take or acquire the invention from any external source. If the AI inventor is software owned or licensed by a corporation, then a probable human surrogate would be a development manager or corporate officer. Placing such a burden on a human surrogate would create an incentive for AI platform developers to make their systems transparent. Because inventions by AI will occur (and potentially in a very big way over time), an incentive to create transparency is preferable to ignoring the issue or attempting to deny the reality of AI inventors.

A more challenging issue with AI inventors is how to define "a person having ordinary skill in the art to which the claimed invention pertains." *See* 35 U.S.C. Section 103. The concept of a "PHOSITA" is fundamental to patent law, and this concept is already handled inconsistently among patent Examiners. AI systems are evolving rapidly, so if AI systems are included in the PHOSITA definition, more and more inventions will be considered obvious. Applying different PHOSITA definitions to human versus AI inventors might partially address that, but it would create an absurd result that an invention might be patentable or not depending on who is listed as the inventor. The same absurd result would occur if patent law attempted to ignore AI inventors (i.e., by a simple rule that AI inventors are not allowed). Any proposed solution to this PHOSITA issue must address: (i) the fact that there will be both human inventors and non-human inventors; (ii) the continued evolution of AI inventors, as well as advanced AI tools used by human inventors; (iii) the constitutional and legislative goal to promote the progress of science; and (iv) the need for a workable solution for inventors, patent practitioners, and patent examiners.

AI inventors may also affect how the U.S. Patent Office handles Section 101 (subject matter eligibility) and Section 112 (written description and enablement). Our view is that supporting AI inventors should not affect these laws. Regardless of whether there are AI inventors, the same subject matter should be eligible for a patent, and a patent should satisfy the same disclosure requirements (without the disclosure requirement, a patentee would not be fulfilling the bargain to get a monopoly on the invention).

Today, U.S. patent law can handle inventions where AI is used as a component of an invention. To accommodate AI inventors, we propose a first step of allowing a human surrogate to sign declarations and assignments on behalf of AI inventors. The question of how to define "ordinary skill in the art" is a more complex issue that needs further investigation. ∎

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