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When AI Creates IP: Inventorship Issues To Consider

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Law360, New York (August 10, 2017, 12:51 PM EDT) -- "AI" is a loaded acronym. Potentially, AI — artificial intelligence — could refer to any of a number of different technologies of varying complexity and capability. Yet recent advancements in the broad field of AI, particularly in deep learning and other machine learning technologies, seem the vanguard of an AI revolution, likely forever changing the way humans will interact and work with machines.

So, what should we do when a new drug is discovered, perhaps a cure or treatment for a particularly problematic disease, if that drug and its use were never conceived by any human, but instead were entirely conceived by machines? What if, with no human interaction, one AI decides to try to cure this disease, and, either by itself or by controlling additional AI implementations, decides on the set of data to analyze, performs an analysis, and develops and invents the proposed new cure or treatment all on its own?

While such a scenario may (or may not) be a long way off, assuming the invention is novel, nonobvious and does not run afoul of other patenting requirements such as § 101, is the new cure or treatment a patentable invention? And if so, who is the inventor? The end user of the AI? The trainer of the AI? The designer or creator of the AI? The AI itself? Or is it not patentable simply because there is no human who meets the standards we require for inventorship? If that's the case, does the individual or company that owns the AI (or others at least in part responsible for the AI) have no ability to protect this invention under the patent laws?

The Inventorship Requirement

Because patent rights initially belong to the patent's inventor, the question of inventorship is critical for determining who actually owns the rights to a patentable invention. Under existing case law, the inventor of a patent is the

individual or individuals who conceives of the invention.[1]

Conception of an invention happens at the point at which the invention is “definite and permanent” such that only ordinary skill is necessary to reduce the invention to practice.[2]

Under the law, to be named as an inventor, a person must have materially contributed to the conception of the invention.[3] The inventor’s contribution must be to the conception of the invention, not just efforts made to reduce the invention to practice after conception. For example, a person that follows another’s instructions, such as in performing experiments, is not a co-inventor.[4] Similarly, teaching skills or general methods that facilitate a later invention, without more, does not mean a person is a co-inventor.[5]

But the Federal Circuit also has stated that “inventors must be natural persons and cannot be corporations or sovereigns.”[6] One might think this ends the question for whether a machine, such as an AI, could ever be deemed a patent inventor. The Federal Circuit’s commentary, however, was premised on the fact that a corporation cannot contribute to the conception of an invention, which is an imaginative, creative act, and did not consider whether a nonhuman entity that actually contributed to the conception of an invention could be named as an inventor. As a result, whether, and to what extent, a machine that can conceive of a patentable idea might qualify as an inventor has never been directly addressed by either the patent office or any federal court.[7]

Is the User of the AI the Inventor?

At least as of right now, when an AI plays a role in the conception of an invention, there will likely be many individuals also involved in such a success. To start, the end users of the AI may be the persons primarily responsible for identifying the problem and developing and implementing a plan for its solution. In this case, the use of AI technology is not radically different from past uses of computers in the invention process: The AI is merely another form of technology that the inventors utilized to help with their creative process. Indeed, inventors have always used technology — prior inventions — to help create new inventions. The mere fact that we now characterize one of those tools as “intelligent” does not suddenly mean that the computer AI must be named as an inventor on the patent. Nor does there need to be a categorical bar against inventions created with the aid of “intelligent” computers. Rather, because humans identified the problem, came up with a plan to solve the problem, and then used the AI as a tool to arrive at the solution, it is the human end users to which the law should look as potential inventors.

Yet there are often other individuals beyond the ultimate end users that are involved in designing, creating or training an AI with relevant rules or data sets. In some cases, one or more of these individuals might be considered a potential inventor, even if they weren’t among the group of people actually using the AI to come up with the solution, so long as their activity was such that it could fairly be considered to have materially contributed to the conception of the invention. For example, there may be a situation in which the actual design of the AI, or the method or selection of data used in training the AI, are a material part of the conception of the inventive solution. In such a case, it may be

appropriate to consider the designer or trainer of the AI as an inventor.

Ultimately, while all such activities are likely material to the overall creation and use of the AI itself, whether any given person's activity is material to the actual conception is a more nuanced question that will need to be addressed on a case by case basis. In the case of a "generic" AI — one that is a general tool and not specifically designed or developed to address the particular problem being solved — most questions of conception are likely to focus on end user activities. There may be times, however, where the training, development or even the fundamental design of more highly specialized AI is itself rightly considered a part of the act of conception. In such cases, it may be appropriate to consider whether individuals involved in those activities should also be included among the named inventors.

What About More Advanced AIs?

Interestingly, as AI technologies continue to evolve, cases are likely to arise in which it becomes harder to identify any individual as one who provided a material contribution to the act of conception. For example, what about the situation where the AI is more than just a useful tool, but is capable of enough self-direction to be thought of as an actual participant in the conception? Perhaps an individual has a problem, and a general understanding of what might be required to solve the problem, but no understanding of how to arrive at the solution. For its part, the AI accepts the problem and guidance from the human and then, under its own direction, identifies and collects the necessary data, comes up with a specific plan to achieve a solution, and finally identifies the patentable solution. In this situation, so long as the individual's contribution to framing the problem and potential solution was a material contribution to the overall conception, the human may still be deemed an inventor. However, there may be a strong argument in this case that the AI also should be considered an inventor, since the AI likely materially contributed to the conception through its own direction.

There have been proposals to allow an AI to be deemed an inventor of a patent when the AI is at least partially responsible for conceiving of an otherwise patentable invention, either under an expansive interpretation of the existing laws or through future legislative revisions.[8] In part, these proposals view AI-created inventions as inevitable, and suggest that the owner of the AI should reap the benefit of any patentable inventions conceived by the AI in order to incentivize people to proliferate innovations not just by humans but also by machines. While, right now, it is an open question whether a machine is eligible under the existing patent laws to be a named inventor of a U.S. patent, we are nearing the time when exactly who, or what, qualifies as an inventor of AI-created inventions is going to be put to the test.

But, before we get there, we need to ask whether an AI ever should be legally recognized as an inventor for a patent. Suppose, in an even more extreme example of machine invention, the AI is a more general intelligence, truly independent and fully self-directing. Once the creators have engaged the AI, it does not need a user for training or direction, or even to frame a problem that needs solving. The AI itself can decide upon a problem to pursue, come up with an approach, identify the data it requires, and develop a solution all without any human input.[9] In effect, there is no human responsible for monitoring, controlling or in any way directing the inventive activities of the AI. In such cases, just as a matter of

public policy, we should not be encouraging undirected, unsupervised innovations by AIs without some form of significant human oversight and responsibility. Thus, to discourage the creation of undirected AIs, there may be an argument for not providing patents to anyone for inventions even partially conceived by an AI.

Instead there should be a middle ground under which patent rights remain generally available for human co-inventors to incentivize humans to remain involved and materially contribute to the conception of an invention. Conversely, as machines do not require incentives to innovate, but are simply created or instructed to do so, there is no need to grant inventor status to an AI for its role in the conception process. In this way, patents would remain available for all patentable inventions created with the aid of an AI except, perhaps, in the very extreme cases of inventions wholly conceived by self-directing AIs. Without this exception, however, there would be no incentive for humans to maintain direct oversight and responsibility for the control of a creative AI when such individuals could simply sit back and be rewarded with patent rights for an invention for which they had no part in conceiving. Instead, by refusing to allow a patent for inventions conceived wholly by AIs, we would avoid overly rewarding human owners of AIs simply for owning a creative machine, and would simultaneously encourage their more active participation in and control of the process should they not want any resulting inventions to fall to the public domain.[10]

A separate, perhaps less important, benefit of limiting inventorship to human activity is that, under such an approach, existing patent laws seem well disposed to handle questions of inventorship on a case-by-case basis. Evaluating each case individually, we should be able to consider the circumstances and identify which, if any, of the humans responsible in whole or in part for the AI's discoveries qualify as inventors.

Conclusion

It doesn't seem too controversial that, just because some form of AI technology is involved in the conception of a patentable invention, we shouldn't throw out the baby with the bath water and refuse to grant a patent. Ready or not, the pace of AI advancement is likely to increase, and the resulting uses only likely to further proliferate, as we continue through the 21st century. We should thus continue to provide incentives for our future inventors through the general availability of patents for their patentable innovations, even when an AI is involved in the process.

That said, incentivizing innovation does not mean losing sight of the need for human responsibility for artificial creations. Human oversight and overall control of AI is an important safeguard against unintended consequences. As a result, patents should generally be available for inventions conceived in whole or in part by AI technologies, but with some exceptions to ensure, as a matter of public policy, that humans stay in the loop. In the case in which no human provides a material contribution to the conception of an invention, patent protection should be withheld for lack of inventorship in part to encourage humans to remain significantly involved in the process. In addition, evaluating each case on its own merits, existing legal frameworks for inventorship should then allow us to fairly determine who should be an inventor for patentable inventions conceived in whole or in part by an AI.

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[1] See Burroughs Wellcome Co. v. Barr Laboratories, Inc., 40 F.3d 1223, 1227–28 (Fed. Cir. 1994) ("Conception is the touchstone of inventorship, the completion of the mental part of invention.").

[2] See Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986) (quoting 1 Robinson on Patents 532 (1890)); Burroughs Wellcome, 40 F.3d at 1228.

[3] See Board of Educ. v. American Bioscience, 333 F.3d 1330, 1342 (Fed. Cir. 2003) ("[T]eaching skills or general methods that somehow facilitate a later invention, without more, does not render one a coinventor.").

[4] See Sewall v. Walters, 21 F.3d 411 (Fed. Cir. 1994) (holding that a person that follows another's instructions to implement an invention is not a co-inventor).

[5] See Board of Educ. v. American Bioscience, 333 F.3d 1330, 1342 (Fed. Cir. 2003).

[6] University of Utah v. Max-Planck-Gesellschaft Zur Forderung Der Wissenschaften EV, 734 F.3d 1315, 1323 (Fed. Cir. 2013); see also Beech Aircraft, 990 F.2d at 1248 fn. 23 (Fed. Cir. 1993).

[7] While an open question in the patent context, it should be noted that the Copyright Office has issued a regulation stating that it will not register "works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author," (Copyright Office, Compendium of U.S. Copyright Office Practices (3d ed. 2014) § 313.2) (a ruling which is subject to debate in its own right); see also Naruto v. Slater , No. 15-cv-4324, 2016 WL 362231, at *3–4 (N.D. Cal. Jan. 28, 2016 (challenging the standing of a non-human animal to raise a claim of copyright infringement).

[8]See Ryan Abbott, I Think, Therefore I Invent: Creative Computers and the Future of Patent Law, 57 B.C.L. Rev. 1079 (2016), http://lawdigitalcommons.bc.edu/bclr/vol57/iss4/2; see also Erica Fraser, Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law, (2016) 13:3 SCRIPTed 305 https://script-ed.org/?p=3195.

[9] This scenario requires significant advancement in the state of AI technologies from where things stand today, but is by no means out of the realm of future possibility.

[10] Of course, even without patent rights, the owner of an AI may still have available other forms of intellectual property ownership and protection, such as trade secret rights, for inventions wholly-conceived by an AI.