

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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Request for Comments on Patenting Artificial Intelligence Inventions

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Docket No. PTO-C-2019-0029

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**COMMENTS BY THE BAR ASSOCIATION OF DISTRICT OF COLUMBIA**

**INTELLECTUAL PROPERTY COMMITTEE**

November 8, 2019

## **I. COMMENTER’S INTEREST**

Founded in 1871, the Bar Association of the District of Columbia (the “BADC”) is one of the oldest bar associations in the nation and the first in the District of Columbia. The BADC and its members have a proud history of working closely with the judiciary, the D.C. Council, and the U.S. Congress on the administration of justice. The BADC currently has a significant interest in developing and promoting policies on artificial intelligence (“AI”). AI has already been implemented in numerous industries with important impact and, under appropriate governance and policies, it will continue to have an unprecedented economic effects. Accordingly, the BADC urges the USPTO to develop a patent policy that strikes the appropriate balance between the promotion of AI and the reward provided to inventors of AI.

## **II. RESPONSE TO RFC’S QUESTIONS**

### **Question 1: What are elements of an AI invention?**

The elements of an “AI invention” should be no different from those of other inventions—an “AI invention” requires conception and reduction to practice. *Solvay S.A. v. Honeywell International*, 742 F.3d 998, 1000 (Fed. Cir. 2014). Under such universal framework, the following are some (non-limiting) examples that *could* be considered an “AI invention”: (1) computational architectures underlying AI (*e.g.*, convolutional neural networks, residual neural networks); (2) processes for training such computational architectures (*e.g.*, dropout backpropagation); and (3) applications of such computational architectures (*e.g.*, autonomous driving). However, the BADC does not believe it is particularly useful to categorize an invention as AI or not as the same laws and rules should apply to AI-related software and hardware inventions as to any other software or hardware inventions. AI is most appropriately

considered the next advancement in computing tools that may be used to solve certain types of problems, and it should not be treated any differently than other inventions.

**Question 2: What are the different ways that a natural person can contribute to conception of an AI invention and be eligible to be a named inventor?**

Consistent with existing law on conception, a natural person can contribute to conception of an AI invention, as with any other invention, by forming “in the mind of the [person,] a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.” *Hybritech Inc. v. Monoclonal Antibodies Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986). *See also Townsend v. Smith*, 36 F.2d 292, 295 (CCPA 1930). And this should be so regardless of whether the invention involves AI or not, or of the AI invention’s type.

For example, a natural person can contribute to the conception of a computational architecture underlying AI by forming “a definite and permanent idea of the complete and operative” architecture. *Hybritech*, 802 F.2d at 1376. Similarly, a natural person can contribute to the conception of a training process by forming “a definite and permanent idea of the complete and operative” training process. *Id.* The same is true for an invention directed to an application of AI.

If, however, a natural person contributes to an AI invention that in turn generates a derivative invention, the natural person would not have contributed to the conception of the derivative invention and hence would not be an inventor, unless the person had formed “a definite and permanent idea of the complete and operative” derivative invention itself. *Id.* Just as a developer of a new programming language (*i.e.*, tool) does not own the operating system (*i.e.*, invention) written using that language, a developer of an AI process (*i.e.*, tool) that, in turn, creates a derivative invention (*i.e.*, invention) should not own the derivative invention, unless the developer also conceived of the derivative invention. If no natural person contributes

to the conception of a derivative invention, the derivative invention would have no inventor—as discussed below with respect to Questions 3 and 4, an entity or entities other than a natural person should not be named an inventor; protectable innovation and invention requires human contribution.

**Question 3: Do current patent laws and regulations regarding inventorship need to be revised to take into account inventions where an entity or entities other than a natural person contributed to the conception of an invention?**

No. Conception is inherently a human activity: it requires forming “in the *mind* of the inventor, a definite and permanent *idea*[.]” *Id.* (emphases added.) Accordingly, an entity or entities other than a natural person cannot contribute to the conception of an invention. An entity or entities can be a tool that a natural person uses to conceive and reduce to practice her or his invention. However, just like with any other tools, including existing software tools, such entity or entities should not be considered an inventor.<sup>1</sup> As the author of a recent European Patent Office study on AI sensibly concluded, “not only does the present legal position not allow for AI systems to be considered as inventors, it is submitted that at present there are no convincing reasons to consider a change in this respect.” Noam Shemtov, *A study on inventorship in inventions involving AI activity*, 33 (Feb. 2019) (commissioned by the European Patent Office) (hereinafter the “*EPO Study*”)<sup>2</sup>.

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<sup>1</sup> Under this framework, an invention may well be created without a corresponding conception. For example, an invention may be created entirely by a non-natural-person entity (*e.g.*, an AI system) that autonomously trains a neural network. For such invention, the BADC believes no patent should issue.

<sup>2</sup> [http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/Concept\\_of\\_Inventorship\\_in\\_Inventions\\_involving\\_AI\\_Activity\\_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/Concept_of_Inventorship_in_Inventions_involving_AI_Activity_en.pdf) (last visited November 1, 2019).

**Question 4: Should an entity or entities other than a natural person, or company to which a natural person assigns an invention, be able to own a patent on the AI invention?**

A company should be permitted to own a patent on an AI invention only through an assignment, just as under current law. For example, a company that trains an AI process that, in turn, creates a derivative invention could own the AI process itself (through an assignment from a natural-person inventor), if the statutory requirements for patenting that AI process are met. Because developing an AI invention requires a human contribution, the current assignment process of assigning the invention from the (natural-person) inventor to another entity should be sufficient to allocate and transfer the intellectual property rights of AI inventions.

To the extent this question is directed to the inventorship of an entity or entities other than a natural person, the BADC believes that an entity or entities other than a natural person should not be named an inventor, as discussed above for Question 3.

**Question 5: Are there any patent eligibility considerations unique to AI inventions?**

No. The BADC believes that the existing patent eligibility considerations for software inventions adequately address policy objectives for AI inventions.<sup>3</sup> However, the BADC recommends the USPTO to develop examination guidelines for AI inventions (particularly for USPTO patent classifications associated with AI, such as class 706) to encourage consistent application of patent eligibility considerations to AI inventions.

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<sup>3</sup> The BADC considers the current debate about the patent eligibility of computer software inventions to be separate from this question regarding AI inventions and not an appropriate topic for the current consideration of AI inventions.

**Question 6: Are there any disclosure-related considerations unique to AI inventions?**

Yes. Under 35 U.S.C. § 112(a),<sup>4</sup> a patent specification should disclose sufficient information to demonstrate possession, enablement, and best mode of a claimed invention. Accordingly, in the context of AI inventions, if a claimed invention cannot be realized with conventionally available technologies without undue experimentation, its patent application should be required to explain how such claimed invention can be realized.

**Question 7: How can patent applications for AI inventions best comply with the enablement requirement, particularly given the degree of unpredictability of certain AI systems?**

AI systems can have aspects that are unpredictable. For example, some systems may depend meaningfully on training data or initialization parameters to obtain desirable results or to achieve functional benefits. Patent applications directed to such unpredictable AI systems must include the appropriate information to comply with the requirements of Section 112(a). Furthermore, to the extent that the claimed invention relies on an AI system that may not be readily available to a person of ordinary skill in the art, further disclosure may be required. The BADC recommends the USPTO to develop guidelines on adequate disclosure of such unpredictable AI inventions.

**Question 8: Does AI impact the level of a person of ordinary skill in the art? If so, how?**

Yes. Once conventional AI systems become widely available or otherwise accessible to a person of ordinary skill in the art, such accessibility would be expected to enhance the abilities of

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<sup>4</sup> 35 U.S.C. § 112(a) states, in part, “[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.”

a person of ordinary skill in the art to develop solutions and therefore increase the effective level of a person of ordinary skill in the art.

For example, if a person of ordinary skill in the art, working with a conventional or otherwise accessible (to a person of ordinary skill in the art) AI system, can readily create a particular invention, that invention should be deemed obvious by one of ordinary skill in the art. Similarly, if a conventional AI system can rapidly try a vast number of potential solutions, larger than what has traditionally been considered “a finite number of identified, predictable solutions” under *KSR*, one of ordinary skill in the art should be deemed to have the ability and expectation to try those potential solutions.

**Question 9: Are there any prior art considerations unique to AI inventions?**

Just like any other inventions, the patentability of AI inventions should be analyzed in view of statutory requirements set forth in Title 35 of the United States Code, and such analysis entails comparison of the invention to prior art. With AI inventions, the prior art should include conventional AI systems that are accessible to one of ordinary skill in the art. Consequently, the question of obviousness depends on what a person of ordinary skill in the art could accomplish through conventional training of such an AI system. If a person of ordinary skill in the art were deemed to have access to a conventional AI system, then the Examination process should account for what is feasible using such conventional AI system. To facilitate such an examination process, the Patent Office may consider requiring: (1) a patent applicant to explain, in the specification or in response to an office action, what may be feasible using a conventional AI system; and/or (2) an Examiner to personally compare the claimed invention to what can be readily created using a conventional AI system.

It may be difficult for Examiners to find prior art relating to what training data or variables have been used in the past. These details are unlikely to be in traditional public prior art papers or patents. They would instead often be embodied in existing systems where the algorithmic functions were not previously disclosed. Thus, it may be difficult for Examiners to find prior art to reject an allegedly novel aspect of processing a new correlated input as training data.

Given the unique difficulties with finding relevant prior art, it may be desirable to subject AI inventions (particularly those directed to the training process) to a more rigorous examination process. For example, a prior art water flow prediction algorithm computes water flow and actuates a dam based on past inflow, upriver waterflow and precipitation. If the purported inventive contribution is to add one new variable (e.g., the temperature upstream) and otherwise reproduce the prior art system to process a broader set of data via an AI trained model to achieve the same result, we advise the USPTO to be rigorous in examining of such matters. Computers and AI inherently can process more data and inputs over time, so the contribution of the new training aspect must be significant to achieve patentability. Generally, adding as an input to an AI system a known factor should not be sufficient to achieve patentability without something more, such as some new and unexpected synergies from the way the additional input is used.

**Question 10: Are there any new forms of intellectual property protections that are needed for AI inventions, such as data protection?**

No. Adequate protection of data sets is already available through trade secret and, in some situations, copyright law.

**Question 11: Are there any other issues pertinent to patenting AI inventions that we should examine?**

No. As discussed above, the BADC believes that AI inventions should be treated like other software and hardware inventions as they represent an at-times more sophisticated tool used by persons of ordinary skill in the art.

**Question 12: Are there any relevant policies or practices from other major patent agencies that may help inform USPTO’s policies and practices regarding patenting of AI inventions?**

The European Patent Office (the “EPO”) has taken several steps to address challenges associated with AI inventions.

*First*, on November 1, 2018, the EPO issued new guidelines<sup>5</sup> for the patentability of AI and machine learning inventions, explaining that patent applications within this subject matter will be treated largely as unpatentable. The EPO intends to treat AI and machine learning as a form of mathematical method that is inherently unpatentable. The EPO explains, however, that a particular technical application of AI and machine learning may be patentable. This guideline appears largely consistent with patent eligibility jurisprudence in the United States.

*Second*, the EPO commissioned Dr. Noam Shemtov of Queen Mary University of London to study inventorship-related issues associated with AI inventions. This study, published in February of 2019, “examine[d] the patent regime of the EPC as administered by the EPO, while also canvassing the legal position in the following eight jurisdictions: United States, China, Japan, Republic of Korea, United Kingdom, Germany, France and Switzerland,” and found that “none of the relevant jurisdictions allow[ed] for AI systems to be considered as inventor under their patent law regimes.” *EPO Study* at 5. The study submitted that “the concept of the

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<sup>5</sup> Available at [https://www.epo.org/law-practice/legal-texts/html/guidelines2018/e/g\\_ii\\_3\\_3\\_1.htm](https://www.epo.org/law-practice/legal-texts/html/guidelines2018/e/g_ii_3_3_1.htm) (last visited November 1, 2019).

inventor in inventions involving AI activity should continue to carry the same meaning as it does in relation to more traditional inventions” and concluded that “the current legal framework, including the EPC, is suitable for addressing the inventorship and ownership of inventions involving AI activity both at present and in the foreseeable future.” *Id.* at 7.

*Third*, on February 20, 2019, the EPO published feedback from the EPC Contracting States on “[l]egal aspects of patenting inventions involving artificial intelligence (AI).”<sup>6</sup> The feedback suggested “a similar understanding of AI patenting” amongst the Contracting States, including that: (1) there need not be “special rules on patentability of AI inventions”; (2) “[t]he skilled person will need to be an interdisciplinary team able to use AI;” (3) “[i]nvention must be disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art”; and (4) “the requirement of sufficiency of disclosure” needs to be enforced to “avoid ‘black box’ patenting.” *Feedback Summary* at 6-9.

The Japan Patent Office (the “JPO”) has also published “Case Examples pertinent to AI-related technology,”<sup>7</sup> providing various case studies illustrating what would be considered sufficient written description and what would be considered inventive. With respect to written description, the JPO requires that “a certain relation such as a correlation among the multiple types of data” used as training data either be “common general technical knowledge” or be described in the patent application. *See* JPO Case Studies at 1. With respect to inventiveness, the JPO suggests that, generally, a mere application of AI is unlikely inventive; and that the choice and pre-processing of training data can be inventive as long as it brings about a

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<sup>6</sup> Available at [http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/\\$File/AI\\_inventorship\\_summary\\_of\\_answers\\_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/3918F57B010A3540C125841900280653/$File/AI_inventorship_summary_of_answers_en.pdf) (hereinafter “*Feedback Summary*”) (last visited November 1, 2019).

<sup>7</sup> Available at [https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/handbook\\_shinsa/document/index/app\\_z\\_ai-jirei\\_e.pdf](https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/handbook_shinsa/document/index/app_z_ai-jirei_e.pdf) (the “JPO Case Studies”) (last visited November 1, 2019).

“significant effect.” *See id.* at 5, 35, 42. To the extent the JPO suggests that the choice and pre-processing of training data is inventive without considering whether its contribution is significantly more than just the abstract idea of providing one more input to an AI system, the BADC disagrees with it as it is too permissive and will ultimately stifle innovation.