

To the U.S. Patent and Trademark Office, in response to your docket No. PTO-C-2019-0029, "Request for Comments on Patenting Artificial Intelligence Inventions"

From: Lori Pressman

Date: November 8, 2019.

Thank you for the opportunity to comment on patent-related issues regarding artificial intelligence inventions, and for the USPTO's guidances on subject matter eligibility overall.

I've been an enthusiastic participant in our innovation ecosystem for 40 years, as an engineer, inventor, investor, license negotiator and technology transfer professional, reasonably royalty expert, coach for entrepreneurs, member of grant review committees, and scholar. I received the AUTM (formerly the Association of University Technology Managers) Bayh-Dole award in 2017.

In brief, requiring enablement and written description sufficient to teach a person or ordinary skill in the art to practice the invention without undue experimentation is fair. A priori shading classes of patent eligible subject matter is not, and disadvantages smaller and newer innovators.

Responses to the questions posted August 27, 2019 are below. The letters in square brackets were added for reference.

1. Inventions that utilize AI, as well as inventions that are developed by AI, have commonly been referred to as "AI inventions." What are elements of an AI invention? For example: [A] The problem to be addressed (e.g., application of AI); [B] the structure of the database on which the AI will be trained and will act; [C] the training of the algorithm on the data; [D] the algorithm itself; [E] the results of the AI invention through an automated process; [F] the policies/weights to be applied to the data that affects the outcome of the results; and/or other elements.

This question has two parts:

What should

- i) the applicant be required to disclose, describe, and enable; and
- ii) what constitutes statutory subject matter.

Re: A) The field of the AI

The applicant should be required to disclose the field of the AI to the extent such identification is needed to show that their insight is not known to someone of ordinary skill in the applicable art. As with any other inventions, limiting the application to a particular field is helpful with respect to demonstrating that it is "not obvious to someone of ordinary skill in the art".

Re: B) The structure of the database

With respect to i) enablement and written description: Yes, for the classifiers, -otherwise it would appear impossible to use the teachings. Yes, also for any inventive data pre-sorting, pre-filtering, or pre-treatment, steps. With respect to ii), statutory subject matter: Field definitions (unless they are inventive), and the ERD itself (link tables, e.g.) seem more suitable for copyright protection.

Re: C) The training of the algorithm.

With respect to i) enablement and written description: So long as the final, useful, classifiers (which can be ranges) are disclosed, the steps it took to define them may not be relevant. In view of recent work on unintended biases resulting from selection of inappropriate proxy variables

<https://science.sciencemag.org/content/366/6464/447>, disclosing the proxy variables and classifiers is worth encouraging. With respect to ii) statutory subject matter: If there is some particularly clever and fast way of training an algorithm, -itself essentially another algorithm, which the applicants wish to disclose, it seems reasonable that it be considered statutory subject matter.

D) The algorithm itself

With respect to i), enablement and written description: Yes, the applicant should be required to disclose it. With respect to ii) statutory subject matter: Algorithms should not a priori be ruled as non-statutory.

Re: E) The results of the AI:

With respect to i) enablement and written description: Yes, the practical results should be described and the claims should relate to accomplishing a practical task, -as in a particular method for sorting, steering, guiding, etc...

With respect to ii) statutory subject matter: patent protection should be limited to using the claimed, (and fully enabled and described method) for accomplishing a practical task.

In view of recent work on unintended biases resulting from selection of inappropriate proxy variables, <https://science.sciencemag.org/content/366/6464/447>, generating an “unbiased” output should be considered a practical result.

F) The policies/weights applied to the data:

With respect to i) enablement and written description: To the extent that disclosing the weights is necessary to accomplish the task or to enable the invention, then yes. With respect to ii) statutory subject matter: To the extent that the weights themselves, -for example, potentially ignoring certain information, e.g. weighting it at zero, is the invention, then yes.

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? For example: Designing the algorithm and/or weighting adaptations; structuring the data on which the algorithm runs; running the AI algorithm on the data and obtaining the results.

A natural person can contribute to designing the algorithm, defining the classifiers, and if they are functions or combination of other fields, defining the fields, the weights, and the layers. Pre-treating data in the training set including de-selecting certain data can also be a contribution.

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?

It seems reasonable to resolve the issue of rights other than inventorship via contract law and not patent law. Data are already valued in license agreements and access to data and the right to use or refer to it are priced separately from patents. Artificially generated training data, including data engineered to help trouble shoot or detect flaws or biases could be generated and licensed or sold like naturally occurring data.

It may be worth exploring the concept of a “Derivative” as it pertains to copyrighted datasets and training sets. Can there be rolling expiration of the copyright?

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? For example: Should a company who trains the artificial intelligence process that creates the invention be able to be an owner?

A company can own an invention by contract only, not via inventorship.

5. Are there any patent eligibility considerations unique to AI inventions?

In view of i) the relative ease of showing reduction to practice and ii) the skepticism toward AI related inventions, evidence needed to show that the applicant is in possession of a practical method should be in the specification.

6. Are there any disclosure-related considerations unique to AI inventions? For example, under current practice, written description support for computer-implemented inventions generally require sufficient disclosure of an algorithm to perform a claimed function, such that a person of ordinary skill in the art can reasonably conclude that the inventor had possession of the claimed invention. Does there need to be a change in the level of detail an applicant must provide in order to comply with the written description requirement, particularly for deep-learning systems that may have a large number of hidden layers with weights that evolve during the learning/training process without human intervention or knowledge?

Require disclosure of the classifiers, training sets, weights, and layers, sufficient to enable an individual of ordinary skill in the art to practice the invention, and to replicate the practical result. The alternative to this disclosure for the applicant is deciding to keep the algorithm a trade secret.

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

I disagree with the characterization that patentable AI is “unpredictable”, as “practical” implies “reproducible”, and thus “predictable”.

Provide evidence that the algorithm produces practical results

Describe the classifiers, weights, and layers.

If appropriate, describe data pre-treatments, including deselection from data in training sets, and how such deselection can improve the efficiency and accuracy of the algorithm.

8. Does AI impact the level of a person of ordinary skill in the art? If so, how? For example: Should assessment of the level of ordinary skill in the art reflect the capability possessed by AI?

Not initially. At some point, AI skill may become a standard requirement in professions other than AI, and thus “of ordinary skill in the art” may expand to arts outside of AI and ML.

9. Are there any prior art considerations unique to AI inventions?

Invalidation should require description at the same level of enablement as is required of the applicant when applying for patent protection, of the art said to anticipate, or render obvious the claimed invention.

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

I would favor a form of expiring data protection to help incentivize fair use and disclosure. “Fared-use” is better than no use, and certainly more fair to small content providers. See

<http://www.tomwbell.com/writings/FullFared.html>

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3032076

<https://www.ip-watch.org/2017/08/23/dilemma-fair-use-expressive-machine-learning-interview-ben-sobel/>

From concern that there may be excessive and counterproductive use of trade secrets, I would favor cautious consideration of a shorter or different form of protection for AI related inventions. However, the essence of the patent system is the granting of time limited monopolies in exchange for disclosure of the invention, and I would not support the time limited monopoly grant without the disclosure requirement.

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

The concept of a derivative work as it applies to datasets and training sets. Can there be rolling expiration of copyright protection of data in large databases?

Can we imagine a period of elapsed time, however great, when previously private data becomes public, or when previously “fared” data is all available for fair use?

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?

At this time, I have no particular insights or knowledge of such policies or practices.

Sincerely,
Lori Pressman