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The Honorable Andrei Iancu
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office
600 Dulany St.
Alexandria, VA 22314

Re: Comments on Patenting Artificial Intelligence Inventions

Dear Under Secretary Iancu,

I write to comment on the topic of patenting AI inventions. Tutunjian & Bitetto, P.C. is privileged to represent clients that work in the field of artificial intelligence, and our attorneys have substantial experience with drafting the sorts of patent applications contemplated in the Request for Comment. Due to the duty of confidentiality, these comments will naturally be kept in abstract terms. While I make these comments in consultation with the other attorneys at Tutunjian & Bitetto, P.C., they do not necessarily reflect any official stance or policy of the firm.

The U.S. patent system has two motivating principles, one pragmatic and one moral, both grounded in the words of the Constitution. The first is to "promote the progress of science and useful arts," and seeks to motivate technological innovation. The second comes from the identification of those to whom the right to a discovery is secured: inventors. This stands as a recognition that the benefits of the inventive act should go to those who perform it. While it may be possible to obtain the pragmatic benefits of the patent system without safeguarding the rights of natural persons, to do so would be beyond the powers of Congress under the Constitution.

Following that general principle, please consider following answers to the questions set out in the Request. In the event that the Office would like clarification of any point, please do not hesitate to contact the undersigned.

1. "What are the elements of an AI invention?"

The full text of the question sets out examples of parts of an AI invention. However, the *essential* elements of an AI invention seem to be (a) the model that is used to calculate an output based on an input (apparently referred to in the comments as the "algorithm itself"), (b) the process of training the model based on a set of training data (apparently referred to in the comments as "the training of the algorithm on data," but also including generating the training data), and (c) applying the model's output to some useful end.

It is worth noting that novelty can lie in any of these parts of the invention. For example, the model may have a novel algorithmic structure, the model may be trained in some novel fashion, and the output of the model may be applied in some novel way. It should also be noted that an AI invention may include novel aspects outside of these essential parts. For example, it is conceivable that some novel process may be applied to the input or output of the model, and that

this novel process could also be considered an AI invention. Thus, the above list is not intended to be limiting, but are instead presented to form the basis of components that every AI invention should have to be regarded as such.

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?

This question seems amply answered by the existing statutes and caselaw, for example as described in MPEP 2138.04. Thus, any person who contributes to the conception of claimed features of a patent application should be a named inventor.

The question suggests its own negation, however, and it may be more interesting to look at the potential contributions a person could make *without* being eligible to be a named inventor. One of the examples set out in the Request stands out in particular: running the AI algorithm and obtaining the results. In essence, one should not be able to simply push a button and be named an inventor. Running an AI algorithm on an input and obtaining results is separate from the act of "conception" by any reasonable understanding of that word. In other words, the operation of an AI invention on some input, without some interpretation or application of the output, does not form the basis of conception by any person, natural or otherwise.

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.

As noted briefly above, the term "inventors" in the Constitution should be understood to refer to natural persons. While this may be amply supported from an originalist perspective, there is a more practical and immediate reason for keeping the meaning limited in this way—at this time, only natural persons are capable of "conceiving" of an invention.

Within the current, and the reasonably foreseeable, state of the art, "Artificial Intelligence" is simply another tool for performing computation, like the general purpose computer before it. While it derives its inspiration from biological processes, and while its outputs can surprise its operators, it is fundamentally no different from any other kind of software, and is thus limited by the natural persons who provide it with data and interpret its output.

The existing caselaw holds that conception is "the complete performance of the mental part of the inventive act" and is "the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice…." Townsend v. Smith, 36 F.2d 292, 295 (CCPA 1929); *see also* MPEP 2138.04. While the caselaw on the subject is old, there does not seem to be any reason to hold artificial intelligences to a lesser standard than natural persons are held to.

At the present time, the output of any AI system is going to simply be a dataset, which will require interpretation and application by a human being. As a result, neither an AI system, nor a corporation or other non-natural person that owns an AI system, is capable of "conceiving" an invention without the involvement of a natural person. As such, there is no need to revise the patent laws and regulations to accommodate any other entity.

Taking this question to its logical extreme, one can imagine a random number generator that eventually produces any conceivable combination of information. When the random number generator happens to output the solution to a problem, could it be said to be an inventor? Clearly not. Instead, the inventor would be the human being who, tasked with watching the random output, should be credited with seeing the useful output and understanding its import.

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?

No. As noted above, there is no entity other than a natural person that is capable of conceiving of an invention. Thus, there is no need to provide for the original ownership of a patent by any entity other than a natural person. Furthermore, there is no apparent policy goal which would be served by making such a change.

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

Not at this time, as AI inventions represent just one kind of a computer/software invention. Until and unless AI inventions exceed the boundaries of simple tools, their eligibility can be judged according to existing statute and caselaw.

6. Are there any disclosure-related considerations unique to AI inventions?

It is worth keeping in mind that the novelty of an AI system can lie at any stage, from training to application, and that one having ordinary skill in the art would not necessarily need a thorough explanation of every stage. Thus, if the invention is directed to some new deep learning model, then the algorithm should be described in detail. However, if the novelty in the manner by which the model is trained, or in the manner in which the output is applied, then a detailed description of the model may not be needed, as those having ordinary skill in the art could understand how to supply a suitable model.

The Request specifically questions whether a greater level of detail should be needed for deep-learning models that have a large number of hidden layers and weights that change without human intervention. But, as with any other invention, the correct amount of written description is "enough" written description. As long as those having ordinary skill in the art would conclude that the inventor had possession of the claimed deep-learning model, then the written description requirement has been satisfied.

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 are, in general, deterministic. Given the same inputs, two implementations of the same model will produce the same output. The unpredictability of an AI system would thus lie in its behavior when provided with differing inputs. For inventions that are focused on the model, or on the application of its output, there does not seem to be any special burden with respect to enablement. If some element of randomness is present in the model or its application, then that randomness would need to be described to a similar degree of specificity.

However, if an AI invention's ability to perform its function depends on a specific kind of training or input data, then that input data (or the process of generating it) would need to be described with such specificity as to enable a person having ordinary skill in the art to implement it without undue experimentation.

It is conceivable that some AI inventions could only be performed using very specific training data, and that it would not be feasible for a third party to replicate that data. In such a case, it might be appropriate to require disclosure of the particular training data that is used, in a manner akin to the disclosure of a sequence listing for certain biological patents.

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

Yes, inasmuch as any new tool expands the capability of those having ordinary skill in the art, and inasmuch as the use of AI is known for the application in question. Just as the existence of test tubes impacts the level of a person of ordinary skill in the chemical arts, and just as the existence of general purpose computers impacts the level of a person of ordinary skill in the software arts (and many others), so to would AI affect the level of skill in the arts where it can be made useful.

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

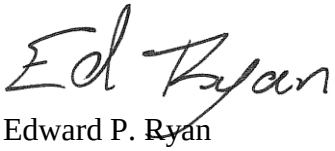
None that are immediately apparent.

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

None that are immediately apparent. While the Request gives the example of "data protection," presumably referring to training data, such data would already be protectable as a

trade secret or, in the event that the training data provides some new and useful outcome, then as a patent.

Sincerely,



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