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Director of the United States Patent and Trademark Office,
P.O. Box 1450,
Alexandria, VA 22313-1450
U.S.A.

November 8, 2019

Subject: Docket No. PTO-C-2019-0029 Request for Comments on Patenting Artificial Intelligence Inventions.

Dear Sir or Madam,

The Japan Patent Attorney Association (JPAA) was established under the Patent Attorneys Act in Japan in May of 1915, and it is the sole professional bar association of patent attorneys in Japan. At present, the JPAA has more than 11,300 members practicing intellectual property law in Japan. Its members practice in all areas of intellectual property law, including patent, design and trademark law, as well as copyright and unfair competition.

The JPAA appreciates this opportunity to submit comments on the Artificial Intelligence Inventions. We would be happy to answer any questions regarding our comments below.

Q1. What are the elements of an AI invention?

First of all, AI inventions can be classified into the three categories below.

(Category 1) AI-mechanism invention: an invention of AI itself, such as deep learning. This category includes a trained model and a trained neural network. In this category, how to train the AI is a primary element. More particularly, elements include determining how to use the AI, selecting data to use for training (for unsupervised learning, selection of data may be unnecessary), and selecting a neural network to use. Even when using a similar neural network as prior art, it is worth protecting the construction of a very good classifier that is trained with particular data to provide particular results through trial-and error and investments therefor.

(Category 2) AI-utilizing invention: an invention that utilizes a supplied AI system which provides a specific function, such as image or voice recognition, so as to solve a problem.

In these cases, a logical method can be an element of an AI invention. Furthermore, utilizing data for training which are suitable for combination with the logical method will be effective in improving training efficiency and recognition accuracy. At the same



time, this category may also include an invention using an AI to solve a problem in a logical method (i.e., a method which does not use a trained machine), using a logical method to solve a problem in AI, and using AI and a logical method in a synergistic manner to solve a problem.

(Category 3) AI invention: an invention made by an AI system, such as an invention of an article with a new shape output from the system.

We would suggest that, to facilitate discussion, we always need to confirm which category is the subject of the discussion. Similarly, we would suggest that USPTO's guidance indicates an applicable scope, since guidance pertaining to one category does not necessarily apply to another category. In particular, AI that accompanies training seems to be a primary focus in this request for public comments. Therefore, public comments to be submitted and guidance based on these public comments would be focused on the class of AI that accompanies training. As such, established guidance should indicate that the focus of the guidance is the class of AI that accompanies training, since applying this guidance to other classes of AI would possibly cause an unreasonable conclusion.

Q2. What are the different ways in which a natural person can contribute to the conception of an AI invention and be eligible to be named as inventor? For example: Designing an algorithm and/or weighting adaptations; structuring the data on which the algorithm runs; running the AI algorithm on the data and obtaining the results.

i.

Generally speaking, the same standard as a conventional software-related invention can be applied to an AI-related invention. Namely, there should be a problem-to-be-solved also in an AI-related invention, and the person who conceived how to solve the problem will be an inventor.

In terms of an AI-utilizing invention above, a person who conceived a project with a specific direction will be an inventor, since such a conception is made based on a problem to be solved in a particular field and will lead to solving such a problem. For example, a person who found how to use AI, how to select data for training, how to perform pre-processing on the data, how to configure a model to be trained, how to evaluate the output with an evaluation function, or how to perform training, will be an inventor if they made a sufficient contribution to be evaluated as inventor according to conventional standards. Furthermore, a person who found how to select the output from the AI may also be an inventor, if such a selection is made according to their technical knowledge rather than automatically. In this way, a person who engages in the starting stage or the final stage of the AI-utilizing invention is likely to be an inventor.



ii.

On the other hand, a person who engages in data collection, data modification (such as data format conversion), configuration of a training program, execution of the training program, management of hardware for the training, or feeding the output result back to the AI, is not likely to be an inventor, since these works may be evaluated as merely an assisting task. More particularly, a person who does not have technical knowledge on a final output result or whose technical knowledge does not contribute to the quality of the final output result would not be an inventor. Even a programmer who made an excellent general-purpose AI core would not be an inventor if they do not have technical knowledge on a final output result of an AI-utilizing invention that employs the AI core and do not have a direct influence on the result obtained by the invention. Nevertheless, a person who configures and executes a training program that performs training through adjusting a Generative Adversarial Network (GAN) without collecting data, may be an inventor in view of their technical knowledge based on the final target of the training. Similarly, a person who collects specific data to train the AI to provide suitable biased results ideal for the AI-utilizing invention in view of their technical knowledge on the ideal results, rather than in a nondiscriminatory manner, may also be an inventor. In other words, a person who has technical knowledge on the final output result of the AI-utilizing invention and technically contributes to the final output result, more than merely as a technician, may be an inventor.

Q3. 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 the invention?

We find no particular reason to change the criteria pertaining to an inventor. An entity other than an inventor may be evaluated merely as an assistant for conception. For example, Microsoft Excel is very helpful in scientific studies through analysis of computation results and extraction of best modes, however, Microsoft Excel will never be an inventor. In such a case, a natural person should make criteria to discriminate good/bad results and should prepare data to analyze. Similarly, even when an AI system contributes to the conception of an invention, a natural person will still need to set up an invention project using the AI and evaluate the results from the system, and in such a case this natural person deserves to be an inventor.

Q4. 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 that trains the artificial intelligence process that creates the invention be able to be an owner?

A company that performed training as an instructor would be evaluated merely as an



assistant and not as an inventor.

This also applies to a company that provides a cloud computing environment. If the company found a technical problem to be solved and made a technical study for an invention, or developed a specific training method for the invention, an employee of the company may be an inventor, and the inventor can assign the invention to the company, however, this does not mean that the company itself is an inventor. If the technology progresses and an AI system can find a technical problem to be solved by itself, our answer may change.

Q5. Are there any patent eligibility considerations unique to AI inventions?

If an AI system performs what has been conventionally performed by a human on a large scale, eligibility may be denied under Step 2 of the Alice test.

Q6. Are there any disclosure-related considerations unique to AI inventions? For example, under current practice, written description support for computer-implemented inventions generally requires 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?

In terms of written description (and enablement), the justifiable scope of a claim in view of the specification will be an issue, especially when a result with high accuracy (such as an image recognition result with a high score) can be obtained only when a specific algorithm or data sets are used.

More specifically, the specification of an AI-related invention will include a very specific result, which is similar to a specification in chemistry and biology fields, and which is very different from a conventional software-related invention. Thus, as with the chemistry and biology fields, an examination should be performed with particular attention to the relationship between the specification and the claims.

Q7. How can patent applications for AI inventions best comply with the enablement requirement, particularly given the degree of unpredictability of certain AI systems?

Sometimes it would be difficult to determine whether the AI-related invention described in the specification is actually enabled. We are concerned that an unreasonably broad claim compared to the disclosure in the specification may be



granted. The specification should be described in a manner such that a different engineer can verify the training method.

Furthermore, we would like to note that a mere disclosure of a training algorithm is not always enough to enable the invention. In order to enable the invention, the specification should include a disclosure which enables a person skilled in the art to understand that the training data employed in the specification can be used to achieve a trained AI system applicable for a particular application. We propose the following three criteria, one of which should be met to satisfy the enablement requirement:

- Criteria 1: the relationship between input the element and output (supervisory) element in training data is obvious without explicit description;
- Criteria 2: although the relationship between the input element and output (supervisory) element in training data is not obvious or does not exist, the specification describes a logical or statistical relationship, and a skilled person can understand that this training data is effective for training; and
- Criteria 3: the relationship between the input element and output (supervisory) element in training data cannot be explained, but the specification discloses an example which establishes that the training with the training data was in fact effective and which is concrete enough to enable a person skilled in the art to perform follow-up verification.

Q8. 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?

At present, a person skilled in a field other than AI will have little knowledge in AI, and similarly a person skilled in a field of AI will have little knowledge in a field other than AI. Therefore, using AI to solve a problem in a different field is not easy. At least at present, AI has not largely impacted the level of a person skilled in the art.

However, the integration of AI in other fields may change the situation. For example, a Generative Adversarial Network (GAN) may find a new form with reduced air resistance, which is completely different to the conventional form, without any technical background. In such a situation, a person skilled in the art would be able to achieve an invention more easily, i.e., the level of a person skilled in the art would be higher.

Q9. Are there any prior art considerations unique to AI inventions?

There would be an issue in using an AI invention as prior art. Namely, if there was an AI system which could produce numerous objects in different forms, and one of them provided a technical advantage, it would be an issue as to whether the object should be recognized as prior art.



Page 6 of 7
November 8, 2019

There would be another issue in assessing the inventive step of an AI-utilizing invention. Namely, while simple substitution of an artisan's work with AI does not possess an inventive step, it would be very difficult to find out such artisan's work in an examination.

Q10. Are there any new forms of intellectual property protections that are needed for AI inventions, such as data protection?

We are afraid that neither a patent right nor trade secret could sufficiently prevent illegal copying or unauthorized use of an AI core itself. There are needs for a new system to provide protection from illegal copies of an AI core.

Q11. Are there any other issues pertinent to patenting AI inventions that we should examine?

Currently, a larger portion of prior art is disclosed in research papers than in patent publications. Therefore, more careful prior-art search for these papers is important in improving examination quality.

Q12. Are there any relevant policies or agencies that may help inform USPTO's policies and practices regarding the patenting of AI inventions?

The JPO has studied AI-related inventions.

https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/ai_jirei_e.html

In particular, the guideline states the JPO's attitude regarding inventive step, enablement requirements, and the written description requirement for an AI invention with the reasons for the JPO's decision.

As for the inventive step of an AI invention, the guideline suggests that an invention that is mere a replacement of a prior technique with AI has no inventive step. In addition, the guideline says: An AI invention meets an enablement requirement or written description requirement without any evaluation of the AI system, if the AI system has a correlation between the input and the output of the AI. On the other hand, the AI system's performance has to be evaluated as to whether it meets the enablement requirement or written description requirement, if the AI system does not have a correlation between the input and the output of the AI.

We hope that this proves useful for your discussion.

Thank you for the opportunity to comment on the proposed rule.



Page 7 of 7
November 8, 2019

Sincerely,

A handwritten signature in black ink, reading "Y. Shimizu". The signature is written in a cursive, flowing style.

Yoshihiro SHIMIZU
President, JPAA