

From: [George J. Jakobsche](#)
To: [Nguyen, Laura](#); [Geary Jr., Charles](#); [aipartnership](#)
Subject: Comments on Patenting Artificial Intelligence Inventions
Date: Friday, January 10, 2020 2:32:03 PM

To whom it may concern:

I am very sorry for submitting my comments after the comment period has ended. If possible, please consider my comments. Thank you.

Comments to USPTO on AI in re Inventions

AI is just another tool for human use

Artificial intelligence (AI), *i.e.*, intelligence demonstrated by machines, is currently used by humans to perform many functions, such as understanding human speech, competing at the highest level in strategic game systems (such as chess and Go), autonomously operating cars, intelligent routing in content delivery networks and military simulations. ^[1] Interestingly, once a solution to a problem, such as optical character recognition, becomes routine, it is *removed* from the scope of AI. Thus, the term “AI” is an indication that a *problem* solved by a particular technology is currently considered *difficult to solve algorithmically*, more than an identification of a specific technology. AI is, therefore, a *tool* used by humans to solve problems.

Over time, tools used by humans to solve problems have become progressively more sophisticated and capable, thereby enabling humans to solve ever more difficult problems. For example, finite element analysis (finite element method or FEM) is widely used for solving problems involving structural analysis, heat transfer, fluid flow, mass transport and electromagnetic potential. Similarly, computer-aided design (CAD), computer-aided manufacturing (CAM) and computer-aided tomography (CAT) systems are now widely used. Before computers made large-scale FEM, CAD, CAM or CAT feasible, many such problems could not be solved by humans. However, humans still need to define parameters for an FEM, CAD, CAM or CAT analysis.

The same is true for AI. For example, a machine learning (ML) ^[2] AI system uses a *training dataset* in order to make predictions or decisions without being explicitly programmed to perform a particular function. An ML algorithm builds a mathematical model based on sample data in the training data set. The training data set is used to “teach” the algorithm how to process data in a particular *problem domain*. However, a *human* selects the ML algorithm and the training dataset. The quality of results produced by an ML system depends, at least in part, on appropriateness of the algorithm and the training data set to the *problem* data set later processed by the algorithm. Here again, ML is a *tool* used by a human to solve a problem and, like other kinds of tools, AI has become more sophisticated and capable, thereby enabling humans to solve ever more difficult problems.

AI has helped raise the ordinary level of skill in many arts

The skill level of “one of ordinary skill in the art” increases over time, as each art evolves. Engineers and scientists always use the best then-currently available tools to solve problems. An ordinary level of knowledge of what tools are currently available, and how to use them, is *expected* of an ordinarily-skilled practitioner. Thus, although an ordinarily-skilled engineer or scientist working in the 1940s would not have used AI tools to solve a problem, an ordinarily-skilled practitioner in

2019 might use such a tool.

The patent statute recognizes only humans as potential inventors

The patent statute ^[3] says, “Whoever invents or discovers ... may obtain a patent therefor, ...” The statute does not say “Whatever invents ...” Thus, the statute requires an inventor to be a *natural person* (human being). As noted, humans use tools, including AI, to solve problems and invent or discover. Even if a screwdriver or an FEM analysis program is instrumental in making or discovering an invention, the *tool* is not a (co)inventor. A human *chose* and *operated* the tool prior to the inventive act. Similarly, in the context of AI, a human chooses an algorithm and perhaps a training data set. It is, therefore, the *human* who is the inventor. **The Office should, therefore, adopt an interpretation of §101 that limits inventors to natural persons.**

Use of AI in arriving at an invention does not negate invention any more than any other tool

The patent statute ^[4] says, “Patentability shall not be negated by the *manner in which the invention was made.*” **Thus, whether AI was involved in making an invention or discovery should not influence whether the invention is patentable.** Because AI is merely a *tool* used by a *human* to make an *invention or discovery*, **only the human should be considered an inventor. The AI should not be considered a (co)inventor.**

Novelty and obviousness should be evaluated in view of the contemporaneous level of skill in the art, including the availability of AI

The Office should *continue* to evaluate whether a particular invention, including an invention made using AI, meets the requirements of the patent statute, such as §§102 and 103, in light of the level of skill of an ordinarily-skilled practitioner *at the time the invention was made*. Thus, for example, if a scientist or engineer chooses or develops a training data set for an off-the-shelf ML algorithm, and an invention results, the Office should follow its *established procedures* for determining whether the invention is *patentable*.

1. Wikipedia: Artificial Intelligence.

2. Wikipedia: Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as “training data,” in order to make predictions or decisions without being explicitly programmed to perform the task. Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop a conventional algorithm for effectively performing the task.

Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a field of study within machine learning, and focuses on exploratory data analysis through unsupervised learning. In its application across business problems, machine learning is also referred to as predictive analytics.

3. 35 U.S.C. §101 (emphasis added).

4. 35 U.S.C. §103 (emphasis added).

Respectfully submitted,

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[1] Wikipedia: Artificial Intelligence.

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