

Artificial Intelligence and Patents:

Issues for patent prosecution

Jonathan P. Osha

October 26, 2023

AI and Patents

Problem # 1: the search for common terminology

“Of course AI inventions are patentable! They are just like any other computer software.”

“AI inventions aren’t patentable. Only humans can invent.”

“AI inventions result only from humans using AI as a tool.”



The AI-related inventions definitions project

1. Inventions on Core AI Technology (“Core AI Technology”)

- Software-based AI technology such as AI training, architectures, and methodologies; or
- Hardware-based AI technology such as AI accelerator chips, neuromorphic chips, and improvements in graphics processing units (GPUs).

2. Inventions on Specific Applications of Core AI Technology (“Applications of Core AI Technology”)

- Products, designs, processes, computer programs, or other types of material artifacts employing Core AI Technologies as one component in a larger context to perform tasks more intelligently. In other words, this type of AI-related invention applies one or more Core AI Technologies to a specific problem or task domain.

The AI-related inventions definitions project

3. Inventions Generated by or using AI

- Products, designs, processes, computer programs, or other types of material artifacts that are:
 - a) Conceived of or devised by a human with the assistance of an AI technology (AI is a tool of innovation);
 - b) Conceived of or devised by a human in collaboration with AI where the activity of the AI, if done by human, would be considered co-inventorship (AI is co-inventor with a human inventor); or
 - c) Conceived of or devised by an AI system under circumstances in which no person traditionally qualifies as an inventor (AI is only inventor; no human inventors).

AI and Patents

Problem # 2: addressing all the pertinent issues



AI inventorship tends to dominate discussions of AI & Patents

Very interesting, but not the only important issue and perhaps less urgent than others

Issue spotting: Core AI inventions

- Hardware, software, mathematical approaches....
- From an IP perspective
 - Patent eligibility is a known problem, particularly in the U.S., but...
 - *Nothing new here from an AI perspective!*

Issue spotting: Applications of Core AI Technology

- **Eligibility** is a primary concern, but no different from other CII
- AI-specific issues:
 - **Sufficiency**
 - How much detail must be provided about the AI system used, the training data and the input data?
 - **Inventorship**
 - Applications of Core AI Technology may involve humans in non-traditional “inventor-like” roles. Who to name on the patent application?

Applications of Core AI Technology: Sufficiency

- A commercially valuable Application of Core AI Technology is defined, at least in part, by the data with which it was trained and from which it continues to “learn”
 - How much detail must be provided about the training and input data?
 - Does this change if the Core AI technology is completely “off the shelf”?
 - Does it matter if the data (or similar data) are not publicly available?
 - Does this change if the Core AI Technology is a Deep Learning application?
 - System may have billions of parameters and cannot be represented directly in writing
 - System may be irreproducible in its exact form, even by the inventor(s)
 - Will AI be treated as an “unpredictable” art?

Applications of Core AI Technology: sufficiency

Example from EPO Technical Board of Appeal T0161/18

- Claim related to method for determining cardiac output from an arterial blood pressure curve that has been processed with the help of an artificial neural network
- Application rejected for lack of sufficient disclosure under Article 83 EPC

The present application uses an artificial neural network to transform the blood pressure curve measured at the periphery into the equivalent aortic pressure. With regard to the training of the neural network according to the invention, the present application merely reveals that the input data should cover a broad spectrum of patients of different ages, genders, constitutional types, health status and the like so that the network does not become specialized However, the application does not disclose which input data are suitable for training the artificial neural network according to the invention, or at least one data set suitable for solving the technical problem at hand. The training of the artificial neural network cannot therefore be reworked by the person skilled in the art, and the person skilled in the art cannot therefore carry out the invention. The present invention, which is based on machine learning, in particular in connection with an artificial neural network, is therefore not sufficiently disclosed, since the training according to the invention cannot be carried out due to a lack of corresponding disclosure.

What about a more complex system???

Applications of Core AI Technology: Inventorship

- Human roles in machine learning: who to name as the inventor(s)?
 - Collecting/selecting/labeling/curating data
 - Significant impact on model performance – can this be “inventive”?
 - Training the model
 - Optimization of parameters (billions)
 - May lead to irreproducibility
 - Deploying the model
 - Designing / adjusting for real-world application
 - Selecting “inventive” outcomes from large set of results
 - One result is better than the others
 - Recognizing “inventive” unintended outcomes
 - What can we learn from the 1928 discovery by Dr. Alexander Fleming??
 - “patentability shall not be negated by the manner in which the invention was made”
 - 35 U.S.C. 103

Issue spotting: Inventions Generated by or using AI

- Category (a): “Conceived of or devised by a human with the assistance of an AI technology (AI is a tool of innovation)”
 - Claim is to the resulting output! (this point is often missed)
 - When an output is what is claimed, the manner in which it was made is irrelevant (at least in the U.S.) so long as what is claimed is sufficiently described and enabled
 - *No need to even disclose the invention was made using AI!*

Issue spotting: Inventions Generated by or using AI

- Category (b): “Conceived of or devised by a human in collaboration with AI where the activity of the AI, if done by human, would be considered co-inventorship (AI is co-inventor with a human inventor)”:
 - Again, claim is to the resulting output.
 - For sufficiency, no need to disclose how invention was made so long as it can be described directly
 - Sole issue is inventorship:
 - Is it enough to name only the human inventor?

Issue spotting: Inventions Generated by or using AI

- Category (c): “Conceived of or devised by an AI system under circumstances in which no person traditionally qualifies as an inventor (AI is only inventor; no human inventors)”:
 - Note: this category is theoretical, at least for now...
 - Sole issue would be inventorship:
 - Most of the world would consider this not patentable

Summary recommendations

- Consider to which AI invention category each claim relates
- Be rigorous with support in the specification for claims to applications of core AI technology
 - References to available data sets or descriptions with as much detail as possible
 - Details of data curation
 - Details of training process
 - Investigate the proper (human) inventorship
- For inventions made by or using AI, be aware disclosure of an AI tool used as part of the inventive process need not be disclosed if it is not claimed (at least under current law in most countries)
 - Be sure to investigate the proper (human) inventors