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An IP Primer for Artificial Intelligence Innovations: Managing Model Drift, Data Licensing, and Other Topics

Evan M. Clark and Aseet Patel*

As artificial intelligence ("AI") inventions become pervasive, inventors and companies will need robust intellectual property strategies to protect their research and development investment in and competitive advantage created with AI. The authors of this article discuss the import of dissecting inventor's AI systems to scrutinize specific, valuable aspects of the AI, and then tailoring their patenting, licensing, and data use agreements accordingly.

The number of patent applications filed with the U.S. Patent and Trademark Office ("USPTO") involving artificial intelligence ("AI"), machine learning, and deep learning has grown in both raw number and share of all filed public applications.[1]

By 2018, patent applications involving AI are found in more than 42 percent of the USPTO's subclasses.[2]

This increase in the number of patent applications involving AI illustrates the rapidly growing importance for sound intellectual property ("IP") strategies to protect a company's AI. Companies' IP strategies must be informed by the challenges AI brings in its patent protection, data use, and licensing, as explained below.

Tailor Your Patent Strategy to Your AI in Actual Use

By way of introduction, AI, by definition, "comprise software and/or hardware that can learn to solve complex problems, make predictions or undertake tasks that require human-like sensing (such as vision, speech, and touch), perception, cognition, planning, learning, communication, or physical action."[3] This definitional property of AI to behave in a human-like fashion creates some tension with U.S. IP laws, which primarily protects human solutions to problems. For example, the USPTO has found that

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inventors are natural persons and AI is precluded from being listed as an inventor on a patent application.[4] In this way, solutions to problems generated by AI in actual use will face challenges in being protected by a patent.

Patent strategy for AI should be careful to understand how AI operates in actual use. For example, AI operates in a dynamic environment that can create model drift. There are two types of model drift: concept drift and data drift. Both result when what the AI is attempting to understand changes and cause the AI to become more inaccurate over time. Training a model bakes into the AI an understanding of the problem to be solved. Concept drift occurs when the baked-in understanding of the AI is insufficient to solving the problem in its actual environment. In other words, the definition of the problem has changed for the actual environment. Data drift occurs when a trained model's understanding is sufficient to solve the problem in its actual environment, but the input data has changed in some way that the AI is unable to capture.

In view of concept drift and data drift, patents that too narrowly claim AI-based technology, such as specific AI model structure, specific forms of training data, or specific forms of AI model data output, can limit the patent's value. Therefore, maintaining a pending continuation patent application is even more important so patent claims can be redirected if the AI changes through its life span.

In addition to accommodating for model drift, patent strategy should be informed by challenges that arise due to the specific environment the AI is placed in. For example, AI is increasingly implemented on cloud-computing platforms, such as software as a service ("SaaS") or software as a medical device ("SaMD"). Cloud-computing platforms raise questions about divided infringement that should be accounted for when developing patent claim strategy.[5] Separate from patent protection, the proliferation of AI implementations on cloud-computing platforms, and federated learning arrangements, raises its own challenges for trade secret protections.[6]

Avoid Land Mines in the Data Used With Your AI

AI is a data-intensive process that relies on large volumes of data. The current U.S. legal landscape offers inadequate copyright protection for data inputs of AI.[7] Nevertheless, contractual

obligations can be imposed on others before sharing data to limit its unauthorized uses.[8]

Furthermore, certain types of data may be subject to data privacy rules and regulations that, if unaccounted for, can expose parties to liability.[9] In this way, it is important to understand, define, and account for the use rights over the data involved in AI.

The data-intensive nature of AI should also be considered when drafting patents involving AI. Since disclosing volumes of data might not be practical or desirable in patents, there should be guidance and working examples of the AI in the patent application.[10] Working examples can include examples of training data used to train an AI model, examples of labels associated with the training data, examples of data used to test a trained model, and examples of the output data provided by a trained AI model.

Practical Tips When Licensing Your AI

The data-intensive nature of AI rewards sophisticated licensing agreements. Illustrative licensing terms include:

- Indicating who will provide and own the training data;
- Whether the provider will have access to the input data provided to the AI when in use;
- Who will own and be able to use the output data produced by the AI; and
- Who will own any changes to the AI if it is reconfigured and/or improved during its life cycle.

The nature of the software package that implements the AI can inform the licensing terms. For example, if a software package is installed at a user's premises, it may be natural for the user to wish to own the output data. There are secondary considerations to consider when drafting license terms for AI. For example, establishing specific terms that define clear data use rights can often be beneficial to all parties to a license. As some examples, if the user owns the output data, it may be beneficial to cross-license that data with the provider, who may be able to improve their training data sets based on the output data. The user, however, may want additional terms that outline restrictions on how the training data can be used with third parties.

Additional examples of terms establishing use rights including terms defining whether the licensee is able to freely use after the license is terminated any modifications to the AI they made during the term of the license, and whether output data needs to be destroyed after termination of the license. Training data is a more specific example of the importance of defining use rights in a license. The training data being used by the licensee may include confidential information (e.g., customer account data, social security numbers, etc.) and/or be protected by trade secret. Terms may be included that define the licensor's inability to access the training data due to the training data's inclusion of confidential information and/or trade secret protection. Specific terms establishing a lack of IP rights may also be beneficial. For example, if the licensor is providing just the AI model, terms defining that the licensor lack any IP rights in a method of training the model and/or training data may be beneficial.

The fee structure of the license is crucial given the often-dynamic environment in which AI operates. If the performance of the AI degrades over time (e.g., due to model drift), a linear fee structure, such as an annual subscription or annual maintenance fee, is less suitable. A linear fee structure can handcuff a licensee to paying the same price for AI that is operating at reduced performance. In this way, the fees could be front-loaded to the early portion of the AI license's term where performance is likely achieving expected benchmarks. Alternatively, the licensor could provide additional services that make a linear fee structure more suitable for AI. For example, if the licensor provides analytics and maintenance services for monitoring the performance of the AI and reconfiguring the AI if necessary, a linear fee structure may be suitable.

Looking to the Future

Going forward, as AI becomes pervasive, of increasing importance is the ethical use of such technology. Licenses may include terms that restrict the scope of the AI's use and restrict the ability to create derivatives and/or improvements based on the AI.[11] These restrictions can be placed on both the end-user agreement and the source code license. What is considered ethical use may be up to the licensor and/or licensee to decide. But facial recognition, with

its ability to identify persons, is a common type of AI that may be restricted from being used in ways that are considered unethical.

Notes

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1. Inventing AI—Tracing the diffusion of artificial intelligence with U.S. patents, Office of the Chief Economist IP Data Highlights, Number 5, October 2020, pages 4-6.

2. *Id.* at page 7.

3. U.S. National Institute of Standards and Technology, 2019, pages 7-8.

4. *See* Decision on Petition in Application No. 16/524,350 (April 22, 2020).

5. Ameya V. Paradkar & Ji Young Park, Infringement Issues in Artificial Intelligence Patents, The Legal Intelligencer, March 29, 2019, available at https://www.blankrome.com/publications/infringement-issues-artificial-intelligence-patents; see also, Nathanial Grow, Resolving the Divided Patent Infringement Dilemma, 50 U. Mich. J. L. Reform 1, 2016, available at https://repository.law.umich.edu/mjlr/vol50/iss1/1.

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8. *See, e.g.*, C. Macedo, N. Spence, B. Beavan, & B. Brager, How To Identify, Prepare and Package Data for Monetization in AI, Les Nouvelles, Journal of the Licensing Executives Society, Volume LVI, No. 3, September 2021, available at https://ssrn.com/abstract=3897882.

9. *See, e.g.*, M. Gomez, S. Stone, & K. Hoppmann, Five Tips for Life Sciences Companies to Protect Their AI Technologies, JD Supra, February 26, 2021, available at https://www.jdsupra.com/legalnews/five-tips-for-life-sciences-companies-3589104/.

10. *See Pi-Net Int'l Inc. v. JP Morgan* (D. Del. 2014) (holding the patent invalid for lacking enablement because the specification is "devoid of direction, guidance, and/or working examples" for implementing the invention).

11. Examples of licenses that address ethical concerns can be found at https://www.licenses.ai/ai-licenses.