Ways To Beef Up AI Patent Portfolios' Long-Term Value

By **Darren Smith** (March 6, 2023, 6:04 PM EST)

Intellectual property around artificial intelligence should be carefully considered today, as the approach to patenting these technologies can have significant impact on the extent of a patent portfolio that AI-related research and development will generate.

It would be tough to overstate the amount of interest AI has attracted. Recent chatbots, such as ChatGPT developed by OpenAI, show great promise in providing natural language processing. AI can also be leveraged in other fields of technology by learning outcomes from large "training" data sets and applying those outcomes to control systems based on actual input.

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AI development is active in many fields including autonomous driving and driver assistance systems for motor vehicles, generating recommendations for users based on observed user behavior, facial recognition, identifying new drug targets, optimizing patient cohorts in clinical trials and identifying patient conditions from medical images.

The enormous interest in AI is due, in part, to AI's ability to learn and adapt to input data over time. This has a unique effect in the context of patents.

Patents have a nominal term of 20 years from filing, but many are rendered irrelevant much sooner. The life of a technology in the market can be much less than a patent's 25-year life.

As an industry moves from one generation to the next, patents covering earlier generations often lose value. AI technology can evolve on its own through continued training, slowing the transition from one generation to the next.

This evolving ability increases the longevity of AI by allowing a generation to remain applicable for a longer time. Patent applications written today for AI technologies will thus need to face a longer test of time.

A large set of AI-related patent applications are now proceeding through substantive examination, and a few recent ex parte appeal decisions from the Patent Trial and Appeal Board can provide practitioners with some guidance for preparing AI-related patent applications with an eye to obtaining patents that will provide protection as AI technology matures.

First, an aspect of AI should be explicitly recited in the claims. One potential broadening strategy for drafting claims to AI technology may be to capture relationships or outcomes that are the end result of the AI processing.

However, that drive to broaden claim scope should not result in removing an explicit recitation of AI that may improve arguments in favor of patentability. In the August 2021 Ex Parte Jack Mccallum, Scott Roloff, William Mccallum, & Ken Grifno case, the appellant claimed a "method of searching in a computing environment."[1] The claims were rejected as directed to ineligible subject matter.[2]

On appeal, the appellant remarked that in the invention an "artificial intelligence machine learning app uses database extracts to calculate total cost and risk," the invention "may use complex algorithms to compare and analyze data," and the invention "'learns' by comparing predictions to actual costs by using learning modifiers."[3]

The PTAB affirmed the rejection that the invention was ineligible subject matter.[4]

The PTAB dismissed the appellant's arguments on appeal because "the machine learning features are not claimed."[5]

Claiming AI algorithms in a manner that captures both AI and non-AI algorithms resulted in the claim being an abstract idea that "does not provide an inventive concept."[6]

Additionally, the recitation of AI should extend beyond the preamble. In the April 2020 Ex Parte Hiroaki Miyazaki PTAB case, the appellant attempted to distinguish the claimed invention from prior art by contending that the prior art "is not directed to artificial intelligence" and instead "describes a system for recognizing and classifying input information into one of a plurality of known formalism types."[7]

The appellant distinguished "the claimed subject matter [as] directed to a method for realizing artificial intelligence, i.e., a self-learning mechanism."[8] However, the PTAB found that the preamble term "artificial intelligence" simply "state[s] a purpose or intended use for the invention."[9]

This conclusion was based on the body of the claimed invention having defined a complete invention that accomplished a result — furnishing information or control signals — such that the "artificial intelligence" preamble recitation did not contribute toward the claimed invention.[10]

The PTAB's test was to delete the term "artificial intelligence" from the preamble claim and determine whether that changed the performance of the method, or whether the term is otherwise essential to understand limitations or terms in the claim body.[11]

Thus, practitioners drafting claims for AI inventions should incorporate aspects of AI into the performance of the method or otherwise explicitly recite AI in the body of the claim.

In claiming AI-related inventions, the AI recitation should be linked to the processing of the data. In the March 2022 Ex Parte Joshua Budman PTAB case, the representative claim included a step of obtaining images from a mobile device and "predicting future progress of the skin condition based on the parameter values of the skin condition in the first and second images using a machine learning algorithm."[12]

The claims were rejected as obvious.[13] The appellant remarked that the cited reference

does not disclose using machine learning algorithms to predict future progress of skin conditions based on images obtained from a mobile device" but rather "based on images obtained from a microscope, endoscope, or other imaging modality (e.g., CT or MRI).[14]

The examiner cited a separate reference for the use of mobile devices to obtain images in the obviousness rejection.[15]

The PTAB determined that the appellant's arguments amounted to an improper "attacking references individually where the rejection is based upon the teachings of a combination of references."[16]

Here, the argued nonobviousness was not related to the AI, but rather the source of data for the AI. When preparing patent applications, practitioners should consider how the data is processed by the AI or how the data changes the AI, and the claims drafted to reflect the interaction with the AI to link AI to the aspects that may be argued as nonobvious.

Further, practitioners should consider including, in the specification, experimental data indicating efficacy of the AI in performing the claimed processing. The experimental data can be based on an example AI trained with a portion of an available data set having known outcomes and determining an accuracy of the AI using a remaining portion of the available data set.

Such experimental data may be particularly useful when particular AI algorithms demonstrate remarkable synergism with particular data sets.

In the June 2021 Ex Parte Yu Zheng, Xing Xie, Wei-Ying Ma, Hsiao-Wuen Hon, & Eric I-Chao Chang case, the appellant claimed "an artificial neural network (ANN) classifier … wherein the temporal classifier is one of a linear-chain conditional random field (CRF) classifier, a hidden Markov model (HMM) classifier, or a maximum entropy Markov model classifier."[17]

The appellant argued that although the prior art

> include[d] a list of artificial intelligence and machine learning techniques, there is nothing in [the cited prior art] that would suggest a configuration where the spatial classifier is an artificial neural network (ANN) classifier … and … the temporal classifier is one of a linear-chain conditional random field (CRF) classifier, … a hidden Markov model (HMM) classifier, or a maximum entropy Markov model classifier.[18]

In rejecting the claims, the examiner argued that "an artisan would have … been motivated to use one of the many classification algorithms known and used at the time, which include artificial neural networks and hidden Markov models."[19]

The examiner concluded that the "combination amounts to no more than combining prior art elements according to known methods to yield predictable results."[20] The PTAB upheld this obviousness rejection in view of the appellant's lack of data regarding results for the particularly claimed AI algorithm.[21]

The PTAB cited the precedent that "'some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected' tends to indicate nonobviousness."[22] But, the PTAB added that "unexpected results as a secondary consideration 'must be shown to be unexpected compared with the closest prior art.'"[23]

With algorithms that implement AI to solve a problem, careful consideration should be given to detail the inputs and outputs. For example, the specification should describe, in as much detail as available, what data is input to the AI, what data is output from the AI, how the input data is pre-processed in preparation for analysis by the AI, and how the output data is used in a practical application.

Without understanding how particular inputs and outputs change the operation of AI can leave a claimed invention vulnerable to general obviousness allegations. In Ex Parte Nicole Ann Shanahan, the appellant claimed a

> machine learning engine … comprising: a database to store digital assets; … and a processing device … configured to: generate a binary file for each digital asset based on a machine learning model comprising a vector representation based on paragraph vector classification using an unsupervised learning model.[24]

The PTAB found the claim obvious based on a combination of a first reference that "discloses an online patent application submission, assignment, and docketing system" and a second reference that demonstrates "comparing and analyzing textual documents using machine learning algorithms … is old and well-known," including the claimed "machine learning model comprising vector representation analysis based on paragraph vector classification using an unsupervised learning model."[25]

The PTAB noted that combining the prior art references to apply the known AI system to the known database was not "uniquely challenging or difficult for one of ordinary skill in the art" or "represented an unobvious step over the prior art."[26]

In contrast, a more detailed claim describing particular inputs and outputs from AI that differentiate how the AI is applied to data was found patentable over prior art. In the March 2022 Ex Parte Lucian Mihai Itu case, the appellant claimed:

> predicting regions in the automatically generated patient-specific anatomical model for which user feedback is required for accurate computation of a hemodynamic index using one or more trained learning models.[27]

This step involves the selection of certain data for which to obtain additional corresponding user feedback. The specificity in the claim language allowed the appellant to distinguish the inventor's own prior art that also used machine learning and a hemodynamic metric.[28]

The appellant argued that the reference describes AI that is "applied to compute the post-treatment hemodynamic metric" rather than applied to a patient-specific anatomical model for "predicting regions … for which user feedback is required."[29]

Despite similarities between the claim language and the prior art, the claimed specificity regarding the "where" of the application of AI resulted in the reversal of the rejection.

The PTAB succinctly opined that "the machine learning based model cited in [the reference] is used after information is input from the user" in contrast to the claimed application of AI earlier in the data processing.[30]

Likewise, details regarding the implementation of AI that answers the question "how many" AI has been

found patentable. In the November 2021 Ex Parte Wen-Kwang Tsao, Chia-Yen Chang, & Pinghuan Wu case, the appellant claimed a "computer-implemented method of static behavior-predictive malware detection," including:

> Inputting the first static features to a first network trained by machine learning to generate behavior-predictive static features [and] inputting the first static features and the behavior-predictive static features to a second network trained by machine learning to obtain a malicious score.[31]

The appellant argued that the prior art disclosed only a single machine learning system and that there is "no suggestion in [the prior art] that the single disclosed 'learning classifier' of performing the two separate steps of" inputting data to two machine learning processes.[32]

The PTAB agreed and reversed, noting that the prior art "generally uses machine leaning techniques to detect threats," rather than "use[s] two networks trained by machine learning in the manner recited by the claims."[33]

AI inventions have promise to revolutionize the way we interact with electronics in performing our human tasks. AI allows electronics to mimic human capacity for identifying relationships in data sets. As a result, AI demonstrates great potential for reducing much of the routine from human tasks.

However, there is much research to do in determining how AI can be trained and applied to perform these tasks. Investments in this research should be protected in patent applications.

These suggestions gleaned from recent PTAB proceedings should provide practitioners with some suggestions for shaping the invention disclosure and application drafting processes to improve outcomes from prosecuting the patent application, resulting in improved long-term value of AI patent portfolios.

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[1] No. 2021-001033, 2021 WL 3537288, at *1 (PTAB Aug. 9, 2021).

[2] Id.

[3] Id. at *6.

[4] Id. at *7.

[5] Id. at *6 (citing Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd., 955 F.3d 1317, 1325 (Fed. Cir. 2020) ("[T]he specification may be 'helpful in illuminating what a claim is directed to ... [but] the specification must always yield to the claim language' when identifying the 'true focus of a claim."')).

[6] Id. at *10 (citing West View Research, LLC v. Audi AG, 685 F. App'x 923, 926 (Fed. Cir. 2017) ("claims

to receiving and analyzing data queries, retrieving/processing information constituting a response thereto, and generating a visual or audio response to the data query do not improve computer functionality")).

[7] No. 2018-007636, 2020 WL 1663484, at *4 (PTAB Apr. 1, 2020).

[8] Id.

[9] Id. (citing Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 809-10 (Fed. Cir. 2002)).

[10] Id.

[11] Id.

[12] No. Ex Parte Joshua Budman et al., 2021-005527, 2022 WL 970577, at *1 (PTAB March 29, 2022)

[13] Id. at *3.

[14] Id. at *3.

[15] Id. at *2

[16] Id. at *3 (citing In re Merck & Co., Inc., 800 F. 2d 1091, 1097 (Fed. Cir. 1986)).

[17] No. 2020-001995, 2021 WL 2495181, at *4 (PTAB June 16, 2021).

[18] Id.

[19] Id. at *5.

[20] Id. at *5

[21] Id. at *6.

[22] Id. (citing In re Soni, 54 F.3d 746, 750 (Fed. Cir. 1995))

[23] Id. (citing Kao Corp. v. Unilever U.S., Inc., 441 F.3d 963, 970 (Fed. Cir. 2006) (quoting In re Baxter Travenol Labs., 952 F.2d 388, 392 (Fed. Cir. 1991))).

[24] No. 2019-005945, 2020 WL 3571711, at *1 (PTAB June 24, 2020).

[25] Id. at *3.

[26] Id. (citing Leapfrog Enters., Inc. v. Fisher-Price, Inc., 485 F.3d 1157, 1162 (Fed. Cir. 2007)).

[27] No. 2021-001353, 2021 WL 736078, at *1 (PTAB March 9, 2022).

[28] Id. at *4.

[29] Id. at *3.

[30] Id. at *4 (emphasis original).

[31] No. 2020-006152, 2021 WL 5631613, at *1 (PTAB Nov. 30, 2021).

[32] Id. at *3.

[33] Id.