



**The Journal of Robotics,
Artificial Intelligence & Law**

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Artificial Intelligence at the Patent Trial and Appeal Board

Braden M. Katterheinrich, Ryan L. Duebner, and Sean Wei*

The authors explain that Patent Trial and Appeal Board panels have found patent eligibility in only 20 percent or so of the decisions applying the U.S. Patent and Trademark Office's 2019 Revised Patent Subject Matter Eligibility Guidance to claims reciting AI-related features.

Since the U.S. Patent and Trademark Office (“USPTO”) released its 2019 Revised Patent Subject Matter Eligibility Guidance (“Guidance”), the Patent Trial and Appeal Board (“PTAB”) has published over 50 decisions that apply the Guidance to artificial intelligence (“AI”)-related inventions.

Included in those decisions is *ex parte Hannun*,¹ a decision recently designated by the PTAB as being “informative” and that applies the Guidance to find claims involving AI to be patent-eligible under 35 U.S.C. § 101.

This article reviews the *Hannun* decision and summarizes findings and insights, from analyzing each of the published PTAB decisions that have applied the Guidance thus far to AI-related inventions.

In short, the PTAB panels have found patent eligibility in approximately only 20 percent of decisions applying the Guidance to claims reciting AI-related features. These decisions provide helpful insight into strategies for drafting and successfully prosecuting applications to issuance for AI inventions.

Ex Parte Hannun

The claims at issue in *Hannun* involved a method for speech recognition using a trained neural network. The examiner asserted that the claims recited a mathematical relationship/formula, certain methods of organizing human activity and a mental process. The representative claim recited:

- A computer-implemented method for transcribing speech comprising:
 - Receiving an input audio from a user;
 - Normalizing the input audio to make a total power of the input audio consistent with a set of training samples used to Train a trained neural network model; and
 - Generating a jitter set of audio files from the normalized input audio by translating the normalized input audio by one or more time values.
- For each audio file from the jitter set of audio files, which includes the normalized input audio:
 - Generating a set of spectrogram frames for each audio file;
 - Inputting the audio file along with a context of spectrogram frames into a trained neural network;
 - Obtaining predicted character probabilities outputs from the trained neural network; and
 - Decoding a transcription of the input audio using the predicted character probabilities outputs from the trained neural network constrained by a language model that interprets a string of characters from the predicted character probabilities outputs as a word or words.

In reviewing the representative claim, the PTAB applied the USPTO's Guidance, under which the USPTO has created two prongs for applying step one of the U.S. Supreme Court's current patent-eligibility test.

Applying Prong 1 of the Guidance, the PTAB noted that the claimed steps cannot "practically be performed mentally," so the claim is not directed to a mental process. For example, the PTAB found that steps such as normalizing an input file, generating a jitter set of audio files and obtaining predicted character probabilities from a trained neural network were not mental processes.

Further, the claims did not recite steps for organizing human behavior because the claims did not feature "fundamental economic principles or practices, commercial or legal interactions, managing personal behavior or relationships or interactions between people." Finally, the mathematical algorithm or formula described in the specification was not itself recited in the claims.

Applying Prong 2 of the Guidance, the PTAB found that the claims included other features that "integrate the judicial exception

into a practical application.” In particular, the PTAB found that the claims recited “specific features” of transcription that were “specifically designed to achieve an improved technological result.” This finding was based in part on the specification’s description that a trained neural network “achieves higher performance than traditional methods on hard speech recognition tasks while also being much simpler.”

Under step two of the Supreme Court’s patent eligibility test, the PTAB found that the examiner simply failed to provide sufficient evidence to support the assertions under this step.

Data and Practice Pointers

The PTAB panels that have applied the Guidance to AI-related inventions have reversed approximately only 20 percent of patent eligibility rejections under 35 U.S.C § 101.

Over 50 percent of the reversals found that the claims were patent-eligible under Prong 1 of the Guidance. This shows the importance of focusing on this portion of the Guidance and submitting arguments that show that the claims are not directed to mathematical relationship/formula, certain methods of organizing human activity or mental processes.

For claims asserted to recite mathematical concepts, the PTAB sided with appellants when mathematical concepts were not explicitly recited in the claims—regardless of whether the specification disclosed mathematical equations. As noted in the *Hannun* decision, under the Guidance, the claims should not be rejected if the mathematical algorithm or formula described in the specification is not specifically recited in the claims.

For claims asserted to recite certain methods of organizing human behavior, appellants were successful in reversing rejections by showing how the claims did not involve fundamental economic principles or practices, commercial or legal interactions, or managing personal behavior, relationships or interactions between people.

For example, in *ex parte Adjaoute*,² the appellant successfully argued that the examiner had read the claim features too broadly or otherwise ignored the AI-specific features. Agreeing with the appellant, the PTAB found that the claimed “monitoring the operation of machines . . . using neural networks, logic decision trees,

confidence assessments, fuzzy logic, smart agent profiling, and case-based reasoning” was not a fundamental economic principle.

For claims asserted to recite mental processes, the PTAB sided with appellants when it was shown that the recited features could not be “practically” performed mentally.

For example, in *ex parte Carter*,³ the PTAB found that “statistically identifying a logic problem in input text, as a practical matter, reasonably could not be performed entirely in a human’s mind.”

As another example, the PTAB in *ex parte Markram*⁴ found that a “neural network device implemented in hardware or in a combination of hardware and software” and comprising “a collection of [interconnected] node assemblies” is not a mental process. The PTAB pointed to the specifications to support their findings in both cases.

Approximately 30 percent of the reversals found that the claims were patent-eligible under Prong 2 of the Guidance. Successful arguments under Prong 2 included showing how the problem being solved by the claimed invention was addressed by “specifically using several artificial intelligence classification technologies” or “a machine learning application that included specific steps...”

Other successful arguments under Prong 2 included showing how the problem being solved by the claimed invention was “rooted in computer technology and did not exist prior in the pre-Internet world” per the Federal Circuit’s decision in *DDR Holdings LLC v. Hotels.com, L.P.*

For reversals under step two of the patent eligibility test, the PTAB typically found that the examiner simply failed to follow the USPTO’s Berkheimer guidance for establishing additional elements as being well-understood, routine, or conventional.

Conclusion

As highlighted by *Hannun* and other PTAB decisions, AI-related inventions are more likely to be found patent-eligible at the USPTO when the claims do not explicitly recite mathematical formulas and instead recite AI-related features that are technologically specific and that cannot practically be replicated in one’s mind.

Notes

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1. *Ex parte Hannun* (Appeal No. 2018-003323).
2. *Ex parte Adjaoute* (Appeal No. 2018-007443).
3. *Ex parte Carter* (Appeal No. 2018-007242).
4. *Ex parte Markram* (Appeal No. 2018-008166).