

Overview of Artificial Intelligence (AI) patent applications and related issues

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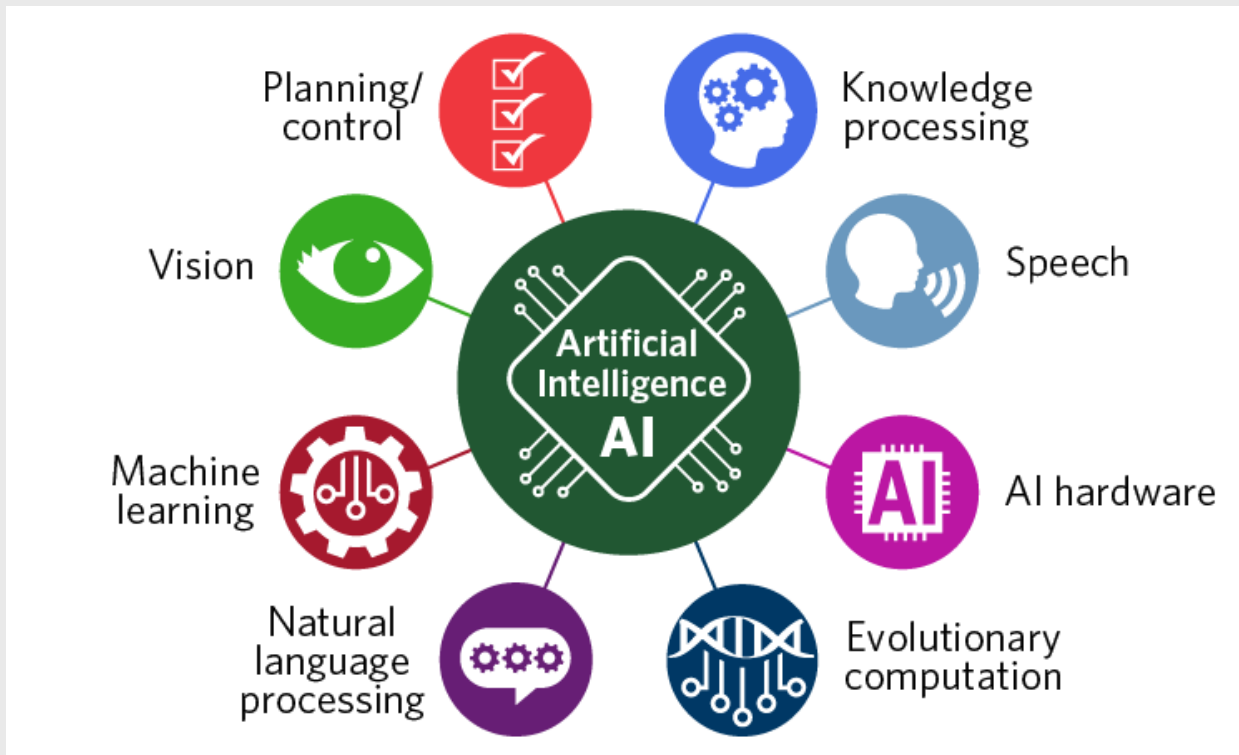
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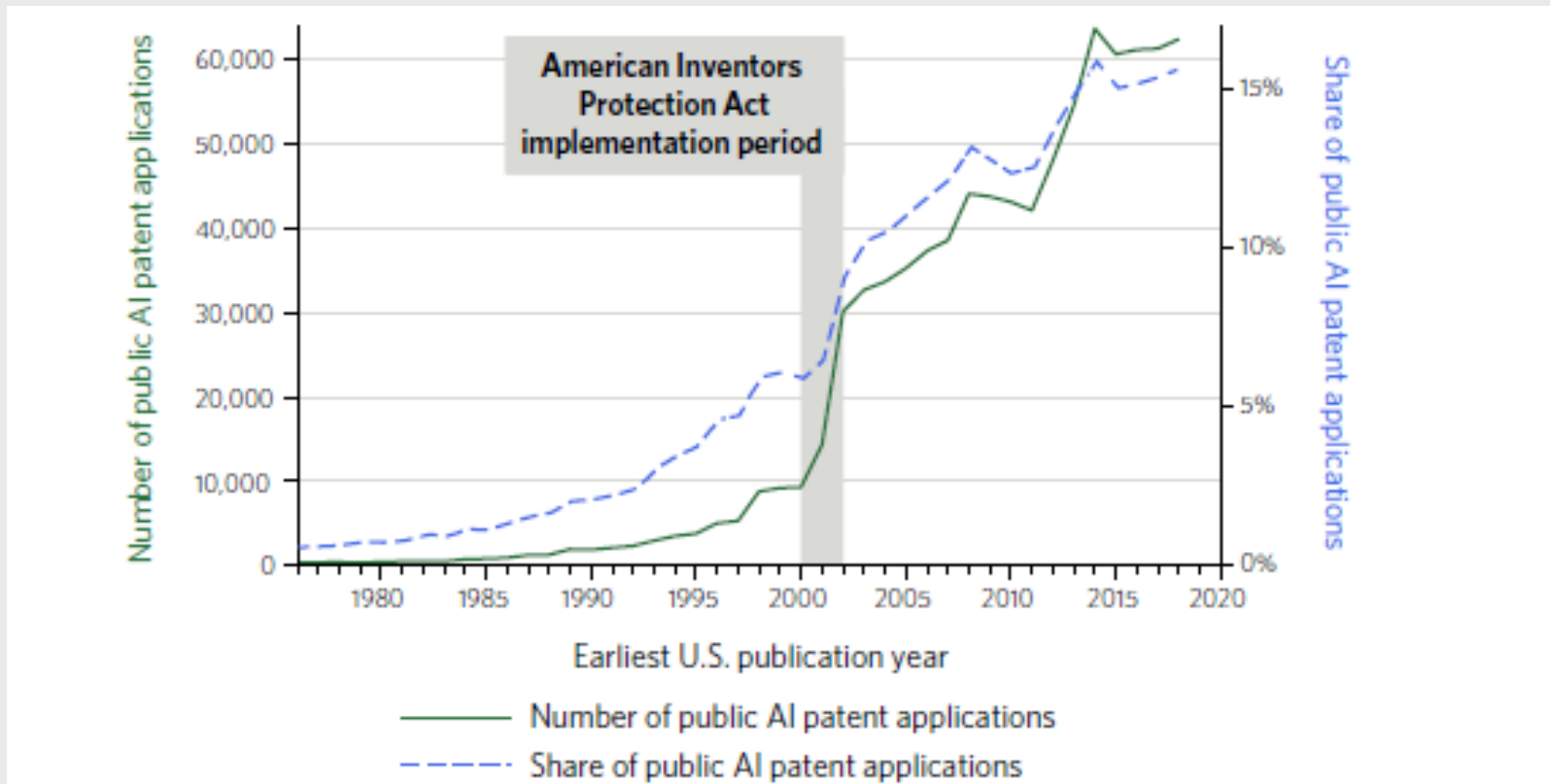
What is AI?

- The U.S. National Institute of Standards and Technology (NIST) define AI technologies and systems to “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.”

For patent applications and grants, AI is defined as comprising one or more of eight component technologies. These components span software, hardware, and applications, and a single patent document may contain multiple AI component technologies.



Volume and share of public AI patent applications, 1976-2018





Birch
Stewart
Kolasch
Birch LLP

Whether AI can be named as the inventor in a patent application?

Answer is NO, for now.

Thaler v. Katherine K. Vidal, 43 F.4TH 1207 (Fed. Cir. 2022).

- In 2018 and 2019, Dr. Stephen Thaler filed patent applications naming Device for Autonomous Bootstrapping of Unified Sentience, known as “DABUS,” as the inventor of the resulting inventions.
- The USPTO refused to allow the two patent applications because the AI system was listed as the sole inventor. The USPTO concluded that both applications were incomplete because they lacked a valid inventor.
- The Federal Circuit affirmed the district court's holding that an AI could not be listed as an inventor on a patent application because the Patent Act requires that inventors must be natural persons.

AI-related examination guidance

- **Subject matter eligibility**

- MPEP 2106 provides general guidance on subject matter eligibility.
 - MPEP 2106.04(a) discusses the abstract idea exceptions (computer-implemented inventions)
- Revised examination procedures in view of the 2019 Revised Patent Subject Matter Eligibility Guidance (2019 PEG)

Example 39 - Method for Training a Neural Network for Facial Detection

- A computer-implemented method of training a neural network for facial detection comprising:
 - collecting a set of digital facial images from a database;
 - applying one or more transformations to each digital facial image including mirroring, rotating, smoothing, or contrast reduction to create a modified set of digital facial images;
 - creating a first training set comprising the collected set of digital facial images, the modified set of digital facial images, and a set of digital non-facial images;
 - training the neural network in a first stage using the first training set;
 - creating a second training set for a second stage of training comprising the first training set and digital non-facial images that are incorrectly detected as facial images after the first stage of training; and
 - training the neural network in a second stage using the second training set.

- **1. the claim falls within the statutory categories?**
 - Yes, a process.
- **2A-Prong 1. the claim recites judicial exception?**
 - No. The claim does not recite any of the judicial exceptions enumerated in the 2019 PEG. For instance, the claim does not recite any mathematical relationships, formulas, or calculations. While some of the limitations may be based on mathematical concepts, the mathematical concepts are not recited in the claims. Further, the claim does not recite a mental process because the steps are not practically performed in the human mind. Finally, the claim does not recite any method of organizing human activity such as a fundamental economic concept or managing interactions between people. Thus, the claim is eligible because it does not recite a judicial exception.

Eligible

Ex parte Hannun (formerly Ex parte Linden), 2018-003323 (April 1, 2019)

- Claim 11: 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;
 - 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.

- The Examiner rejected the claim as being patent-ineligible, asserting that the claim is merely abstract ideas (i.e., mathematical concepts and certain methods of organizing human activity without significantly more.)
- The PTAB disagreed. While the PTAB generally agreed that the patent specification included mathematical formulas, such mathematical formulas were “**not recited in the claims.**”
- The PTAB also disagreed with the Examiner’s contention that the claims involves a method of organizing human activity since the recited steps cannot practically be performed mentally.



- According to the PTAB, the claims were directed to a specific implementation comprising technical elements including AI and computer speech recognition.
- The PTAB noted that even if the claims were considered to recite one of the aforementioned categories of abstract ideas, the claims still "are not directed to an abstract idea because the alleged judicial exception is integrated into a practical application."
- the PTAB observed that "the claims of the current application include specific features that were specifically designed to achieve an improved technological result" and "provide improvements to that technical field," since the specification describes a trained neural network used with a language model that "achieves higher performance than traditional methods on hard speech recognition tasks while also being much simpler."
- **Eligible**

AI-related examination guidance

- **Compliance with 35 U.S.C. § 112**

- **MPEP 2161.01** provides guidance on disclosure requirements for computer-implemented functional claim limitations.
- **MPEP 2181** provides general guidance for examining means plus function (35 U.S.C. 112(f)) limitations. MPEP 2181(II)(B) provides guidance on the description necessary to support a claim limitation that invokes 35 U.S.C. 112(f).
- **MPEP 2173.05(g)** discusses functional limitations that do not invoke 35 USC 112(f).
- Examiner training on **Examining Computer-Implemented Functional Claim Limitations for Compliance with 35 U.S.C. 112**.

Europe

- The EPO has refused to approve patents in which the AI itself is named as the inventor.
- The EPO has deemed AI-related inventions abstract per se—and hence not patent-eligible, as they are based on computational models and algorithms.
- According to the EPO Guidelines, a patent may be granted only when the AI can be applied so as to solve a specific technical problem.

China

- The CNIPA has refused to approve patents in which the AI itself is named as the inventor.
- China in the new revision of the Patent Examination Guideline added a new section including particular rules for the examination of inventions that include algorithms, business rules, or method features, such as AI related patents, and added some patentability examples.

Korea

- The KIPO has refused to approve patents in which the AI itself is named as the inventor.
- Patent eligibility for AI inventions is treated substantially the same as that for computer-implemented inventions.

Japan

- The EPO has refused to approve patents in which the AI itself is named as the inventor.
- The JPO did not revise the Patent Examination Guidelines/Handbook specifically for AI, but added case examples of AI-related inventions to Patent Examination Guidelines/Handbook.

AI-related application drafting suggestions

- **Claim:**

- Avoid using all functional language
- Recite AI-specific architecture or training elements (need not recite the underlying mathematical relationships, formulas, or calculations), e.g., reciting a convolutional neural network (CNN), a recurrent neural network (RNN)
- Recite a training process
- Reflect an improvement specific to AI technology or functioning of a computer

AI-related application drafting suggestions

- **Specification:**

- Identify a technical problem in the existing technology.
- Describe how the claimed invention provides an improvement to the technical field.
- Describe the relationship between the problem to be solved and the architecture used to solve it.
- Provide specific and technical details regarding operation of the architectural elements, training process/elements and solution elements.
- Provide an algorithm for the software/AI implemented functions, and provide definition and description of exemplary use of the AI specific elements.

The End

