Patenting AI and Update on FICPI/AIPLA/AIPPI Colloquium on AI

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November, 2019
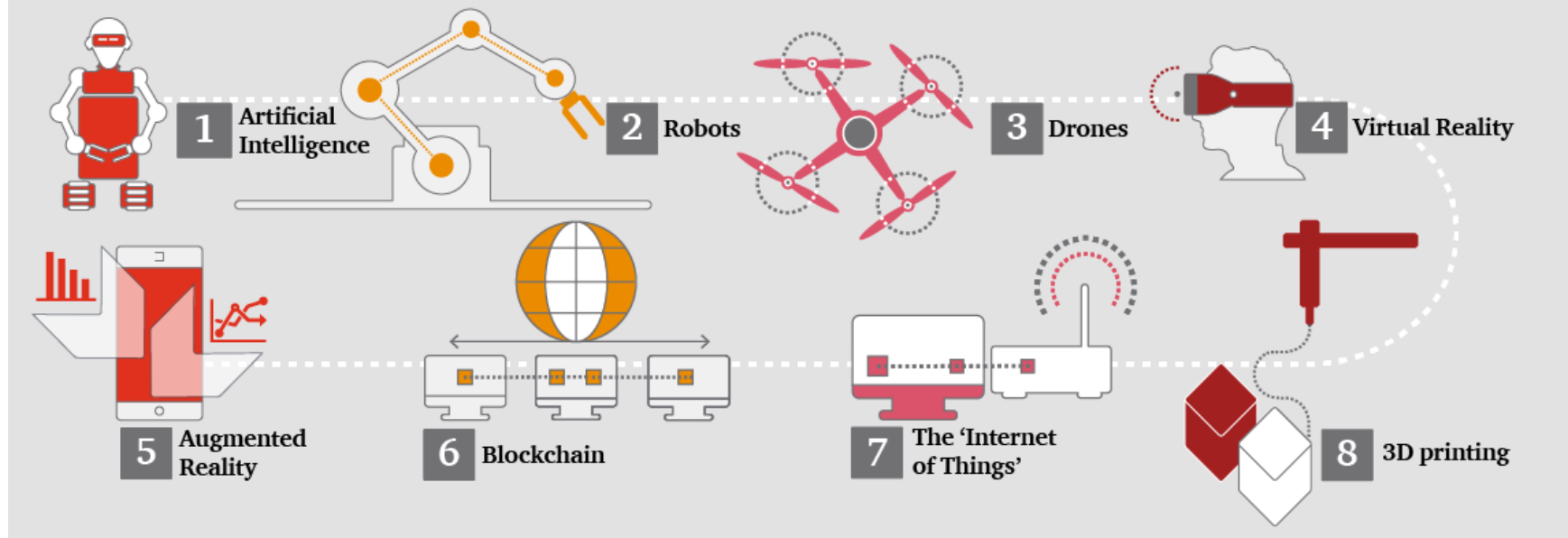
History of Emerging Technology

Current Emerging Technologies

The eight emerging technologies you should learn to love:

1 Artificial Intelligence
2 Robots
3 Drones
4 Virtual Reality
5 Augmented Reality
6 Blockchain
7 The 'Internet of Things'
8 3D printing

https://www.pwc.co.uk/intelligent-digital/disruption-assets/disruption-AI-8-technologies.png

On the Horizon

- ## 5G wireless technology
  - Faster speeds
  - More connectivity
  - Drastic increase in amount of data generated
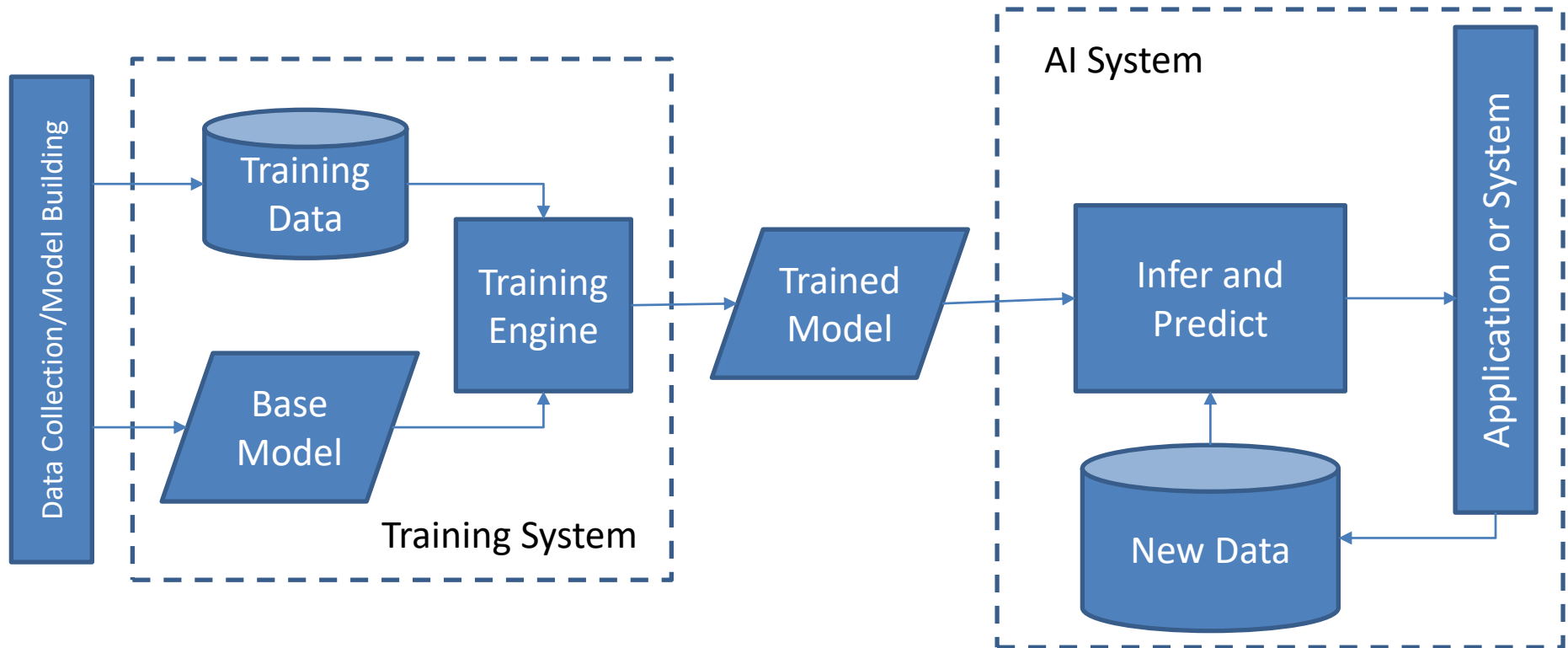 - Convergence of technologies

https://www.gigabyte.com/Article/mec-a-flexible-choice-for-a-better-5g-mobile-internet-experience

AI Introduction

- AI is a foundational emerging technology
- Example AI system (deep learning):

FICPI/AIPLA/AIPPI Colloquium on AI

- 28-29 March, 2019 - Turin, Italy.

- Approx. 100 attendees, including IP offices and industry speakers.

- Topics: AI overview, AI in IP offices, AI in IP practices, AI and copyright, ethical issues and AI patent issues (inventorship, subject matter, sufficiency of disclosure, inventive step).

AI: Challenges to Patent System

Challenge 1:   Inventorship

Challenge 2:   Subject Matter Eligibility

Challenge 3:   Sufficient Disclosure

Challenge 4:   Inventiveness
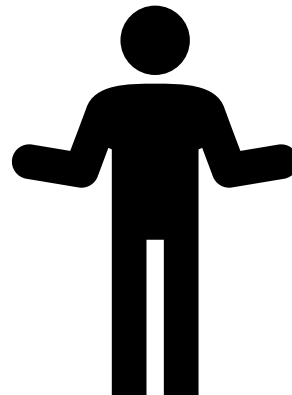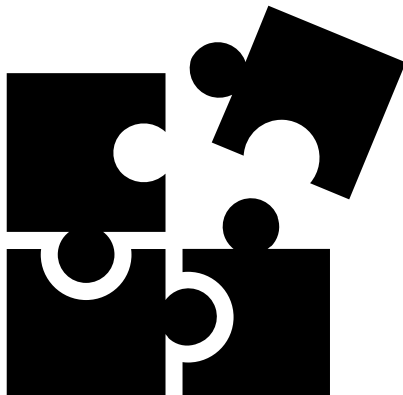
Challenge 1: Inventorship

- Most patent systems require that humans be named as inventors – should this still be necessary?

- Does a human inventor need to conceive of the crux or result of an invention?

- Is there a need for a legal "electronic person" to attribute (co-)inventorship?

Inventorship: U.S.

- Issue 1: determine how much protection given to inventors of AI inventions.

- Issue 2: determine what protection is afforded to the inventive AI entity.

- U.S. requires that the inventors (or co-inventors) be named in application.

- Case law: to be an inventor must be a "contribution to the conception" of the invention.

- 35 U.S.C. § 100(f) defines "inventor" as the "individual or…individuals collectively who invented…".

- There is a presumption under U.S. law that the inventors are human.

- "people conceive, not companies" – *New Idea Farm Equipment Corp v. Sperry Corp. and New Holland Inc.*

Inventorship: China

- Under Rule 13 of Chinese Patent Law Implementing Regulations, an "inventor" or "designer" means "any person who has made creative contributions to the substantive features of an invention-creation."

- The Examination Guidelines explain that the "inventor" shall be an individual, and an organization or company is not qualified to be "inventor."

- Inventive AI would not be recognized as an inventor, and only the developer or the user of AI can be recognized as an inventor under current Chinese law.

Inventorship: Europe

- Art. 60(1) of the European Patent Convention (EPC) states that the inventor or his successor in title is entitled to the right to a European patent. The EPC does not define the term 'inventor'.

- EPO has no power to determine questions of, or indeed disputes over, inventorship and entitlement in terms of substantive law (see item 3 of Reasons for the decision in G3/92).

- According to Art. 1(1) of the Protocol of Recognition, incorporated under Art. 164(1) EPC within the EPC, the courts of contracting states have exclusive jurisdiction to decide entitlement claims.

- Implementation of any such decision from a national court is governed by Art. 61 EPC.

Inventorship: Japan

- In order to be 'an inventor', an inventive entity must be a natural person. Thus, AI itself cannot be an inventor regardless of the AI's contribution during the invention process.

- The AI inventorship situation is similar to 'joint invention' in which two natural humans collaborated to create a single invention. Based on a Tokyo District Court decision - if a person conceived of the means for solving the problem, he/she is highly likely to be considered to be an inventor.

Inventorship: Korea

- Current Korean laws consider individuals as inventors. There has been little discussion as to whether to admit Inventive AI as an inventor under Korean law because Inventive AI is generally considered to be an object that is embodied in hardware by a human being.

- Korean Patent Act addresses whether to admit any meaningful results or technical creations produced by the AI as an invention. Such results produced by the AI, however, are generally interpreted as a process of creating something by a human being and cannot be an invention under Korean Patent Act.

Challenge 2: Subject Matter Eligibility

- Are AI algorithms non-technical subject-matter?

- Consider the patent-eligibility of:
  - AI algorithms per se
  - use of existing AI models (black box)
  - data and data sets

- Given the value of data sets, should there be a new type of IP protection?

Subject Matter Eligibility: U.S.

- 35 U.S.C. § 101: *"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title".*

- Broad language of § 101 requires courts to find exceptions and boundaries of what subject matter is eligible.

- USPTO published 2019 Patent Subject Matter Eligibility Guidance (2019 PEG).

Subject Matter Eligibility: U.S. (con..)

October 2019 Update

- Further explanation on following topics:

I.   evaluating whether a claim recites a judicial exception;

II.   the groupings of abstract ideas enumerated in the 2019 PEG;

III. evaluating whether a judicial exception is integrated into a practical application;

IV. the prima facie case and the role of evidence with respect to eligibility rejections; and

V.   the application of the 2019 PEG in the patent examining corps.

Subject Matter Eligibility: U.S. (con..)

- Subject Matter Eligibility Example 39 (January 2019):

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.

- This claim is **eligible** because it does not recite a judicial exception.

Subject Matter Eligibility: Europe

- A computer implemented invention (CII) involves use of a computer, computer network or other programmable apparatus, in which one or more features are realised wholly or partly by means of a computer program.

- G3/08 on CIIs, several cases since.

- Two-hurdle approach:
  - 1st hurdle: The claimed subject-matter must have technical character. Claims may contain a mix of technical and non-technical features.
  - 2nd hurdle: Inventive step may only be supported by features which contribute to technical character i.e. those features which contribute to the solution of a technical problem by providing a technical effect, giving a technical contribution.

Subject Matter Eligibility: Europe (con..)

- Guidelines on the patentability of AI and machine learning technologies came into force in November 2018.

- Computational models and algorithms are generally considered to be of a mathematical nature.

- However, a mathematical method may contribute to the technical character of an invention, i.e. contribute to producing a technical effect that serves a technical purpose, by:

    i) its application to a field of technology, and/or

    ii) being adapted to a specific technical implementation.

Subject Matter Eligibility: Europe (con..)

Refused:

- "evaluating (140) the content of the at least one data stream using machine-learning algorithms".

- T1510/10 - 'no inventive step can derive just from the use of machine learning'.

Allowed:

- EP 2,214,403 – correcting large video jitter

a motion classifying unit configured to identify the movement of the photographing device according to the feature vector generated by said feature vector generating unit, on the basis of an association between the feature vector and the movement of the photographing device, the association is obtained as a result of previously-executed machine learning of the feature vector and an actual movement of the photographing device,

- Smaller search range, increasing accuracy of the parameter, reducing operation cost for searching

Subject Matter Eligibility: Asia

China

- According to the Examination Guidelines, computer programs per se, pure algorithms or mathematical rules are excluded from patentability. But a solution capable of being implemented by using a computer program is patentable if the solution solves a technical problem, employs technical means, and achieves a technical effect.

Japan

- Computer software inventions are patentable in Japan even if they are business related. If AI-inventions can be claimed as computer-implemented methods, computer systems or data structures without reciting any human or operator intervention, the inventions may be patentable if they satisfy the usual patentability requirements.

Korea

- Korean law specifies that patent-eligible subject matter includes "the highly advanced creation of a technical idea utilizing the laws of nature." Under current Korean law, an AI algorithm embodied in software/hardware would most likely not be patent-eligible.

Challenge 3: Sufficient Disclosure

- What is the extent of disclosure required for an AI-related invention?
  - training data, algorithms, models
- How do you disclose data that evolves with AI?
- Should such disclosure be an ongoing obligation?

Sufficiency: U.S.

- 35 U.S.C. 112(a) requires specification provides a written description of:

    1) the invention;

    2) the manner and process of making and using the invention; and

    3) the best mode for carrying out the invention.

- USPTO guidance: maintains need for specification to disclose the algorithm for performing the claimed specific computer function in CII (such as AI inventions).

- Adequate disclosure in U.S. requires specification to provide sufficient written description to clearly allow PSAs to understand that the inventor had possession of the claimed subject matter at the time of filing.

Sufficiency: U.S. (con..)

- "The specification must provide a sufficient description of an invention, not an indication of a result that one might achieve".

- Descriptions of AI algorithm or AI program itself should provide a skilled AI programmed the information necessary to prepare such an AI algorithm/program.

- Since AI inventions are CIIs, they must disclose both the hardware and software required to enable any computer-implemented features in the claims.

- Keep in mind: patent specification must teach how to use the AI invention as broadly as it is <u>claimed</u>.

Sufficiency: Europe

- Article 83 EPC: Disclosure of the invention:
  - The European patent application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

- To satisfy Article 83 EPC typically need at least one example (often more if broad).

- Lack of sufficiency cannot be remedied after filing.

- Can be used to refuse application or as a ground of opposition.

Sufficiency: Europe (con..)

- EPO Examination Guidelines F-III, 12:
  - If the desired technical effect is expressed in the claim and lacks reproducibility an objection of lack of sufficient disclosure under Art. 83 should be raised.
  - If the (non-reproducible) effect is not expressed in the claim but is part of the objective technical problem to be solved, an objection under Art. 56 should be raised.
- "Are there sufficient details to reproduce the invention?
- "Is the effect claimed by resorting to a particular machine learning process plausibly and credibly achieved?"

Sufficiency: Europe (con..)

- What about experimental data or comparative tests?

- EPO Examination Guidelines and case law:
  - Supplementary post-published evidence may be taken into consideration.
  - Despite being absent from the original specification.
  - But only under certain conditions.
  - Cannot be used as the sole basis to establish that application solves the problem it purports to solve.
  - Can back-up findings in the patent application, not fill in gaps in sufficiency.

Challenge 4: Inventiveness

- Does using AI to derive an invention make it obvious to try?

- Can an AI-implemented step be considered technical?

  - why should AI differ from cryptography or data compression?

- What should the scope of the "technical field" be for AI-related technologies?

Inventiveness: U.S.

- 35 U.S.C. § 103

- Graham Factors:

    1) The scope and content of the prior art;

    2) The level of ordinary skill in the prior art; and

    3) The differences between the claimed invention and the prior art.

- Patents based on AI inventive contributions are long established (no particular obviousness bar).

- For inventive AI, consider that it has been held that patentability "shall not be negated by the manner in which the invention was made".

- However, "a person of ordinary skill in the art" could be problematic.

Inventiveness: Europe

- Recall 2nd hurdle: Inventive step may only be supported by features which contribute to technical character i.e. those features which contribute to the solution of a technical problem by providing a technical effect, giving a technical contribution.

- Dimension 1: A claim directed to a specific technical implementation may comprise an AI algorithm specifically adapted for an implementation or an AI technology motivated by technical considerations of the internal functioning of the computer.

- Dimension 2: A technical application is given if the AI algorithm serves a technical purpose. This can be if it solves a technical problem in a technical field, is specific (not generic), or the claims are functionally limited to a technical purpose.

USPTO Request for Comments on AI

- August 27, 2019 - USPTO Notice:

The USPTO is interested in gathering information on patent-related issues regarding artificial intelligence inventions for purposes of evaluating whether further examination guidance is needed to promote the reliability and predictability of patenting artificial intelligence inventions. To assist in gathering this information, the USPTO is publishing questions on artificial intelligence inventions to obtain written comments from the public. The questions are designed to cover a variety of topics from patent examination policy to whether new forms of intellectual property protection are needed.

USPTO Questions

1. Inventions that utilize AI, as well as inventions that are developed by AI, have commonly been referred to as "AI inventions." What are elements of an AI invention? For example: The problem to be addressed (e.g., application of AI); the structure of the database on which the AI will be trained and will act; the training of the algorithm on the data; the algorithm itself; the results of the AI invention through an automated process; the policies/weights to be applied to the data that affects the outcome of the results; and/or other elements.

2. What are the different ways that a natural person can contribute to conception of an AI invention and be eligible to be a named inventor? For example: Designing the algorithm and/or weighting adaptations; structuring the data on which the algorithm runs; running the AI algorithm on the data and obtaining the results.

USPTO Questions (con..)

3. Do current patent laws and regulations regarding inventorship need to be revised to take into account inventions where an entity or entities other than a natural person contributed to the conception of an invention?

4. Should an entity or entities other than a natural person, or company to which a natural person assigns an invention, be able to own a patent on the AI invention? For example: Should a company who trains the artificial intelligence process that creates the invention be able to be an owner?

USPTO Questions (con..)

5. Are there any patent eligibility considerations unique to AI inventions?

6. Are there any disclosure-related considerations unique to AI inventions? For example, under current practice, written description support for computer-implemented inventions generally require sufficient disclosure of an algorithm to perform a claimed function, such that a person of ordinary skill in the art can reasonably conclude that the inventor had possession of the claimed invention. Does there need to be a change in the level of detail an applicant must provide in order to comply with the written description requirement, particularly for deep-learning systems that may have a large number of hidden layers with weights that evolve during the learning/training process without human intervention or knowledge?

USPTO Questions (con..)

7. How can patent applications for AI inventions best comply with the enablement requirement, particularly given the degree of unpredictability of certain AI systems?

8. Does AI impact the level of a person of ordinary skill in the art? If so, how? For example: Should assessment of the level of ordinary skill in the art reflect the capability possessed by AI?

USPTO Questions (con..)

9. Are there any prior art considerations unique to AI inventions?

10. Are there any new forms of intellectual property protections that are needed for AI inventions, such as data protection?

USPTO Questions (con..)

11. Are there any other issues pertinent to patenting AI inventions that we should examine?

12. Are there any relevant policies or practices from other major patent agencies that may help inform USPTO's policies and practices regarding patenting of AI inventions?

So What Now?

- AI is currently just a tool (no real AI *yet*)
- But...AI is rapidly advancing.
- Despite its complexity, aspects of an AI may be considered "non-technical".
- Thus some aspects of an AI system could be difficult to patent under current systems.
- Your AI patent strategy must adapt to the challenges outlined above.

Questions?

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