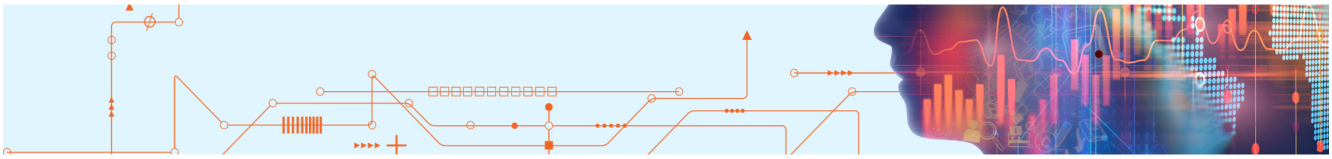

2019 Artificial Intelligence Year in Review

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2019 saw many notable developments related to the patenting of Artificial Intelligence (AI). Here, we provide a brief summary of three key highlights: 1) the European Patent Office's decision on whether an AI can be named as an inventor; 2) the development of patent office policy on AI and the release of updated guidance documents; and 3) the World Intellectual Property Office (WIPO) "Technology Trends" report providing data and analysis on the global AI patent landscape.

AI Inventors – Coming to a Patent Office Near You?

On December 20, 2019 the European Patent Office (EPO) rejected two European patent applications (EP3564144 and EP3563896) which designated a connectionist AI named DABUS (short for "Device for the Autonomous Bootstrapping of Unified Sentience") as being the sole inventor.

What is DABUS?

The applicant for the two applications was the developer of DABUS, Dr. Stephan Thaler. The applications were filed by the Artificial Inventor Project, an international team of patent attorneys filing patents on behalf of DABUS globally. During prosecution of the European patents, the applicant described DABUS as a "creativity machine". The AI comprises two artificial neural networks. The first artificial neural network involves a series of smaller neural networks trained to generate ideas in response to self-perturbations of connection weights which are controlled by a second "critic" artificial neural network. The second neural network monitors the first network for ideas, identifying the novel ideas and selectively forms and ripens the ideas which have the most novelty, utility, or value. The applicant argued DABUS was the sole inventor of the applications and that the owner of the AI should be the default owner of the patents and intellectual property generated by the AI.

The EPO Decision

The EPO issued its reasons for rejecting the applications on January 27, 2020 stating that the designation of an inventor is mandatory because it bears a series of legal consequences. Specifically, this included the requirement that the named inventor must be the legitimate one and they must be able to benefit from rights linked to this status. The EPO noted that an AI inventor lacking a legal personality could not enjoy such rights and that the name of a machine would not fulfill the requirements of Rule 19(1) of the European Patent Convention. Rather, the "EPC does not allow for non-persons, i.e. neither natural nor legal persons, as applicant, inventor or in any other role in the patent grant proceedings". The decision is currently pending appeal. Perhaps by necessity, the EPO decision is reactive, rather than proactive, in its approach to considering AI-inventorship. Further guidance on how the owners of AI-generated inventions should navigate the patent system will be timely and necessary.

Other Jurisdictions

Patent applications naming DABUS as the sole inventor have also been filed in the United Kingdom, Germany, Israel, China, Korea, Taiwan, and the US. The United Kingdom Intellectual Property Office (UKIPO) has also issued a rejection for the applications and taken the applications as withdrawn for failure to file a Form 7, which is the specific Form for designating the inventor. The UKIPO stated that the inventor must be a natural person and it was not for the Office to take a different interpretation absent some judicial or legislative action. The UKIPO also noted that the applicant was not entitled to apply for the patent because there was no law that allowed for the transfer of ownership of an invention from the inventor purely through the applicant's ownership of the inventor.

As of writing, the applications in Germany, Israel, China, Korea, Taiwan, and the US have not yet been published or considered by their respective national patent offices. How these patent offices treat the DABUS case will be interesting to watch.

Bringing Patent Office Practice into the AI-Era

USPTO

On January 31, 2019 the United States Patent and Trademark Office (USPTO) held an event titled "Artificial Intelligence: Intellectual Property Considerations", where several panels addressed issues related to patenting AI-technologies. Director Andrei Iancu was quoted as saying "America's national security and economic prosperity depend on the United States' ability to maintain a leadership role in AI and other emerging technologies". His comments suggest that the USPTO will take an active and supportive role developing intellectual property policies relating to AI.

The USPTO also released subject matter eligibility guidance documents on January 7, 2019 and on October 17, 2019 which, among other things, addressed issues related to the patenting of AI-technologies. These documents revised and clarified how the USPTO conducts its analysis under 35 U.S.C. § 101 in order to determine whether a claim constitutes patentable subject matter or is an unpatentable "judicial exception" such as a mere mathematical algorithm.

Example 39 in the January guidance document provided a claimed method of training a neural network for facial detection. Encouragingly, the claim was identified as patent eligible under the first step of the § 101 analysis because it was not considered to recite any enumerated judicial exceptions. Notably, the USPTO stated that the claim did not recite a mental process because the steps are not practically performed in the human mind. The USPTO also stated the claim did not recite any mathematical relationships, formula, or calculations, even if the steps were based on mathematical concepts and it did not recite any method of organizing human activity.

On September 30, 2019 the USPTO published a request for comments from the public on "Patenting Artificial Intelligence Inventions". A further request for comments was also published on December 3, 2019 for "Intellectual Property Protection for Artificial Intelligence Innovation". The submission period for both of these requests has now closed and hopefully 2020 will see the release of further guidance documents clarifying US patent office practice for AI-related technologies.

EPO

Other patent offices around the world have also started releasing revised guidance documents relating to AI-technologies. The EPO released an update to its Guidelines for Examination in November 2019 which revised a previous statement that the terms such as "support vector machine", "reasoning engine" or "neural network" were to be looked at carefully because they usually refer to abstract models devoid of technical character and therefore patent ineligible. Specifically, the EPO Guidelines were revised to state the terms "may, depending on the context, refer to abstract models or algorithms and thus do not, on their own, necessarily imply the use of a technical means" and that this has to be taken into account when examining whether the claimed subject-matter has a technical character as a whole."

The EPO Guidelines had already discussed how the application of neural networks could constitute a technical contribution in some applications and included an example of the use of neural networks for heart monitoring for the purpose of identifying irregular heartbeats. Taken together, the changes suggest a positive shift in how the EPO views AI patent applications.

JPO

The Japan Patent Office (JPO) also released six new AI-related case examples on January 30, 2019 which demonstrate considerations taken during examination when determining whether an AI invention meets the enablement, support and inventive step requirements for obtaining a patent.

CIPO

To date, the Canadian Intellectual Property Office (CIPO) has not released any guidance documents that refer specifically to AI-technologies.

Practice Notices released by CIPO in 2013 directed towards the examination of computer-implemented inventions refer to identifying whether the “problem” faced by the inventors is a computer problem or a problem whose solution is merely implemented on a computer. The Practice Notices have been criticised for adopting a narrow approach to determining whether a claim defines patent eligible subject matter.

While fundamental advances in AI will likely be considered a patent eligible solution to a computer problem, certain claims directed towards applications of AI or methods of computational analysis implemented using AI on a computer could face rejection as patent ineligible subject matter. Hopefully, future revisions to CIPO’s guidance documents will provide greater clarity and adopt a more encouraging framework for determining patent eligibility consistent with Canada’s leading role in developing AI-related technologies.

Trends in AI - The WIPO Report

On January 31, 2019, WIPO launched a new annual report series titled “Technology Trends”, with AI as the focal point of the first report.

The report identified various trends related to the patenting of AI and looked specifically at three dimensions of AI: techniques (e.g. machine learning), functional applications (e.g. computer vision, speech processing) and fields (e.g. telecommunications, transportation). The report also revealed the top industry and academic players filing AI patent applications as well as the geographical distribution of AI-related patent protection and scientific publications.

Computer vision (including image recognition) was identified as the most popular AI application mentioned in 49% of all AI-related patent documents. The predominant fields for AI patents were transportation and telecommunications followed by security and life sciences. Within transportation, patent filings related to autonomous vehicles had a remarkable annual growth rate of 42% over a 3 year period with 5,569 filings in 2016. Other fields that showed less volume but notable growth in patent filings include AI-related banking and finance, smart cities and agriculture.

The report also revealed that the applicants with the most AI patent application families were IBM, Microsoft, and Toshiba. Remarkably, Chinese universities and public research organizations accounted for more than one-fifth of the top 500 patent applicants for AI patents. While a large number of AI-related patent applications are filed domestically in China, just 4% of those applications were also filed abroad in at least one foreign jurisdiction. 40% of patent applications first filed in Japan and 32% of patent applications first filed in the US are subsequently also filed elsewhere. The US, China, and Japan remain the three most popular offices for filing AI patents, accounting for 78% of total patent filings.

Kai-Fu Lee (Chairman and CEO of Sinovation Ventures and former President of Google China) was quoted in the report saying that Canada has extraordinary talent in terms of research, but lacked an ecosystem to turn the expertise into an economic advantage.

This statement is backed-up by data in the report showing that the relative share of scientific publications by authors in Canada is vastly greater than the number of patent families filed in Canada. In contrast, the US, China and Japan each account for a larger share of patent families than scientific publications. Canadian companies and institutions involved in AI research and development should carefully consider a global patent strategy to compete with dominant industry players in the US, China and Japan.