

Patenting for and by artificial intelligence

04/12/2018

TMT analysis: Katharine Stephens, partner at Bird & Bird, considers some of the questions surrounding patentability of artificial intelligence (AI) systems and their 'inventions'.

What are the types of intellectual property protection that could be used in relation to innovations within AI and machine learning (ML) technologies?

AI covers a range of different technical disciplines, including:

- ML
- neural networks
- natural language processing
- speech and audio recognition
- computer vision
- emotion recognition

At a very high level, what unifies these disciplines is that AI appears to give a machine some form of human intelligence.

While some areas of AI research attempt to build bespoke hardware to replicate human brain function, most of today's AI systems are implemented in software running on off-the-shelf computer hardware. The intellectual property (IP) rights in AI systems are therefore those that often arise in the context of developing other types of software, namely—copyright, trade secrets and patents.

Under what category of invention would AI/ML fall if attempting to patent the same?

The computational models and algorithms on which AI is based will not, without more, be patentable as they fall within the exclusion on mathematical methods.

Also potentially relevant to AI/ML-related inventions are the exclusions of methods for performing a mental act—such as a method of teaching reading—playing games and doing business and programs for computers (see Article 52 of the European Patent Convention (EPC)).

What are the issues, if any, associated with applying the rules on excluded subject-matter to AI/ML-related inventions?

The European Patent Office (EPO) has developed a considerable—if, in the past, not always consistent—body of case law dealing with the exclusions to patentability. Consideration is given to a claim as a whole—if it only comprises excluded subject-matter, it will not be patentable—but if it has technical character, it will not be excluded from patentability.

This is a low hurdle to clear. For example, if a claim to a mathematical algorithm is directed to a method involving the use of a technical means, such as a computer, the subject-matter is considered to have a technical character as a whole and is not excluded from patentability.

Mathematical algorithms can also contribute to the technical character of a computer-implemented method, but only in so far as:

- they serve a specific technical purpose (eg image analysis or speech processing)
- they are adapted to a specific technical implementation motivated by the technical considerations of the internal function of the computer (eg the adaptation of a polynomial reduction algorithm to exploit word-

size shifts matched to the word size of the computer hardware as opposed to making a computer run more efficiently)

Since there are many fields of application for AI, the first bullet point should prove the easier route to patentability.

However, that is not the end of the enquiry. Although most claims survive Article 52 of EPC, in mixed-type inventions—those comprising technical and non-technical features—only those features which contribute properly to the technical character of the claimed subject-matter can be considered in the assessment of inventive step (see Article 56 of EPC). The real challenge, therefore, is to demonstrate that AI-related inventions are defined in terms of technical effect such that they are found to be non-obvious.

How do the EPO Guidelines for Examination (in force November 2018) address these issues?

The EPO has added a short section on AI and ML in the latest version of the [Guidelines for Examination](#) (Part G, Chapter II, section 3.3.1) (the 'Guidelines'). Some examples of what might be considered to give a claim technical character are described, eg the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats is said to make a technical contribution, whereas classifying text documents solely in respect of their textual content does not.

Although the Guidelines state, in relation to mathematical methods, that defining the nature of the data input does not necessarily imply that the mathematical method contributes to the technical character of the invention, in relation to AI, they state:

'Where a classification method serves a technical purpose, the steps of generating the training set and training the classifier [ie the algorithm] may also contribute to the technical character of the invention if they support achieving that technical purpose.'

The EPO may therefore be prepared to be a little more lenient regarding the technicality conferred by specific datasets when considering AI inventions.

What issues are left unanswered by the new Guidelines and what issues arise in relation to the same?

The Guidelines do not address the issues relating to inventive AI systems. Inventing is seen as a human endeavour (see Article 60(1) of EPC). If, under the current law, it is not possible for the AI itself to be considered the inventor, who is the inventor and who should own the resulting patent? Where, in practice, AI is used to assist with research and development, the inventor could be the first person to observe and understand the invention, but the devisers of the underlying algorithms should arguably be considered as joint inventors.

It could be said that in attributing patents to people who are not the inventors, the real inventor, the AI system, is not being acknowledged. However, the consequence in adopting the position of AI as inventor is that, as the law presently stands, the invention could fall into the public domain.

At a meeting held at the EPO on 'Patenting Artificial Intelligence' in May 2018, the general consensus was that the user (ie programmer, developer or implementer), as opposed to the owner could be the inventor.

Secondly, the Guidelines do not comment on other aspects of patent law which are formulated by reference to natural persons, such as the test for inventive step (see Article 56 of EPC) and sufficiency (see Article 83 of EPC). These tests require an assessment of what the skilled but unimaginative person in the art is taken to think, know and understand.

At the meeting at the EPO, it was suggested that the skilled person could be defined by reference to a machine, that is a 'skilled person using a machine', but this assumes that the machine itself is not imaginative or inventive. That is hardly a sustainable position given that AI systems are already capable of invention eg in the field of playing games, DeepMind's AlphaGo Zero has already developed unconventional strategies and creative new moves in order to beat the world champion.

What are the benefits to industry of facilitating the patentability of innovations in this sector?

Computer-implemented inventions, including 'supersoftware' based on AI, are tipped to be one of main drivers of future innovation (see '[Patents and the Fourth Industrial Revolution](#)' published by the EPO in December 2017). The patent system is often seen as encouraging economic growth, but there are concerns that some types of patents, particularly those for computer programs and business methods, do more harm than good (see Professor Hargreaves' '[Digital Opportunity, A Review of Intellectual Property and Growth](#)' published May 2011). The writer is sympathetic to the latter view (perhaps not surprisingly given that she comes from the UK where the Intellectual Property Office takes a stricter view on the exclusions to patentability than the EPO).

Striking the right balance is difficult. Innovation in this exciting and fast-moving area needs to be encouraged and this is not achieved by allowing the patenting of fundamental AI algorithms as such.

Interviewed by Alex Heshmaty.

The views expressed by our Legal Analysis interviewees are not necessarily those of the proprietor.

FREE TRIAL