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## Patenting artificial intelligence in Europe

**The patentability of artificial intelligence (AI) is a hot topic, mainly due to the tremendous expectations around this emerging, disruptive and pervasive technology. On 30 May 2018 the EPO held an international conference on patenting AI in Munich to explore this topic in detail. The EPO has recently published material and videos of the conference on the e-courses section of its website.**

### Background

A recent search on `esp@cenet` with keywords 'neural network' (title and abstract), 'EP' (publication number) and '2017' (publication date) produced only 78 hits. This may not be considered significant in light of the numbers of AI-related filings in other parts of the world. For example, the same search in 2017 publications, titles and abstracts resulted in 612 hits for US patent applications and 3,679 for Chinese patent applications, (ie, eight and 47 times more results than filings at the EPO, respectively).

Notwithstanding the relatively low number of filings, the EPO has indicated its aim to both foster and prepare for a larger wave of applications that will appear once major players in China and the United States decide to extend local patent applications to Europe. Another reason for the EPO's interest is the general consensus that AI will profoundly affect the way that the world works. Patent offices, including the EPO, must be prepared to manage such filings effectively.

### AI patents filed with the EPO

But what does an AI patent application filed with the EPO look like? During the conference, the EPO discussed this topic and presented several representative patents in the AI field, issued by both the EPO and the USPTO. The patents disclosed various aspects of AI and used a wide range of terms in their claims and specifications.

The takeaway from the discussion is that expressions such as 'neural network', 'artificial intelligence' and 'deep learning' – although relatively well accepted and clear (eg, decision T1285/10 of the boards of appeal) – are not normally used in claims but mostly in specifications, as optimised models go well beyond these terms. Rather, buzzwords such as 'trained recogniser', 'adapted model', 'learner component' or even 'determining' an output (as in standard method steps) are often used in the claims and expanded on in the specification. Further, when more specific terms such as 'neural network' are used in the claims, they usually appear only in the dependent claims.

Given the above, when a classic method claim with a definite, detailed sequence of steps is being drafted, one may consider whether a learned algorithm could be used instead and try to encompass it in the main claim. Alternatively, a separate patent application directed specifically to an AI solution may be filed.

The reason for this approach is that a detailed step-by-step claim can be designed around by a model trained on Big Data. Different courts applying the function-way-result test (or similar approaches) for equivalence under Article 69 of the European Patent Convention may have divergent approaches, some of which may conclude that the two ways (ie, step-by-step and trained model) are not substantially the same, thus enabling the above design-around. This also creates issues in assessing novelty and inventive step, as a trained model cannot anticipate or suggest a particular detailed step-by-step method based on the kind of patent applications seen so far, wherein the above buzzwords are mostly used in their general meaning. Therefore, comparative examples and parameter ranges may be given in the specification and even claimed to some extent, as was proposed during the conference.

In addition, inventive step provisions from other areas (eg, industrial chemistry) may be applied to AI patents by the EPO, if it becomes more lenient regarding the technicality conferred by specific datasets and allows a “second use of a model” analogous to second medical use claims in pharmaceuticals. However, even a claim directed to AI that includes specific data sets may not resolve design-around issues, such as those referenced above.

Nevertheless, AI is a subtle player and such a conclusion on designing around could change as soon as the so-called ‘distillation algorithms’ are applied to a trained model. These algorithms can extract a corresponding flowchart algorithm from the trained model, which could be used before courts, where access to the trained model can be requested for assessing equivalence. This would make enforcing computer-implemented method claims even more challenging, but it is far from unthinkable, especially in high-stakes litigation between software giants.

### Comment

Although difficulties in the patent system may increase with the growing use of non-core AI patents, the European patent system can rely on stable jurisprudence that already works relatively well for more conventional computer-implemented inventions and may be adapted to cope with such difficulties. In any event, careful consideration of patenting strategy and drafting patent applications is critical for obtaining the desired protection.

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