The chasm between US and EU software-related inventions

There are some marked differences in the approach taken by IP agencies on either side of the Atlantic towards software-related inventions, but applicants can overcome these hurdles by following consistent principles

By Marta Alvarez Guede and Katelyn Bernier

According to the European Patent Convention (EPC), a patent can be granted in any field. However, it does not regard computer programs as inventions if claimed as such, while methods for performing mental acts, playing games, doing business and presenting information are excluded from patentability altogether.

According to the approach followed by the EPO, a claim directed to a computer program will not be excluded for patentability under Article 52 of the EPC if it contains at least one feature that is considered to have technical character. In this way, it is sufficient that a claim is directed to a device or a method implemented in a computer to avoid exclusion. The non-technical features of such a claim will be ignored when assessing an inventive step.

The EPC provides no general definition of what is technical, but relevant case law before the EPO Boards of Appeal gives some indication of what constitutes 'technical character'. In particular, a claim to a computer program is not excluded from patentability if, when running in a computer, it provides a further technical effect going beyond the computer's normal behaviour. Such further technical effect could be saving computer resources such as memory, processor time or energy, or controlling further processes.

In the same way, data encoding schemes, data structures implemented in a computer, data formats contained in physical mediums or electromagnetic waves carrying information are traditionally considered to have technical character. But in order to contribute to a further technical effect, they should refer to functional data, which serves to control the operation of a device, rather than cognitive data, the content and meaning of which are relevant to human users only.

Across the pond

The US approach to patent protection for software-related inventions differs significantly from this approach, both in terms of scope of eligibility and in how the determination is made.

With respect to scope, the threshold requirement for protection in the United States is set out in Section 101 of Title 35 of the US Code, which defines 'eligible subject matter' as "any new and useful, process, machine, manufacture, or composition of matter, or any new and useful improvement thereof". This is a rather broad definition. Depending on how the claim is framed, a software-related invention could easily fall into one or more of these categories. For example, a claim for software *per se*, presented as a process claim, would pass the baseline for eligibility.

Section 101 is not without its limits, however, and the breadth of what constitutes eligible subject matter has been further distilled based on exceptions defined by the US Supreme Court. Such judicial exceptions are said to include abstract ideas, natural phenomena and laws of nature and are often the biggest hurdle that applicants of software-related inventions face in terms of whether the invention (or claim) qualifies as patent eligible – particularly with regard to abstract ideas. Applications ostensibly involving a judicial

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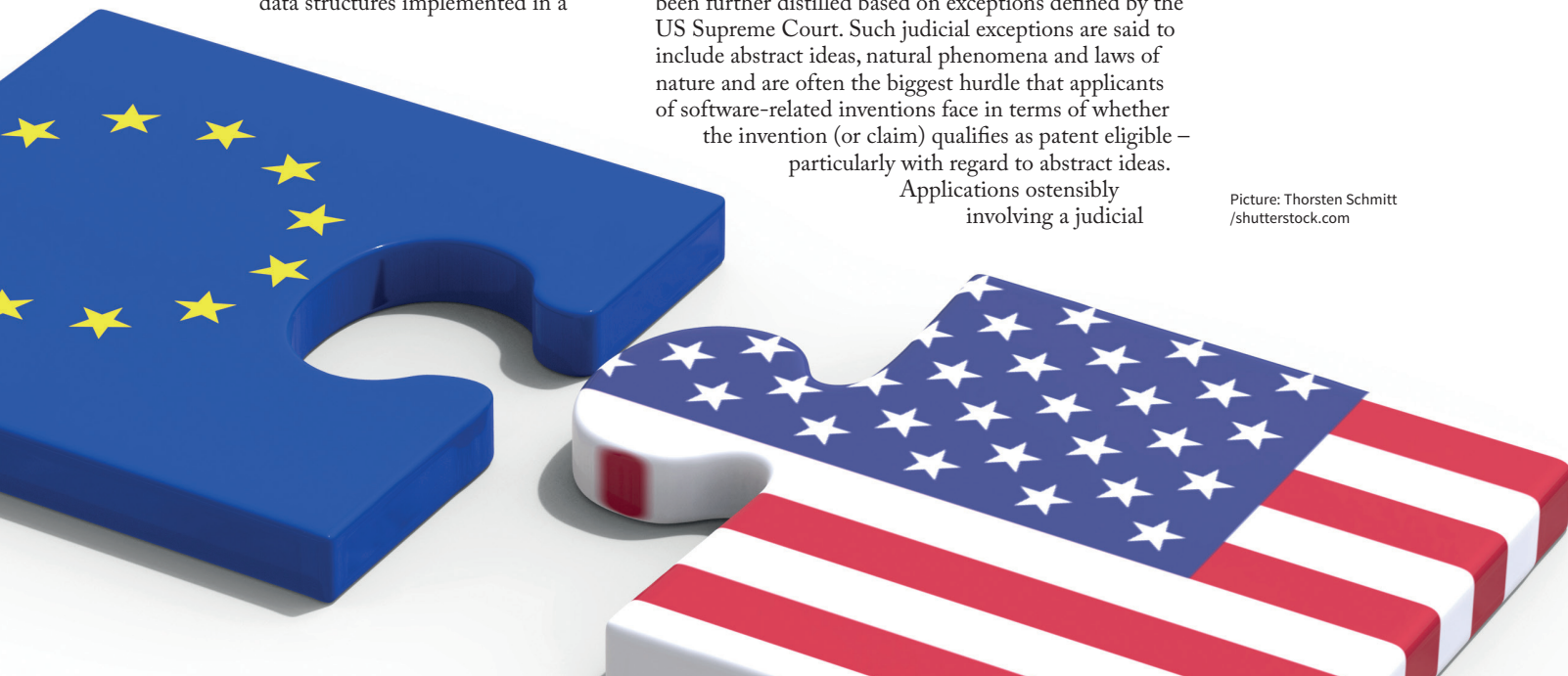
exception are seemingly subject to much more front-end scrutiny during the examination process at the USPTO. In other words, much more emphasis seems to be placed on the analysis of whether the claims of such applications are directed to patent-eligible subject matter than the evaluation of the other requirements of patentability. That is not to say that the requirements of anticipation, non-obviousness and definiteness are any less important during the examination process; rather, the examination of inventions involving an abstract idea is mostly focused on surmounting the eligibility threshold.

"Applicants should carefully analyse software inventions on a case-by-case basis in order to assess the risk that patentability exclusion problems may arise"

Update in progress
In January 2019 the USPTO issued revised patent subject matter eligibility guidance in an effort to streamline the analysis process and improve consistency across the office. Following public commentary, the office issued a further update on the revised guidance in October 2019.

Briefly, the guidelines state that the examiner must first determine whether the claim recites a judicial exception (Step 2A, prong one). In the case of abstract ideas, this could include subject matter directed to one or more of the following groupings:
• mathematical concepts;
• certain methods of organising human activity; and
• mental processes.

If the claim is found to recite an abstract idea, the analysis proceeds to determine whether the claim as a whole integrates the recited abstract idea into a practical application of the exception (Step 2A, prong two).

Although there is no bright-line definition of what constitutes a practical application, a claim is said to integrate the exception into a practical application where it applies, relies on or uses the exception in a manner that imposes a meaningful limit on the exception. Here, the technical nature of the invention starts to permeate

into the analysis and is reminiscent of the EU approach in determining whether a claim has the requisite technical character.

Under Step 2A, prong two, USPTO examiners are instructed to identify whether there are any additional elements recited in the claim beyond the exception(s) and evaluate whether those additional elements individually and in combination with the abstract idea integrate the exception into a practical application.

Examples of considerations that may demonstrate a practical application of an abstract idea include:
• an improvement in the functioning of a computer, other technology or technological field; and
• an additional element that implements the judicial exception in conjunction with a particular machine or manufacture that is integral to the claim.

This determination is a parallel of the EU assessment of whether a further technical effect is present beyond the normal behaviour of a computer.

If it is determined that the abstract idea is not integrated into a practical application, the analysis of the claim proceeds to one final step (Step 2B), where the examiner will evaluate whether there are additional elements recited in the claim that amount to significantly more than the exception – another way of stating that the invention is evaluated to some extent for its technical effect in the field. Although no prior art is cited in the determination, the analysis follows a high-level assessment of whether the claims are obvious in the field.

In the final stage (Step 2B), the examiner will determine whether an additional element or combination of elements adds a specific limitation or combination of limitations that are not well understood, routine or conventional activities in the field, which can evidence an inventive concept. However, if the claim recites only well-understood, routine or conventional activities known in the field at a high level of generality, it is unlikely to be deemed to be patent eligible.

Software-related inventions in different fields
At the EPO, defining the structure of a generic software system or a programming language is generally considered not to be technical unless there is a direct contribution to a technical effect solving a technical problem. A faster algorithm is not a further technical effect either. As such, programming could be considered a mental act, which is also excluded from patentability. Further, defining the rules of a video

A comparison between software patenting in the European Union and the United States

• The EPO requires a further technical effect for software-related inventions.
• In the United States, software-related inventions may be patent eligible. If an abstract idea (eg, a mathematical concept) is claimed, it must be tied to a practical application of the concept.
• Case law defines what is a further technical effect in Europe and, similarly, what may constitute a practical application in the United States.

• Improvements in the functioning of a computer or other technology and/or one or more elements that are not well understood, routine or conventional in the field may evidence that a claim is patent eligible in the United States.
• Software related to user interfaces, business methods, mathematical methods and simulations require extra care in Europe and,

similarly, may be patent eligible in the United States provided that the technical aspect of the invention is sufficiently described.
• Software related to image processing and cryptography is usually considered to have technical character by the EPO and is likely to be patent eligible in the United States if the technical aspects are sufficiently described beyond a high level of generality in the field.

game is specifically excluded under the EPC unless their implementation provides a further technical effect (eg, saving the resources of a computer).

Special care should be taken in the European Union with regard to user interfaces (ie, conveying information to the user), as the presentation of information in any way is also specifically excluded from patentability under the EPC. Features related to user preferences (eg, layouts or particular diagrams) do not contribute to technical character.

However, features related to the presentation of information providing a further technical effect (eg, providing information about an internal state of a system to allow a user to control the system or controlling image resolution in order to allow selection and display of images) are considered technical. In addition, features allowing user input such as entering text in a computer system or setting parameters make a technical contribution unless they merely reflect subjective user preferences (eg, providing colour-coded displays).

AI has been attracting increasing attention in the past few years. Relating to subjects such as machine learning, deep learning or neural networks, AI is based on computational models and algorithms for classification and regression. This again presents a double problem, as these computer-implemented models and algorithms could be considered merely mathematical methods, even if they can be trained based on training data.

Mathematical methods are also specifically excluded from patentability under the EPC. Once again, such methods and models should provide a further technical effect in order to be patentable. AI is present in several technological fields (eg, autonomous driving, recognition or classification of text, images, videos, audio or speech, bioinformatics, drug discovery and genetics).

In the context of image, video, audio and speech classification and/or recognition, there are usually technical considerations involved (eg, to reduce computational complexity), which are patentable. However, classification of text purely based on its content does not serve a technical purpose but rather a linguistic one; therefore, it is excluded from patentability.

Blockchain technology is also becoming more popular. This relates to a kind of distributed, tamper-proof, computer-implemented database. A block mining method could produce the technical effect of increasing security in the context of data storage, which is traditionally considered technical by the EPO. However, in certain cases, a block mining method could amount to no more than a mathematical method and thereby be considered not to be patentable.

Computer simulations are another kind of software-related invention that may fall under the category of mathematical methods or methods for performing mental acts, and therefore under the exclusions from patentability according to the EPC. For instance, a simulation of a marketing campaign or a simulation for determining the schedule of employees would be considered non-technical.

Computer programs directed to financial, commercial, administrative or organisational activities, which are considered business methods and, as such, excluded from patentability according to the EPC, should also provide a further technical effect. This includes activities

Action plan Ⓐ

There are some marked differences between patenting software-related inventions in the European Union and the United States but following certain rules can help applicants to protect their rights on both sides of the Atlantic.

- In Europe, a computer program can qualify for patent protection if, when running on a computer, it provides a further technical effect going beyond the normal behaviour of a computer.
- In the United States, a series of judicial exceptions concerning patentable subject matter are often the biggest hurdle to negotiate for software-related inventions.
- Early 2019 guidance from the USPTO has parallels with the EU approach focusing on the technical effect of an application.
- Applicants in newer areas of technology such as AI and blockchain should take particular care to ensure that their inventions qualify for EU and US patent protection.

such as banking, marketing, the management of rights and contractual agreements, personnel management, logistics, and the scheduling of tasks.

Areas at risk

Looking towards the United States, a non-exhaustive list of sought-after areas of technology that may be at risk of being deemed ineligible subject matter includes inventions related to graphical user interfaces, AI, blockchain technology and computer simulations. Under US patent law, applications for each of these generalised technological fields could constitute patent-eligible subject matter, provided that the specification supports a detailed technical aspect of the invention that goes beyond a high level of generality in the field.

When drafting an application, US applicants should fully describe all of the technical aspects of the innovation and avoid using overly broad, generalised language that is well known, conventional or routine to the field. Much like applications before the EPC, providing a detailed explanation of the technical effect of the invention can go a long way in establishing an invention as constituting patent-eligible subject matter.

As is also true under the EPC, inventions involving graphical user interfaces with no technical effect or improvement could be excluded from protection as being directed to an abstract idea, such as a mental process. However, tying the invention to a combination of elements (ie, hardware) that effectuate a particular process of steps that reflect an improvement in the functioning of the computer could make an otherwise ineligible claim patent eligible. Similarly, for AI technologies, which are often rooted in computational models and mathematical concepts, claims could be excluded as patent ineligible in the absence of a practical application of the models and/or mathematics.

Software-related inventions can easily encounter problems in both the United States and the European Union. As such, applicants should carefully analyse software inventions on a case-by-case basis in order to assess the risk that patentability exclusion problems may arise. In addition, applications should be carefully drafted, taking into account the particularity of this kind of invention. Case law can help when attempting to overcome objections in both jurisdictions. *iam*

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