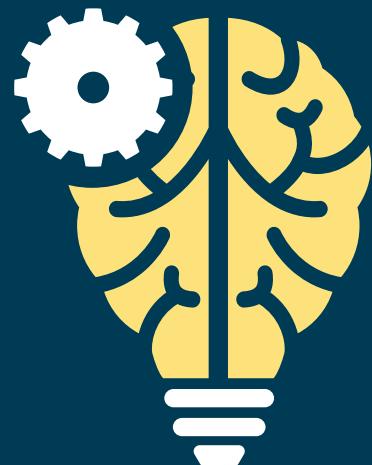


Passing the AI test

Satisfying patent eligibility for AI inventions can be beset with difficulty. **Yoon Chae** offers key advice for US patent attorneys in this groundbreaking field



Artificial intelligence (AI) is one of the most important technology areas today, fuelled by advancements in machine learning and other underlying technologies that have become capable of effecting groundbreaking changes across various domains and industries.¹ Patents' ability to provide protection over inventive aspects of such technologies has resulted in explosive growths in the number of patent filings in the field of AI.² But there are several uncertainties posed by the US patent system when it comes to AI innovations, particularly with respect to satisfying the requirement of patent subject matter eligibility, which is arguably one of the more complex and unpredictable hurdles for patenting software and computer-implemented inventions. In an attempt to alleviate some of the uncertainties, this article provides an overview of the current legal landscape and a few practical takeaways that can be derived from analysing the relevant court decisions and other documents.

US standard on patent subject matter eligibility

In the US, patent subject matter eligibility is governed by 35 USC § 101, which allows patents on "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." This provision, however, has long been interpreted by the courts as excluding abstract ideas, laws of nature, and natural phenomena from patent-eligible subject matter. Among these three categories of judicially recognised exceptions, this article focuses on abstract ideas, given that most software patents invalidated under §101 are held unpatentable as abstract ideas.

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For some time, the Federal Circuit used to employ a so-called "machine or transformation test" when assessing subject-matter eligibility of software and computer-implemented inventions, where a claimed invention would be held patent-eligible if it were tied to a particular machine or apparatus or if it transformed a particular article into a different state or thing. But this standard changed in 2010 when the Supreme Court held that the "machine or transformation test"—although "a useful and important clue" and "investigative tool"—is not the exclusive test for determining subject-matter eligibility.³ And the Supreme Court's subsequent decisions in *Mayo* and *Alice* established the now (in)famous two-step framework for evaluating subject-matter eligibility, ushering in a new era of heightened review under § 101.⁴ Understanding the legal principles set forth in these Supreme Court cases, as well as their interpretations by the lower courts, can provide valuable insights for patent practitioners in navigating the complex and arguably unclear waters of AI patentability.

Mayo/Alice – step one

Under the *Mayo/Alice* standard, step one is for determining whether a patent's claim is directed to a patent-ineligible concept (aka "judicially recognised exception"), such as an abstract idea.⁵ Although what precisely constitutes an "abstract idea" continues to evolve, ideas or concepts like risk hedging, intermediated settlement, and others on "fundamental economic practice[s] long prevalent in our system of commerce" have been judicially recognised as abstract ideas.⁶ Further, under the "mental steps" doctrine, claims reciting subject matter that can be performed through an "ordinary mental process", "in the human mind", or by "a human using a pen and paper" have often been held as being directed to abstract ideas;⁷ as of 29 March 2016, around 24% of the 175 issued court decisions invalidating patent claims under the *Alice* framework relied on the "mental steps" doctrine.⁸ This creates tensions with patenting efforts for AI, as AI often strives to automate or replicate acts performed by humans (or "in the human mind").⁹ Although a significantly increased number of software patents have been invalidated as abstract ideas since *Alice*, the Federal Circuit has warned that *Alice* should not be read "to broadly hold that all improvements in computer-related technology are inherently abstract and, therefore, must be considered at step two," and that precautions must be taken to avoid oversimplifications "at such a high level of abstraction and untethered from the language of the claims [that] all but ensures that the exceptions to § 101 swallow the rule."¹⁰ In fact, when appropriately claimed, certain improvements in computer

functionality or technology will not be held abstract.¹¹

The Federal Circuit has made clear that “[s]oftware can make non-abstract improvements to computer technology just as hardware improvements can.”¹² The fact that an invention can be “run on a general-purpose computer” or that the “improvement is not defined by reference to ‘physical’ components” does not necessarily doom the claims.¹³ In making this assessment, a patent’s disclosures on how the claimed invention functions differently from conventional technologies can indicate the presence of a patentable improvement.¹⁴ Further, a “specification’s teachings that the claimed invention achieves other benefits over conventional [technology], such as increased flexibility, faster search times, and smaller memory requirements” can also serve as positive indicators.¹⁵ A claim that recites a *particular way* of achieving a certain result or of performing a certain function will have a higher likelihood of being patentable than a claim that merely recites the result or the function.¹⁶

Mayo/Alice – step two

Step two examines the elements of the patent’s claim (both individually and “as an ordered combination”) to “determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.”¹⁷

A mere recitation of a generic computer will not be sufficient, and the claim limitations must involve more than a mere “performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’”¹⁸

Claim elements, such as those reciting generic activities like processing, displaying, reporting, or otherwise outputting information, will likely be held as missing the requisite “inventive concept”.¹⁹

But it is important to note that, even if the claim limitations, “taken individually, recite a generic computer, network, and internet components, none of which is inventive by itself,” an “inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces.”²⁰

In other words, the second step can be satisfied when an ordered combination of generic components provides “a specific, discrete implementation of the abstract idea” that improves an existing technological process.²¹ Further, a claim can be held patentable and distinguishable from a facially similar and unpatentable claim that “was not tied to any particularised structure, broadly preempted related technologies, and merely involved combining data in an ordinary manner without any inventive concept.”²²

Guidance from the USPTO

The United States Patent & Trademark Office (USPTO) has also been active in providing guidance for § 101 analysis. Recognising that “[p]roperly applying the *Alice/Mayo* test in a consistent manner has proven difficult, and has caused uncertainty in this area of law,” the USPTO recently issued its 2019 *Revised Patent Subject Matter Eligibility Guidance*, aiming to clarify and standardise subject matter eligibility analysis under steps one and two of the *Mayo/Alice* test, respectively called “USPTO Step 2A” and “Step 2B.”²³ Although the 2019 revised guidance “does not have the force and effect of law”, its teachings are based on the relevant court decisions, and it is viewed by many practitioners as providing a more defined framework for assessing subject-matter eligibility. The 2019 revised guidance focuses on step one of *Mayo/Alice* (ie, “USPTO Step 2A”), which is further described in the context of a two-prong framework:

- Prong one: Determining whether the claim-at-issue falls into one of the specific groupings of abstract idea enumerated in the guidance, which are (1) mathematical concepts (eg, mathematical relationships, formulas or equations, and calculations); (2) methods of organising

human activity (eg, fundamental economic principles or practices, commercial or legal interactions, and managing personal behavior or relationships); and (3) mental processes (eg, concepts performed in the human mind); and

- Prong two: If so, determining whether the claim as a whole recites a practical application of a judicial exception, where a claim that “integrates a judicial exception into a practical application will apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolise the judicial exception.”

Under the second prong of USPTO Step 2A, examiners are required to evaluate whether there is such “integration” of a judicial exception by (1) “identifying whether there are any additional elements recited in the claim beyond the judicial exception(s);” and (2) “evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application, using one or more of the considerations laid out by the Supreme Court and the Federal Circuit.” The 2019 revised guidance also lists “exemplary considerations” that indicate that an additional element or a combination of elements may have integrated the exception into a practical application.

“The second step can be satisfied when an ordered combination of generic components provides “a specific, discrete implementation of the abstract idea” that improves an existing technological process.”

The 2019 revised guidance does not appear to expressly change the analysis required for step two of *Mayo/Alice* (ie, USPTO Step 2B). It explains that “claims may still be held patent-eligible if they recite additional elements that render the claim patent eligible even though a judicial exception is recited in a separate claim element,” where the elements must be considered “individually and in combination” to determine whether they provide an inventive concept. To do so, the examiner is required to evaluate whether the claim includes “a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the field, which is indicative that an inventive concept may be present” or whether the claim “simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception, which is indicative than an inventive concept may not be present.”

The USPTO has also published other helpful documents, such as:

- Subject Matter Eligibility Examples: Abstract Ideas document (7 Jan 2019);
- Memorandum on Recent Subject Matter Eligibility Decision in *Vanda Pharmaceuticals Inc v West-Ward Pharmaceuticals* (7 June 2018);
- Memorandum on Recent 101 Eligibility Procedure in view of *Berkheimer v HP, Inc* (19 Apr 2018); and
- Memorandum on Recent Subject Matter Eligibility Decisions in *Finjan* and *Core Wireless* (2 Apr 2018), among others.

Key takeaways

Although there is no silver-bullet approach, a strategic preparation of the patent and its claims can significantly increase your chances of obtaining a patent that provides effective protection over your AI invention. The following list provides a few pointers that may be helpful for those pursuing patents for their AI inventions.

- **Judicial exceptions:** It would likely be helpful to examine what subject matter has already been characterised as abstract ideas by the courts, so as to help you avoid inadvertently characterising your AI invention as such. The USPTO's 2019 revised guidance provides useful summaries of "judicial exception" categories, such as mental processes and methods of organising human activity, as well as their sub-categories, that should be avoided. The USPTO's Subject Matter Eligibility Examples: Abstract Ideas, issued on 7 January 2019, also provide hypothetical examples of abstract ideas that can be helpful to consult when drafting your claims. Keep in mind that describing your AI invention as replicating a person's mental process or as one that can be performed by a person can hurt your chances for obtaining a patent, whereas claiming aspects of your AI inventions that cannot be performed mentally or by a person can increase those odds.

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- **Improvements:** Disclose details on any specific improvements provided by your AI invention in a specific technology or technical field. Describing how your AI invention functions differently from conventional technologies and/or explaining the benefits provided by your AI invention over the conventional technologies can be helpful. Examples include improvements made in methods for collecting training data or for using the collected data when training your AI model.
- **Implemented with machines:** To the extent possible, draft a patent's claim so that it is tied "to a particular machine or apparatus" or "transforms a particular article into a different state or thing." This is because, although no longer the exclusive test, the "machine or transformation test" is still "a useful and important clue" for § 101 assessment.
- **Generic components:** Highlight the use of any non-generic component in your AI invention and/or any non-generic way of using the components (even if they are individually generic). For example, if your AI invention uses a certain model structure that is new or non-generic, providing that disclosure in the specification will likely strengthen your patent, whereas merely describing that your AI invention can be run on a computer will likely not be sufficient.
- **Broad scope and functional claiming:** Avoid drafting broad claims that merely recite a certain function or result. Instead, focus on emphasising the specific ways in which your AI invention achieves that function or result.

- **International considerations:** It can be helpful to pay attention to developments in other jurisdictions that can affect AI patentability. For example, the European Patent Office (EPO) recently published Guidelines for Examination of "Artificial intelligence and machine learning" (G-II 3.3.1), providing guidance on the assessment of whether an invention on AI and machine learning has the requisite technical character to be patentable. On a slightly different note, the Korean Intellectual Property Office recently introduced an accelerated examination process for patent applications pertaining to AI and other specified emerging technology fields.

Footnotes

1. See Kay Firth-Butterfield & Yoon Chae, *Artificial Intelligence Collides with Patent Law*, World Economic Forum 5 (20 Apr 2018), http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf
2. See Ben Kelly & Yoon Chae, autonomous vehicles in the world of intellectual property rights, *Bloomberg Law* 3 (1 Oct 2018), available at <https://news.bloomberglaw.com/ip-law/insight-autonomous-vehicles-in-the-world-of-intellectual-property-rights>
3. See *Bilski v Kappos*, 561 US 593, 604 (2010).
4. See Ben Hattenbach & Gavin Snyder, *Rethinking the Mental Steps Doctrine and Other Barriers to Patentability of Artificial Intelligence*, in Fall Conference at Columbia Law School 319 (2018).
5. *Alice Corp v CLS Bank Int'l*, 573 US 208, 218 (2014).
6. See *Alice*, 573 US at 220-221.
7. See Ben Hattenbach & Gavin Snyder, *supra* note 3, at 403; Ben Kelly & Yoon Chae, *supra* note 2, at 3.
8. Robert R. Sachs, *The Mind as Computer Metaphor: Gottschalk v Benson and the Mistaken Application of Mental Steps to Software Inventions*, Bilski Blog (6 Apr 2016).
9. See, eg, *Purepredictive, Inc v H2O.AI, Inc*, No. 17-cv-03049-WHO, 2017 US Dist LEXIS 139056, at *13 (ND Cal 29 Aug 2017); *Vehicle Intelligence & Safety LLC v Mercedes-Benz USA, LLC*, 78 F. Supp. 3d 884, 888 (ND Ill 29 Jan 2015).
10. *Enfish, LLC v Microsoft Corp*, 822 F.3d 1327, 1335, 1337 (Fed Cir 2016).
11. *Id.*
12. *Enfish*, 822 F.3d at 1335.
13. *Id* at 1338-39.
14. See *id* at 1337.
15. *See id.*
16. See, eg, *SAP Am, Inc v InvestPic, LLC*, 890 F.3d 1016, 1021-22 (Fed Cir 2018).
17. *Alice*, 573 US at 221 (emphases added).
18. *Berkheimer v HP Inc*, 881 F.3d 1360, 1367 (Fed Cir 2018).
19. See, eg, *Power Analytics Corp v Operation Tech, Inc*, No. SA CV16-01955-JAK, 2017 US Dist LEXIS 216875, at *12 & *14-15 (CD Cal 13 July 2017).
20. *BASCOM Global Internet Servs, Inc v AT&T Mobility LLC*, 827 F.3d 1341, 1349-50 (Fed Cir 2016) (emphases added).
21. *Id* at 1350-51.
22. *Amdocs (Israel) Ltd v Openet Telecom, Inc*, 841 F.3d 1288, 1301 (Fed Cir 2016).
23. 84 Fed Reg 50, 50 (7 Jan 2019).

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