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PATENT LAW ISSUES IMPACTED BY AI- Akshit Rana¹**ABSTRACT:**

The emergence of artificial intelligence (AI) has revolutionized industries across the globe, presenting unprecedented opportunities and challenges for patent law. This abstract explores the intricate landscape of patent law issues influenced by AI technologies, examining key aspects such as patentability criteria, inventorship, ownership, and enforcement. AI-driven inventions present novel complexities regarding patentability criteria, particularly concerning the definition of "inventiveness" and the role of human intervention in the inventive process. The abstract delves into the evolving jurisprudence surrounding AI-generated inventions, highlighting landmark cases and legislative developments shaping the patent landscape.

Moreover, the abstract scrutinizes the notion of inventorship in the context of AI-generated inventions, probing the ethical and legal implications of attributing authorship to autonomous systems. As AI becomes increasingly autonomous and capable of generating innovative solutions independently, defining inventorship poses profound philosophical and legal conundrums. Ownership disputes surrounding AI-generated inventions pose another critical challenge for patent law, necessitating clear frameworks for allocating intellectual property rights among developers, users, and AI systems themselves. The abstract evaluates existing legal frameworks and proposes innovative solutions to address ownership uncertainties in the era of AI innovation.

INTRODUCTION

Some guidance and scholarly discussions on AI's effects on copyright law have taken place. For example, in the wake of a court decision involving a selfie-taking monkey, the

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United States Copyright Office updated its interpretation of “authorship” in 2016 to clarify that it would not register works produced by a *machine* or a mere mechanical process that operates randomly or automatically. It stressed that copyright law only protects “the fruits of intellectual labor” that are “founded in the creative powers of the mind”.² However, no such guidance has been provided and much less dialogue has taken place regarding the repercussions of AI on US patent law. And, in the face of AI’s rapid technological changes and societal effects, further discussions on AI’s patent law implications are paramount to facilitate any necessary changes in the US patent system so that it can continue to achieve its main objectives and help avoid negative social, economic and ethical effects.

THE PATENT SUBJECT-MATTER ELIGIBILITY STANDARD FOR AI

Before exploring truly “disrupted” and less explored patent topics, such as the patentability of inventions created by AI, this White Paper addresses the current, hotly debated topic of patent subject-matter eligibility for software, particularly for AIsoftware. Although an increasing number of AI patents are being issued in the United States,³ the present legal framework on patentable subject matter became more stringent in 2014 and poses heightened challenges for patent applicants in obtaining AI patents. Given that AI could have much greater impact on society than “non-intelligent” software, more discussions are needed on the elevated standard’s impact on innovation, ethics and the economy. After all, as warned by Justice Richard Linn of the United States Court of Appeals for the Federal Circuit (hereinafter Federal Circuit), the “danger of getting the answers to these questions wrong is greatest for some of today’s most important inventions”, such as in computing and in AI.

LEGAL FRAMEWORK FOR THE PATENTABILITY OF “AI PATENTS”

Title 35 of the United States Code, Section 101 (hereinafter 35 U.S.C. § 101) limits

²Julia Dickenson, Alex Morgan and Birgit Clark, “Creative machines: ownership of copyright in content created by artificial intelligence applications”, *EuropeanIntellect.Prop.R.*39(8),457(2017).

³*SmartSys.Innovations,LLCv.ChicagoTransitAuth.*,873F.3d1364,1378(Fed.Cir.2017)(Linn,J.,dissentingandconcurringinpart).

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patentable subject matter to “new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof”. Patent claims that are directed to abstract ideas (e.g. a mathematical algorithm), natural phenomena or laws of nature are not eligible for patent protection;⁸⁸ the Supreme Court of the United States explained that “they are the basic tools of scientific and technological work,” and that granting monopolies on those tools through patent rights might impede innovation.⁴

The Supreme Court, in *Alice Corporation Pty. Ltd. v. CLS Bank International*,⁵ recently made it more challenging for applicants to obtain patents on software or “computer-implemented inventions”. The seminal *Alice* decision has been interpreted and applied by the Federal Circuit and various lower federal district courts to generally exclude patent claims directed to subject matter that could be performed through an “ordinary mental process”, “in the human mind” or by “a human using a pen and paper”, with the limited exception for claims that specifically provide ways to achieve technological improvements over the tasks previously performed by people (e.g. containing an “inventive concept”).

This aspect of *Alice*’s legal framework creates tension with AI patents because the goal of AI is often to replicate human activity.⁹⁴ For example, in *Purepredictive, Inc. v. H2O.AI, Inc.*, the United States District Court for the Northern District of California held that the asserted claims of US Patent No. 8,880,446 covering AI-driven predictive analytics⁹⁵ were “directed to a mental process and the abstract concept of using mathematical algorithms to perform predictive analytics”.⁹⁶ After further finding that the patent’s claims “do not make a specific improvement on an existing computer-related technology”, the court invalidated the claims for being directed to patent-ineligible subject matter.

Similarly, in *Blue Spike, LLC v. Google Inc.*, applying the *Alice* test, the court held that the patent claims covered a general purpose computer implementation of “an abstract idea long undertaken within the human mind” because they sought to model “the highly

⁴Robert P. Merges, Peter S. Menell and Mark A. Lemley, *Intellectual Property in the New Technological Age* (Vicki Been et al. eds, 6th ed., 2012) (citing *Mayo Collaborative Servs. v. Prometheus Lab., Inc.*, 566 U.S. 66 (2012)).

⁵*Alice Corp. v. CLS Bank Int’l*, 134 S.Ct. 2347, 2355 (2014)

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effective ability of humans to identify and recognize a signal” on a computer.⁶ After further finding that the claims merely covered “a wide range of comparisonsthat humans can, and indeed, have undertaken since time immemorial” – and thus lacking any “inventive concept” – the court held that the claims were invalid.⁷ This trend has made it more challenging for patent applicants to obtain AI patentsduring prosecution or for patent owners to defend the validity of their patents during litigation.

DISCUSSION POINTS ON THE PRESENT LEGAL STANDARD

Discussions need to address whether the present subject- matter patentability standard promotes the main objectives of US patent law. For example, whether the present standard promotes or stifles innovative technologies relating to AI is an important question. Many have argued that patents provide incentives for innovation, investment and invention, and that awarding patent rights to software can encourage investment in software-related research and further promote innovation.

This argument would apply analogously to AI, but the case for innovation may be stronger, given the greater potential of AI than general software. Others have argued that patents on software stifle innovation. Some have suggested that patents should not be awarded to any software,¹⁰³ whereas others have proposed awarding shorter patent terms to software patents.¹⁰⁴ And, as discussed above, the courts often hold that patent claims mimicking or replicating human activity lack any “inventive concept”. These differing perspectives must be sufficiently considered to determine whether AI patents in fact promote innovation, or whether those technologies are better protected through other means (e.g. laws on trade secrets or copyrights). Similar conversations are needed for the other objectives of patent law. For example, the relevant actors should assess whether the present standard promotes the disclosure and dissemination of useful information and whether it incentivizes people to create new inventions.

⁶Blue Spike, LLC v. Google Inc., No. 14-CV01650-YGR, 2015 U.S. Dist. LEXIS 119382, at *13-16 (N.D. Cal. 8 September 2015), aff'd in Spike v. Google Inc., No. 2016-1054, 2016 U.S. App. LEXIS 20371 (Fed. Cir. 2016).

⁷Daniel F. Spulber, “How Patents Provide the Foundation of the Market for Inventions”, Northwestern Law & Econ. Research Paper No. 14-14 (26 June 2014),

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PATENTABILITY AND INVENTORSHIP ISSUES FOR AI-GENERATED INVENTIONS

The patentability of inventions *created* by AI, as discussed in this subsection, is a different topic from and should not be confused with patentability of inventions *directed* to AI technologies, which is discussed in the preceding subsection. The questions explored here are whether AI-created ideas, which otherwise would be deemed “inventive” had they been conceived by people, should be protected by the patent law system, and if so, who should be awarded inventorship for such AI-generated inventions. The urgent need to address these questions is underlined by instances of patents already being issued for AI-produced inventions, such as those for ideas from the Invention Machine and the Creativity Machine.

1. Legal considerations for patentability and inventorship for AI

The US patent system’s foundation is principally *utilitarian* and *economic* in nature, justifying patent rights based mostly on the promotion of new and improved works. Thomas Jefferson (US President, 1801-1809), who served as the “first administrator of our patent system” under the Patent Act of 1790 and as the author of the Patent Act of 1793, embraced the utilitarian view⁸ and believed that an “*inventor* ought to be allowed a right to the benefit of *his* invention for some certain time,” “as an encouragement to *men* to pursue ideas which may produce utility”. Thus, the US patent law’s ultimate goals are utilitarian, and how that utility is sought involves encouraging or incentivizing *human* inventors.

The US Patent Act does not require a particular threshold of human control or input in the invention process for granting patent rights, but it frames the questions of inventorship and patentability in terms of *human* creation. Inventorship bestows initial ownership of patent rights, generally driven by public beliefs on the justness and importance of rewarding human effort and stimulating human creativity. Under US patent law, an invention requires *conception*,⁹ which is “the formation in the mind of the

⁸Graham v. John Deere, *supra* note 8, 383 U.S. at 7 (“Thomas Jefferson, who as Secretary of State was a member of the group, was its moving spirit and might well be called the ‘first administrator of our patent system.’”).

⁹Golan v. Holder

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inventor, of a definite and permanent idea of the complete and operative invention”, where the “inventor” refers to an “individual”.¹⁰ The Federal Circuit has consistently explained that “[t]o perform this mental act, inventors must be natural persons and cannot be corporations or sovereigns”. The remainder of the Patent Act and laws are also replete with references to human actions. Section 101 of the Patent Act, governing patentable subject matter, focuses on “whoever” shall invent, and Section 102 on novelty prohibits the patenting of subject matter that “a person” did not invent. Further, the patent application process requires an oath or a declaration from the inventor (i.e. an individual). Limiting patents to human-generated inventions would also be aligned with the United States Copyright Office’s approach of not protecting works produced by machines.

On the other hand, the patent law’s abundant references to human creativity may simply be the by-products of the times when the Patent Act and laws were put in place. Given that the idea of AI-generated inventions was only recently introduced, especially its feasibility, there likely had been no pressing need to characterize the inventive process as one performed by anything other than people. Either way, neither the US Congress nor the courts have addressed whether AI-generated inventions can be patented, and if so, who should be awarded with inventorship.

Discussion points on how to define a “person of ordinary skill in the art”

As AI becomes ubiquitous, or at least more prevalent in various industries, discussion is required on whether the present definition of a POSITA is adequate – requiring a *person* and not an automaton – or whether it should be adjusted so that it can also mean a person equipped with AI if the use of AI is common practice in that technology space. Revising the definition to encompass a person’s use of AI would substantially raise the bar for non-obviousness. Setting the standard too high could prevent deserving inventions from being patented and could thus hamper innovation. On the other hand, a hurdle that is set too low can result in a flood of junk patents and in more patent cases being filed

¹⁰Vertinsky and Rice, *supra* note 5, at 585 (citing *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (reaffirming that the Patent Act covers “any-thing under the sun made by man.”)).

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(especially by “patent trolls”) against true innovators, which can impede businesses and economic growth. Some proponents for changing the POSITA definition (so that it refers to a person using AI, or even just the AI itself)²¹⁸ argue that, as “inventive” machines continue to improve and increasingly raise the bar of patentability,¹¹ only the most innovative technologies will become patented. But this can also result in less patents being granted on human-generated inventions, which can pose several risks as discussed in Section III.B. Moreover, if AI becomes truly super intelligent, then AI as a POSITA could also mean that all innovative activities will eventually be deemed obvious (in the “eyes” of the super intelligent AI).¹² Some even argue that traditional patent law is irrelevant, and that other, non-patent incentives should be used to provide the gate keeping function of non obviousness. Further discussions on these issues should identify the benefits and risks of changing the POSITA definition to allow AI participation with these differing views in mind.

CONCLUSION

This subsection explores other patent law issues that may be implicated by AI and that should be further reviewed by the relevant actors. One example is the question on how to treat patent applications prepared entirely by AI. If more advanced versions of Cloem, AllPriorArt or Specifico reach a technological point of being able to both generate inventive ideas and prepare entire patent applications for those ideas without human input, should such practice be regulated? Although patent laws focus less on who *prepared* the patent applications¹³ than on who came up with the *inventive* ideas, the discussions must explore whether having no rules that govern this issue can have negative real-life effects on the patent system. For example, if such AI-powered computers or tools begin to file an overbearing number of patent applications, this may cripple the examination process at the USPTO, which currently is unlikely to have the necessary resources to process the flood of applications. However, this problem may be

¹¹RobertPatrickMergesandJohnFitzgeraldDuffy, *PatentLawandPolicy: CasesandMaterials*, LexisLawPub, 643(3rd ed., 2002).

¹²MichaelAbramowiczandJohnF.Duffy, “TheInducementStandardofPatentability”, YaleL.J.120, 1590, 1593(2010).

¹³Robert Ambrogi, “TurboPatent Introduces Two AI-Powered Tools for Patent Lawyers”, Law Sites (28 June 2017),

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counterbalanced by raising the application fee and other administrative fees associated with filing patent applications, so that only the higher-quality patent applications get filed.

Another related issue is whether AI-generated content should qualify as prior art. If so, that may intensify the burden on the USPTO's ability to vet the relevant prior art, which may decrease its chances of effectively identifying the best prior art. Similarly, if AI-generated content qualifies as prior art, the present requirement for patent applicants to disclose to the USPTO "all information known to that individual to be material to patentability" may also become more difficult to satisfy, meriting consideration of imposing certain regulations on treating AI-generated content as prior art. But, disallowing prior art that was created by AI, just because of practical challenges, may run afoul of the policy considerations that underlie the legal standards on prior art. The practical considerations must thus be balanced with the intentions behind requiring the USPTO to identify the best prior art and/or behind requiring patent applicants to disclose all material prior art that is known to them.

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