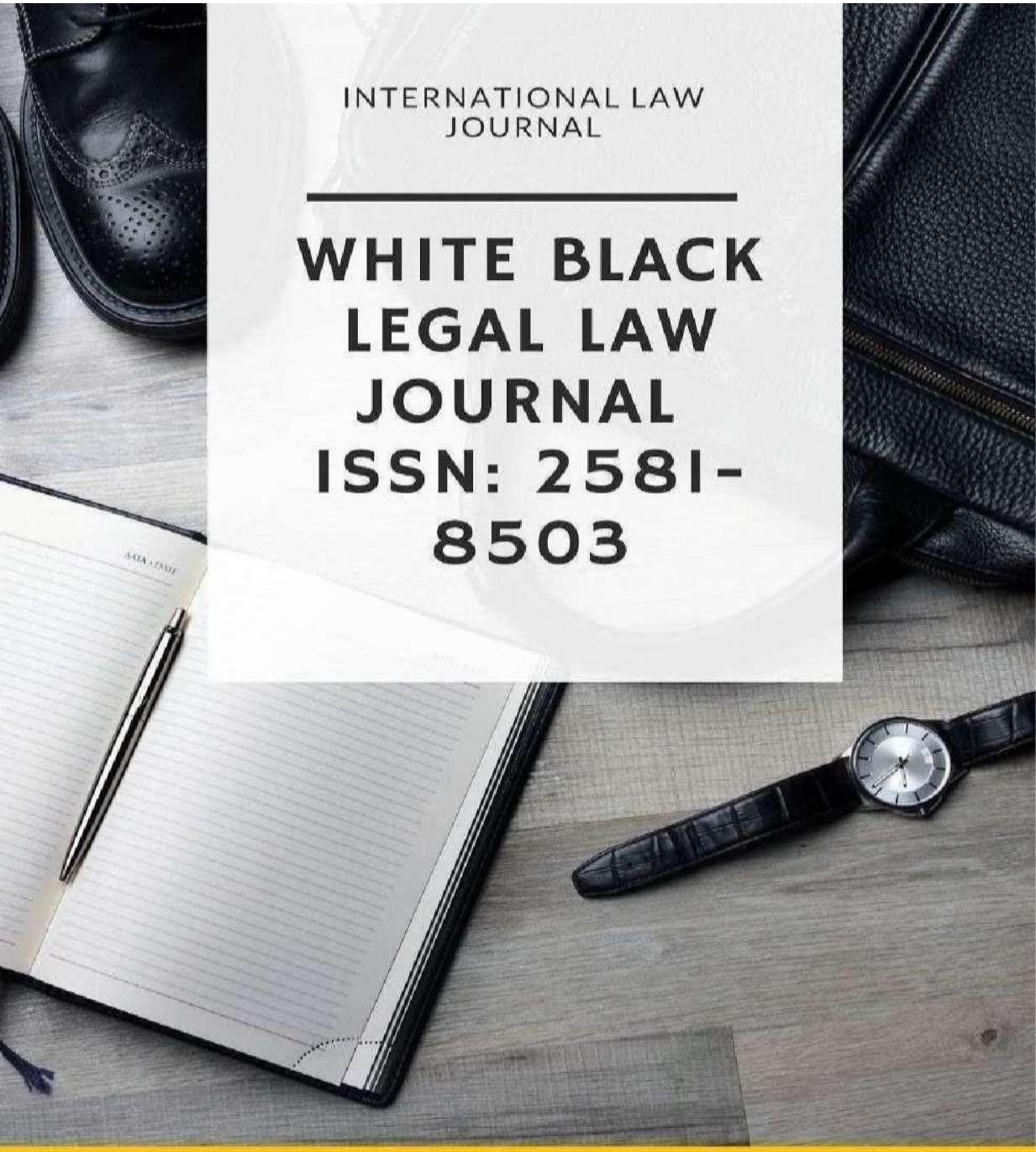

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WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal providededicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

PATENT LAW ISSUES IMPACTED BY AI

AUTHORED BY: ASHWIN SINGH

A3221519268

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It is to certify that Mr. Ashwin Singh is pursuing BBA L.L.B.(H) from Amity Law School, Amity University Uttar Pradesh and has completed his disserta- tion under my supervision. During his internship training he learnt various court craft. The comprehensive report submitted is found to be original and suitable for submission.

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Signature of the Student_____

Name of the Student: ASHWIN SINGH Enrolment No. A3221519268

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ABSTRACT

As artificial intelligence (AI) continues to revolutionize various sectors, its intersection with patent law presents a complex landscape ripe with both opportunities and challenges. This abstract delves into the key patent law issues influenced by AI technologies, examining their impact on innovation, legal frameworks, and societal dynamics. Firstly, AI-generated inventions pose fundamental questions regarding inventorship and ownership. Traditional patent law attributes inventorship to human creators, but AI systems, capable of autonomously generating inventive outputs, blur these boundaries. Addressing this issue requires reconciling legal principles with technological advancements to ensure fair attribution of rights and incentivize innovation. Secondly, the patentability criteria undergo scrutiny in the context of AI. The novelty and non-obviousness of AI-generated inventions raise debates on whether algorithms can be considered "prior art" and how to assess inventive step when the creative process involves machine learning algorithms. Ensuring that patent law adapts to accommodate AI-driven innovation while maintaining rigorous standards is crucial for fostering technological progress.

I. 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 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".[1] 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.

II. 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 AI software. Although an increasing number of AI patents are being issued in the United States,[2] 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.

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[1] Julia Dickenson, Alex Morgan and Birgit Clark, "Creative machines: ownership of copyright in content created by artificial intelligence applications",European Intellect.

Prop. R. 39(8), 457 (2017).

2 Smart Sys. Innovations, LLC v. Chicago Transit Auth., 873 F.3d 1364, 1378 (Fed. Cir. 2017) (Linn, J., dissenting and concurring in part).

III. LEGAL FRAMEWORK FOR THE PATENTABILITY OF "AI PATENTS"

Title 35 of the United States Code, Section 101 (hereinafter 35 U.S.C. § 101) limits 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.[3]

The Supreme Court, in *Alice Corporation Pty. Ltd. v. CLS Bank International*,[4] 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,*

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3 Robert 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)).

4 Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014)

Inc. v. H20.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 effective ability of humans to identify and recognize a signal" on a computer.[5] After further finding that the claims merely covered "a wide range of comparisons that humans can, and indeed, have undertaken since time immemorial" – and thus lacking any "inventive concept" – the court held that the claims were invalid.[6] This trend has made it more challenging for patent applicants to obtain AI patents during prosecution or for patent owners to defend the validity of their patents during litigation.

IV. 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

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[5] Blue 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).

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

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.

The discussions should also account for AI-specific factors as opposed to broader software-specific considerations when assessing whether incentivizing AI through patent rights may have different or greater economic, social and ethical impact than incentivizing general software. For example, many have expressed concern that AI could make much of human employment redundant,106 having more profound negative economic effects than prior technological changes. Others believe that AI's overall economic impact will not be very different from those of previous technological advances.

Some believe that this will result in those first-movers having "too much power, if we don't begin to update patent law now". This may exacerbate the existing risks of AI-induced wage gaps and economic inequality.

How to implement legal changes to maximize the social and ethical benefits from AI should also be explored, to the extent that any patent law adjustments are deemed necessary. Lowering the subject-matter patentability standard for AI inventions relating to areas deemed more socially beneficial, such as healthcare, the environment, criminal justice and education,112 might be one way to help balance promoting innovation with mitigating ethical concerns. These issues must be carefully examined by the relevant actors to ensure US patent law evolves to strike an optimal balance between the various competing objectives.

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 view[7] 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*,[8] which is "the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention", where the "inventor" refers to an "individual".[9] 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

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[7] Graham 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.'").

[8] Golan v. Holder

9 Vertinsky 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.")).

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.

V. DISCUSSION POINTS ON PATENTABILITY

The patent-eligibility issue for AI-generated inventions must be explored in the context of whether patents on AI-generated inventions would further the patent law system's main objectives. Some have argued that granting patent rights to AI-generated inventions would accelerate innovation, even enabling advances that would not have been possible through human ingenuity alone.[10] Others have argued that patent rights do not promote innovation, irrespective of whether inventions are generated by people or AI. Under this view, more patents, resulting from AI-generated inventions, will increase social costs and monopolies, and stifle the entry of new ventures, thereby hampering innovation. China's New Generation Artificial Intelligence Development Plan includes language that calls for promoting "the innovation of AI intellectual property rights", which some could interpret as encouraging recognition of IP rights for AI-generated works (although no mention is made of promoting AI as inventors).

[10] Burroughs Wellcome Co. v. Barr Labs., Inc., 40 F.3d 1223, 1227-28 (Fed. Cir. 1994).

VI. DISCUSSION POINTS ON INVENTORSHIP

If inventions generated entirely by AI become eligible for patent rights,160 the next question to address is who should be listed as the inventor. As discussed in Section III.B.1, the current

law requires *conception* or "the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention" for there to be an invention. Thus, if all the conception takes place in the "mind" of an AI, then there would be no person to list as the inventor under the present law.[11] This presents two main options: (1) list AI as the inventor; or (2) list no inventors on the face of the patent.

Some argue that if AI's work "is indeed inventive, then both treating computational inventions as patentable and recognizing [AI] as an inventor would be consistent with the constitutional rationale for patent protection". But to do so would require the recognition of AI as a *legal entity* or a *legal person*, which is not available under current US law. Nevertheless, the general definition of a "legal person," which is "a subject of legal rights and obligations", is likely broad enough to encompass AI as long as AI's role as an inventor is subject to legal rights and obligations. Legal personhood and inventorship status are thus theoretically possible for AI if the legislature is willing to grant them. But it is important to assess whether granting inventorship would provide any benefits for the patent system. For example, except for AGI or superintelligent AI that has true *consciousness* (which does not exist today), AI "would not be motivated by the

11 Gabriel Hallevy, "AI v. IP: Criminal Liability for Intellectual Property IP Offenses of Artificial Intelligence AI Entities" (17 November 2015)

prospect of a patent"[12] and can continue to generate inventive ideas without any incentivizing through inventorship (like the Invention Machine and Creativity Machine).168 Would there be any meaningful benefits in recognizing AI as inventors beyond those provided by allowing AI-created inventions to be patentable?

VII. LIABILITY ISSUES FOR PATENT INFRINGEMENT BY AI

Another important patent law issue that will likely be disrupted by AI relates to liability in cases where AI is the violator of patent rights, given that most AIs now have the technological capacity to infringe patent claims.170 Similar to the above discussion on AI as the inventor, the liability issue raises the question of who should be held responsible for actions taken by AI – the end
user, the developer or AI itself171 – as well as the related question of how to assess liability.

1. *Legal framework for patent infringement liability*

Patent rights include the right of inventors to *exclude* others from practising (i.e. infringing) the patented inventions in exchange for their respective discoveries.172 In US patent law, infringement of a patent claim occurs when "*whoever* without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor".173 Ascertaining infringement requires a two-step analysis to: (1) determine the meaning of each term in a patent claim; and (2) show that the accused device meets each claim term (i.e. claim limitation), either literally or under the doctrine of equivalents.174 US patent law also acknowledges "induced infringement", as when "*whoever* actively induces

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[12] Bridget Watson, "A Mind of Its Own – Direct Infringement by Users of Artificial Intelligence Systems", IDEA 58(1), 65, 69 (2017); accord. Kahana, *supra* note 34, at 2;

see also Yanisky-Ravid, *supra* note 146, at 43 (“As with inventorship, existing laws and precedent appear to rule out a machine or program as infringer.”); Institute for Globalization and International Regulation, “Artificial intelligence (AI) and intellectual property (IP), a call for ac- tion”, Maastricht Univ. Blog (11 October 2017)

infringement of a patent shall be liable as an infringer", which has been interpreted to mean that the alleged inducer must have knowingly aided another's direct infringement of a patent. Once patent infringement is found, the infringer would have to pay damages to the patent owner in an amount adequate to compensate for the infringement (usually in the form of lost profits or reasonable royalties), and in certain cases would be enjoined or prohibited from performing the infringing activity.[13]

US laws, however, do not currently acknowledge a finding of patent infringement that is independent of human involvement, and do not address how liability or damages should be handled for patent infringement by AI. Helpful guidance and discussion points can be found in the *European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics* (hereinafter European Parliament Resolution), which explains that, today, AI cannot be held liable per se for acts or omissions that cause damage to third parties (e.g. patent infringement). Instead, AI's act would have to be traced back to a *human* agent, such as its manufacturer, operator, owner or user, if that agent could have *foreseen* and could have *avoided* AI's harmful behaviour (e.g. its infringing act).180 But the rapid progress in AI's autonomous and cognitive features makes "the legal responsibility arising through a robot's harmful action" a crucial issue,181 and questions "whether the ordinary rules on liability are sufficient or whether it calls for new principles and rules to provide clarity on the legal liability", especially "where the cause cannot be traced back to a specific human actor".

2. *Discussion points on patent infringement liability*

The view that patent infringement by humans or AI should be deterred is likely

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13 Vishal V. Khatri et al., "Catch Me If You Can: Litigating Artificial Intelligence Patents", Jones Day

(De- cember 2017)

not controversial. Moreover, failing to hold "someone" liable for patent infringement by AI will likely encourage using AI for infringement. But more discussions on *how* to handle patent infringements by AI are required, such as on *who* should be held liable184 and on how liability should be assessed. The answers must promote the patent law system's main objectives, as well as maximize the social, economic and ethical benefits.

The European Parliament Resolution "at least at the present stage" advocates holding a person responsible rather than an AI.185 As to which human actor to hold liable, one possibility would be the AI's end users; as noted in the Resolution, the "rules governing liability for harmful actions – where the user of a product is liable for a behaviour that leads to harm" could apply to damages caused by AI.[14] This can create uncertainty among software users, however, and may lead to their disuse of otherwise helpful AI. It would also be unfair in many instances, given that end users often cannot foresee the patent infringement, especially if they are individuals and not sophisticated corporations. Patent owners sue the companies that develop and/or sell the products much more frequently than the end users of those products, and even in those cases where the end users are sued and held liable, they are often indemnified by the products' manufacturers.

Conclusion

Intellectual property and artificial intelligence are key aspects of modern life. Artificial intelligence is now so ingrained in the world of intellectual property that it is impossible to imagine its growth in the future without using artificial intelligence. Particularly the subjects, covered under copyright are heavily impacted by AI.

The author is the key factor in copyright as prima facie the author is the first owner of copyrighted work. The copyright act required author to be a person and person refers to human being. As a result that must be a human being although there is no direct provision

[14] Gaia Bernstein, “The Rise of the End User in Patent Litigation”, B.C.L. Rev. 55(5) (2014), 1443

which uses the term human being. Certain phrase or term used in the Act, such as term of protection is life plus 60 years from the death of the author, legal heirs etc., indirectly required for author to be human being. There may be specific situation where the authorship can be attributed to company or corporations by applying the 'doctrine of work made for hire' and the concept of co-authorship.

The introduction of artificial intelligence in the field of copyright is posing the problem of authorship. When any work is created by using AI, it is found that these works fulfill allthe conditions of copyrightability as provided under Indian Copyright Act. With regard to the authorship of these works the requirement of human being create problem.

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