AI'S DISRUPTIVE INFLUENCE ON PATENT SYSTEM

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ABSTRACT

Artificial Intelligence (AI) has become a pivotal force for innovation, fundamentally questioning the foundational principles of patent law that rely on human inventorship. As AI systems increasingly create inventions with little to no human involvement, current patent structures encounter considerable legal and conceptual challenges. This article provides a critical analysis of the effects of AI-generated inventions on patent law, focusing specifically on standards of patentability, inventorship, and ownership within the context of Indian law. It evaluates the relevance of traditional patent criteria novelty, inventive step, and industrial applicability to inventions driven by AI, as well as the statutory exclusions outlined in the Patent Act of 1970 and the Guidelines for Computer-Related Inventions (CRI). By comparing the DABUS case with international practices, the paper underscores the shortcomings of existing legal frameworks in recognizing non-human inventorship. The article also derives that although AI-generated inventions may meet essential patentability standards, substantial legal and policy reforms are required to provide clarity, encourage innovation, and maintain doctrinal consistency in the era of artificial intelligence.

Keywords: Artificial Intelligence (AI), AI-generated inventions, Patent law, Inventorship, Computer-Related Inventions (CRI).

INTRODUCTION

Artificial Intelligence (AI) has emerged as one of the most revolutionary technologies of the 21st century, fundamentally altering industries, research approaches, and innovation strategies. It is changing the innovation landscape by allowing machines to undertake tasks that previously necessitated human intelligence such as learning, problem-solving, and even creative thought. As AI technologies advance, they are becoming increasingly integral to the creation of new inventions across diverse sectors, including pharmaceuticals, engineering, and information technology. This swift technological progress has presented intricate challenges for the global patent system, which was traditionally based on the premise that only humans are capable of inventing**.**

AI GENERATED INVENTIONS

Inventions driven by artificial intelligence are creations developed through systems that utilize AI technology. These advancements arise from AI's capability to analyze extensive datasets and uncover underlying patterns. Such AI systems can autonomously generate new ideas, designs, or solutions without human intervention. Consequently, a key characteristic of these innovations is their independence from human creators. The complexity of AI-generated inventions often surpasses traditional inventions, enabling them to address challenges in unconventional manners. These inventions can integrate concepts from diverse fields in unexpected ways, and AI can rapidly refine and enhance designs or identify highly effective solutions.

FORMS OF AI CAPABLE OF PRODUCING INVENTIONS

Machine learning algorithms represent a prevalent category of AI systems utilized for the creation of inventions. These systems analyze extensive datasets to discern patterns and formulate predictions. By integrating learned patterns in innovative manners, they can produce new concepts. Supervised learning algorithms are especially effective for focused invention development. Deep learning neural networks constitute another formidable class of AI dedicated to invention. These systems emulate the neural architecture of the human brain, enabling them to handle intricate, unstructured data and yield highly imaginative results. Generative Adversarial Networks (GANs), a specific type of deep learning, are particularly adept at generating new and original content.

Evolutionary algorithms mimic the process of natural selection to develop new inventions, generating numerous solutions and refining them through iterations. These algorithms can yield surprising and creative outcomes, making them especially effective for optimization challenges. Reinforcement learning systems acquire knowledge via trial and error, enabling them to create inventions by investigating various methods to address a problem. These systems excel at discovering innovative solutions within intricate environments and have demonstrated success in areas such as gaming and robotic control.

AN OVERVIEW OF PATENT LAW PRINCIPLES

Patent law plays a crucial role in the protection of intellectual property, providing inventors with exclusive rights to their inventions for a specified period. The primary objective is to foster innovation and technological progress. Patent laws seek to balance the interests of inventors with the broader interests of society. By offering a temporary monopoly, patents enable inventors to recover their research and development costs. In exchange, they are required to publicly reveal their inventions, thereby enriching the public domain and stimulating additional innovation.

The principle of territoriality is a fundamental element of patent law, as patents are primarily granted on a national basis. An invention that receives patent protection in one jurisdiction may not enjoy the same protection in another. This situation has led to the establishment of international patent frameworks and agreements. Additionally, patent laws embody the principle of fair competition, preventing others from exploiting an inventor's efforts without permission. However, it is crucial that patents do not hinder competition or impede technological advancement. This complex equilibrium is upheld through various legal instruments.

The Indian Patent Act of 1970 serves as the principal legislation regulating patents in India. It provides a comprehensive legal framework for the granting of patents, clarifies the rights of patent holders, and sets forth the processes for patent applications and enforcement. This act plays a significant role in promoting innovation and industrial development in India, while also aligning with international standards of intellectual property.

PURPOSE OF PATENT PROTECTION

The primary purpose of a patent is to encourage innovation and technological

advancement by granting inventors exclusive rights to their inventions for a defined period, typically 20 years from the application date. This exclusivity serves as a legal protection that prevents others from producing, using, selling, or distributing the patented invention without the inventor's consent. As a result, patents incentivize inventors to invest time, effort, and resources into research and development, with the expectation that they may reap financial rewards from their innovations.

Additionally, patents facilitate the sharing of technical knowledge with the public through comprehensive disclosure of the invention, thereby enhancing the collective body of scientific knowledge and potentially inspiring further innovation. Another significant goal is to drive economic growth by encouraging competitive markets where new and enhanced products and processes can develop. Ultimately, patents also help to balance public and private interests by ensuring that once the exclusivity period concludes, the patented invention becomes part of the public domain, enabling society to benefit from the innovation without limitations.

CRITERIA FOR PATENT ELIGIBILITY

The term 'Invention' is defined in Section 2 (1) (j) of the Act, 1970. Understanding this definition is crucial as it outlines the criteria for patentability in India. According to this section, "invention" refers to a novel product or process that includes an inventive step and is suitable for industrial application. In India, an invention is considered patentable if it meets three fundamental requirements: novelty, inventive step (often called non-obviousness), and industrial applicability.

- **Novelty** is a fundamental criterion for patent eligibility. An invention must be novel (new) and not have been previously revealed to the public. As per Section 2(l) **"new invention"** means any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e., the subject matter has not fallen in public domain or that it does not form part of the state of the art.

- The concept of "**non-obviousness"**, often referred to as the "**inventive step"**, represents a significant requirement. Section 2(1) (ja) defines 'Inventive step' as a feature of an invention that involves technical advance as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person

skilled in the art. Essentially, this indicates that the invention does not represent a straightforward enhancement of current knowledge. It should not be readily apparent or easily foreseeable to an individual possessing an average level of knowledge and expertise in the pertinent field. This definition emphasizes that the invention must either exhibit a technical advancement over existing technology or yield a considerable economic effect, or potentially both.

- **Utility**, also known as **industrial applicability**, constitutes the third fundamental requirement. An invention must serve a practical purpose and be suitable for industrial application. Section 2 (1) (ac) of the act defines "capable of industrial application." The invention is capable of being made or used in an industry.

PATENTABILITY OF AI GENERATED INVENTIONS

Under Indian patent law, inventions generated by AI that meet the aforementioned criteria may be eligible for patent protection in India.

1. Novelty

An invention is regarded as novel when it does not belong to the existing part of knowledge. In the event that an AI system develops something that has never been made public (like a new chemical compound, design, or algorithm), it might satisfy the requirement for novelty. AI systems, through the analysis of extensive datasets, can produce results that might be classified as novel. Nevertheless, the growing application of AI also results in the creation of AI-generated prior art, which can pose challenges to the novelty of future inventions.

2. Inventiveness

The requirement for inventiveness asserts that an invention should not obvious to someone skilled in the field. AI-generated inventions might undergo examination based on this principle, given that AI's proficiency in synthesizing existing knowledge might be interpreted as an automated function lacking human creativity. There are those who argue that AI's results could be classified as obvious if they arise from basic algorithmic combinations of known factors. However, should the AI-generated invention reveal a technical advancement or resolve a technical problem in a non-obvious way, it could meet this standard.

3. Industrial applicability

An invention is required to be capable of being produced or utilized in some form of industry. AI-generated inventions often fulfill this criterion, particularly when they have tangible applications in industries such as manufacturing, healthcare, or technology**.** For instance, components designed by AI that can be employed in industrial processes or products generally meet the criteria for industrial applicability.

Certainly, AI-generated inventions are capable of satisfying the critical standards of novelty and non-obviousness that are vital for obtaining patents. AI systems, particularly through the use of machine learning and neural networks, has been instrumental in creating innovative solutions that were once beyond imagination. For example, AI has successfully engineered new pharmaceuticals, materials, and engineering solutions that were not recognized or evident to human experts in the domain. These breakthroughs illustrate the potential of AI to make meaningful contributions across various industries, such as pharmaceuticals, materials science, and product innovation.[1]

DABUS AI: Example of AI Generated inventions

Artificial Intelligence has been recognized for generating inventions that fulfill the technical requirements for patentability. For instance, an AI system known as **DABUS** independently developed a novel fractal-shaped food container and a groundbreaking flashing light device intended for emergency situations. DABUS, which stands for **D**evice for the **A**utonomous **B**ootstrapping of **U**nified **S**entience, this system, developed by Dr. Stephen Thaler, is an artificial intelligence entity. It is intended to independently produce creative concepts and inventions without requiring direct human participation. The importance of DABUS in the realm of patents lies in its challenge to conventional patent law, which has traditionally mandated that a human inventor be identified in patent applications. When Dr. Thaler submitted patent applications listing DABUS as the inventor, it ignited a worldwide discussion regarding the potential for AI systems to be acknowledged as inventors within current patent regulations.

[1] Michael McLaughlin, *Inventive Machines: AI and Patent Law*, 35 Harv. J.L. & Tech. 255 (2022)

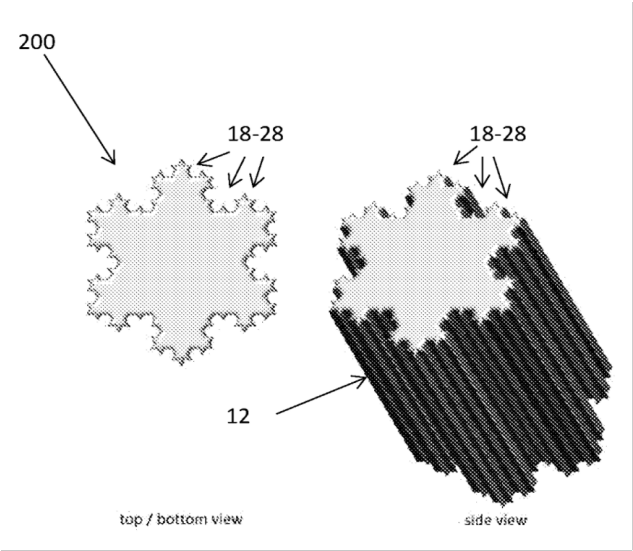

Fig:1.1 AI invented container system by DABUS (Fractal geometry)

The majority of patent offices, such as the United States Patent and Trademark Office (USPTO), the European Patent Office (EPO), and the UK Intellectual Property Office (UKIPO), rejected these applications, citing that existing laws stipulate that an inventor must be a natural person. Conversely, some regions, such as South Africa, have shown a greater willingness to accept this notion and have issued patents with DABUS recognized as the inventor.

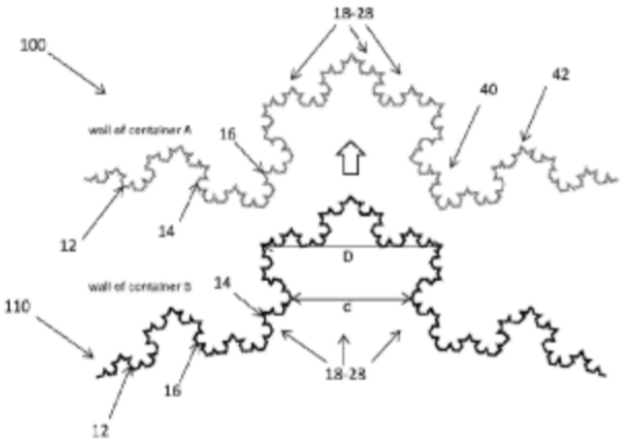

Fig: 1.2 Image of the container border

The DABUS situation prompts essential inquiries about the involvement of AI in innovation, the rights of ownership, and the objectives of patent law. Awarding patents for inventions generated by AI could promote AI advancement and hasten technological

development, yet it also poses challenges to the current legal structures established for human inventors. DABUS serves as a groundbreaking case that could transform intellectual property laws to more effectively accommodate the realities of creativity and invention driven by AI**.**

Despite these inventions being deemed original and non-obvious, patent authorities globally denied their patent applications on the grounds that AI cannot be legally designated as the inventor. Nevertheless, patent offices denied the applications on the grounds that the 'inventor' was not a human being.[2]

GUIDELINES FOR COMPUTER - RELATED INVENTIONS (CRI) AND PATHWAY TO AI PATENTABILITY IN INDIA

Furthermore, Section 3(k) of the Indian Patents Act stipulates that "mathematical or business methods, computer programs per se, or algorithms" are not eligible for patent protection, regardless of their significance in AI systems that address specific, real-world challenges. This creates obstacles for inventions related to artificial intelligence, particularly those that depend significantly on algorithms**.** Numerous industrial applications of algorithmically generated algorithms have extensive implications in sectors such as healthcare and pharmaceutical manufacturing. In these fields, AI can facilitate the development of new medications or enhance production processes. These algorithms are not merely theoretical; they possess concrete, technical applications. Nevertheless, the comprehensive exclusion stipulated in Section 3(k) results in a lack of legal protection, which would otherwise foster further innovation and advancement in these vital industries.[3]

While the statute was intended to prevent monopolization of abstract concepts and guarantee the unrestricted access to fundamental knowledge, it has only recently been acknowledged that the stringent interpretation of Section 3(k) is now significantly hindering AI-driven advancements. The reliance on AI-generated algorithms in industrial processes and technological solutions necessitates a timely reevaluation of this exclusion.

The Guidelines pertaining to **Computer-Related Inventions (CRI)** outline a strategy

[2] European Patent Office, *EPO Refusal Decision on DABUS Applications*, EPO (Dec. 20, 2019), https://www.epo.org/news-events/news/2019/20191220.html

[3] Jaivardhan Goyal, *Artificial Intelligence and the Evolution of Patent Law in India*, Times of India Blogs (Dec. 13, 2024), https://timesofindia.indiatimes.com/blogs/voices/artificial-intelligence-and-the-evolution-of-patent-law-in-india.

for determining the patent eligibility of AI-related creations.[4] Under these guidelines, an invention that fuses an algorithm with a novel hardware aspect or reveals a notable technical effect, such as enhanced computational efficiency, may be considered for patent protection.

1. Technical contribution

AI innovations should exhibit a technical advancement that transcends basic algorithms. This may involve the application of an AI model to a specific tangible device or system to achieve real-world benefits.

2. Focus on hardware-software integration

Innovations that assert the use of AI algorithms alongside particular hardware elements may fulfill the technical contribution criteria, as they exhibit practical implementations that extend beyond mere abstract algorithms. It is frequently deemed patentable when it incorporates an innovative hardware element or when the software produces a tangible technical effect (yields a concrete technical outcome).

3. Avoidance of pure algorithm claims

Patent claims related to AI that are solely based on algorithms or data analysis, lacking practical application, are prone to rejection under Section 3(k). It is essential for claims to highlight the invention's relevance to a tangible system or process, such as in medical imaging or robotic control.

INVENTORSHIP OF AI GENERATED INVENTIONS IN INDIA

There is no uncertainty regarding the identification of the inventor for AI-generated inventions that require human involvement. However, the issue of whether AI technology itself should be recognized as an 'inventor' when it produces patentable inventions remains ambiguous. According to Section 6 of the Patents Act, a patent application for any invention may only be submitted by the true and original 'inventor' or an assignee.

It is widely understood that the patent system provides the inventor with a temporary

[4] Aishwarya Agrawal, *Patents on Artificial Intelligence Invention*, LawBhoomi (Nov. 15, 2024), https://lawbhoomi.com/patents-on-artificial-intelligence-invention/.

monopoly on their invention. The rights to the patent are held by the inventor, and if the inventor is not recognized, the patent could be deemed invalid. A pertinent issue regarding advanced AI is whether a non-sentient machine can be classified as an 'inventor' when it independently generates an innovation or product.

- **Legal framework: Only Human can be an Inventors**

The Indian Patents Act of 1970 does not provide a specific definition for the term 'inventor'; however, it stipulates that only a **natural person** may submit a patent application as the 'true and first inventor.' This is clearly stated in Section 6(1) which refers to "**any person claiming to be the true and first inventor,**" implicitly excluding machines or artificial intelligence systems from being acknowledged as inventors. Courts and patent authorities in India interpret the term 'person' to mean natural or legal entities (such as corporations), rather than AI.

- **AI as a tool vs Inventor**

Presently, Indian jurisprudence regards AI as a tool utilized by human inventors rather than as an autonomous creative entity. Consequently, when a human employs AI in the invention process, that individual is recognized as the 'true and first inventor'. The role of AI is perceived in a manner akin to that of other software applications or automated technologies. This implies that even when AI makes a significant contribution to an invention, the individual who employs or programs the AI must be credited as the inventor. This perspective is consistent with established principles of inventorship, which emphasize intentionality and mental conception, the attributes that AI does not, as essential criteria for being classified as an inventor.

While AI itself cannot be designated as an inventor, inventions developed with the assistance of AI (AI assisted inventions) may be eligible for patent protection in India, provided that a human applicant claims to be the inventor and the invention fulfills the established criteria of novelty, inventive step, and industrial applicability. For instance, when a pharmaceutical firm employs artificial intelligence to identify a novel drug compound, it is necessary to credit a human researcher or team as the inventors.[5]

[5] R. Nair, *AI and Inventorship in Indian Patent Law: Time for Reform?* 14 NUJS L. Rev. 155 (2021).

- **DABUS case in Indian context**

Currently, there is no legal precedent in India recognizing an AI system as an inventor. The Indian Patent Office has yet to rule on a case similar to DABUS, which involved an AI being designated as the sole inventor. However, in light of India's compliance with global IP regulations and the analogous positions of the USPTO, EPO, and UKIPO, it is likely that India will similarly reject patent applications that propose an AI system as the inventor.[6]

DABUS has autonomously created an innovative food container with a fractal design and a pioneering flashing light device for emergency use. Although these inventions are recognized as original and non-obvious, patent authorities worldwide rejected their patent applications, citing that AI cannot be legally recognized as an inventor. Consequently, patent offices dismissed the applications on the basis that the 'inventor' was not a human.[7]

- **Policy Discussions and Future Outlook**

The Indian government has begun engaging in policy discussions concerning artificial intelligence and intellectual property, facilitated by the NITI Aayog and the Department for Promotion of Industry and Internal Trade (DPIIT). While there is an acknowledgment of AI's expanding influence on innovation, formal actions to revise patent law to recognize AI as an inventor have yet to be taken. Experts indicate that India could potentially follow a moderate approach, permitting the patenting of AI-assisted inventions, with the stipulation that human inventors must be credited.[8]

OWNERSHIP OF AI GENERATED INVENTIONS

Patent ownership pertains to the legal entitlements bestowed upon the patent holder, which encompass the authority to prevent others from manufacturing, utilizing, marketing, or importing the patented invention. In accordance with existing patent laws globally, including those in India, the rights to a patentable invention typically belong to either the inventor or an entity or individual who has obtained an assignment of rights from the inventor. This

[6] Sneha Jain, *The DABUS Case and the Indian Position on AI Inventorship*, 27 J. Intell. Prop. Rts. 15 (2022), https://nopr.niscpr.res.in/handle/123456789/58786.
[7] European Patent Office, *EPO Refusal Decision on DABUS Applications*, EPO (Dec. 20, 2019), https://www.epo.org/news-events/news/2019/20191220.html
[8] Department for Promotion of Industry and Internal Trade, *Framework for Artificial Intelligence in India: IP Issues and Challenges* (2020), https://dpiit.gov.in/.

framework will require reassessment and potential modification in light of inventions generated by artificial intelligence.

In this scenario, the issue of ownership becomes more complex due to the involvement of various stakeholders in the creation of AI-generated inventions. These stakeholders include:

(i) the creators and developers of the AI system,

(ii) the proprietors of the AI software and/or the machinery on which it functions,

(iii) the individuals tasked with training the AI systems, and

(iv) the users of the AI systems, who are responsible for operating the AI and providing the necessary inputs that contribute to the invention's development.

Every AI system fundamentally consists of a software program or a group of software programs. The ownership of intellectual property ("IP") related to such software is usually attributed to the programmer or their employers, clients, or assignees, contingent upon the contractual arrangements governing the software's development. However, this ownership should not be presumed to extend to the results produced by the AI system, since an AI-generated invention may frequently neither represent the intended purpose of the software, nor the original idea of the software creator.[9]

However, there may be instances where an individual or entity, not involved in the creation of the core AI software, employs such software to generate a new process or product. In such cases, it can be argued that the software owner should not claim ownership of the invention, as they did not contribute to defining the problem or training the AI system that led to the invention's creation. Consequently, a legal framework aimed at safeguarding AI-generated inventions must establish clear guidelines regarding ownership, considering the contributions and investments of all involved parties.

CONCLUSION

AI technologies have proven capable of producing original and non-obvious

[9] S&R Associates, *AI-Generated Inventions: New Questions for Patent Regimes*, S&R Associates Insights (May 29, 2024), https://www.snrlaw.in/ai-generated-inventions-new-questions-for-patent-regimes/.

inventions, satisfying the essential criteria for inventiveness in patent legislation. However, the acceptance of inventions generated by AI is limited by current patent laws, which mandate that a human be recognized as the inventor. The promise of AI to change the landscape of innovation is substantial, but the legal system must adjust to effectively leverage this promise. The Patents Act of 1970 does not explicitly address AI-generated inventions, which contributes to confusion in India's rapidly advancing technological sector. Until India updates its patent laws or provides clear guidelines, the inventorship of AI is not acknowledged within the country.

Furthermore, the capacity of artificial intelligence to analyze extensive datasets and produce solutions at a pace surpassing that of human researchers poses a challenge to conventional timelines and methodologies in research and development. This transformation necessitates a reassessment of the criteria for evaluating inventive steps and novelty in patent applications. As AI increasingly shapes the development of technological solutions, it is imperative for policymakers and legal frameworks globally to swiftly modify intellectual property regulations. It is essential to safeguard innovation while ensuring clear definitions of inventorship in the era of artificial intelligence.

There is an increasing recognition that technology has reached a stage where an AI system can significantly influence the inventive process, potentially expediting technological advancement. Consequently, the issue of granting and safeguarding intellectual property rights for AI-generated inventions becomes critically important, particularly in terms of encouraging innovations and investments in generative AI systems. A lack of adequate protection for such inventions from an intellectual property standpoint could adversely affect humanity's ability to utilize AI responsibly and, more crucially, for the collective good. This shortcoming may also hinder progress across various fields and disciplines.

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