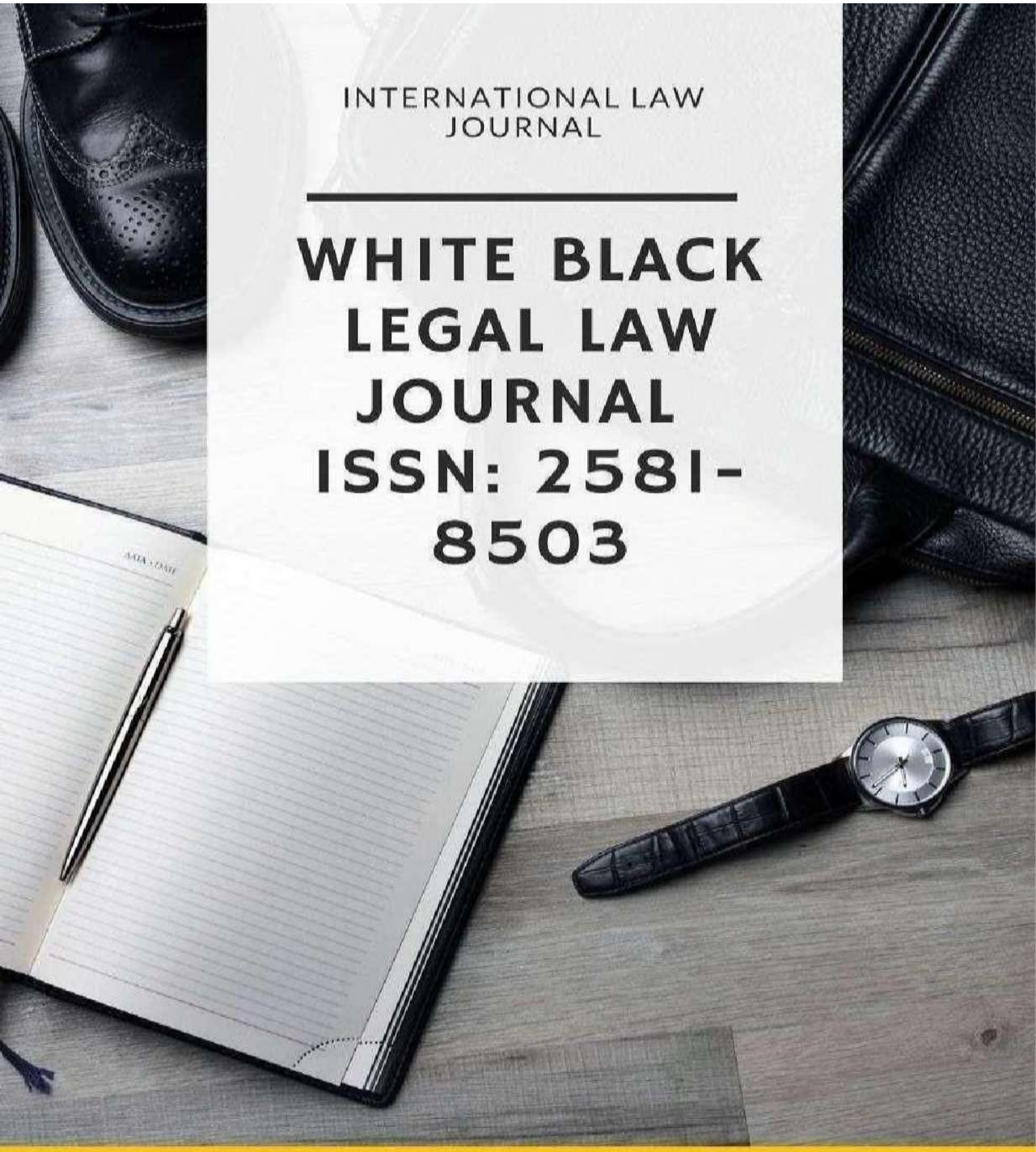

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ABOUT US

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

AI AND INVENTORSHIP: A PATENT DILEMMA IN THE DIGITAL AGE

AUTHORE BY - ANIRUDDHA BAMAL & DR. SALTANAT SHERWANI

ABSTRACT

Inventors, who are usually human, are recognised for their innovation in issue-solving using creative approaches. Intellectual property (IP) safeguards the inventions of the human mind. Patents, a specific type of intellectual property, protect innovative, non-obvious, and industrially useful innovations. It provides innovators exclusive rights to their inventions. However, the rise of AI as a problem-solving tool raises problems regarding inventorship and the patentability of AI-generated creations. From simple tasks like writing a message or editing an image to the most complex of things, like discovering genetic lineage factors to mapping the literal universe, almost all the aspects of human creativity are now supported by Artificial Intelligence. However, AI is progressively developing as a major threat to many legal concerns, including patent law, as well as an emerging technology in national economic growth projects and strategies.

This paper explores the history of AI, the questions it raises concerning patent applications and its expanding industry-wide effect. Next, it explores the global discussion surrounding AI inventorship, with multiple nations' views on how they observe this upcoming development in the field of creativity. This paper emphasises the need for ongoing discussions and potential legal adjustments to address AI's impact on inventorship and patentability. This adaptation is crucial to foster innovation and navigate the uncharted territory of AI-driven inventions.

Keywords: *Artificial Intelligence – Patents – Intellectual Property – DABUS – Patentability*

I. INTRODUCTION

Who is an Inventor?

An innovator can be defined as a person who applies creativity and intellect to generate a novel idea or concept that finds the most optimal way to address a subsequent problem. These problem-solving techniques could be straightforward or extremely complicated, depending on the nature of the problem and the creative approach of the person in order to resolve the issue. Under Indian laws, an

invention is defined as a novel product or method that incorporates an innovative phase and has the potential for industrial use.[1] This suggests that a person who contributes intellectually to the development of a new technique or product is an innovator, and the product is claimed to be his property.

When we talk about property, the first thing that springs to mind is anything materialistic that grants its owner the freedom to own, enjoy, and dispose of it, as well as the negative right to prevent others from misusing it. This type of property is called intellectual property. It lacks a material existence as it is an incorporeal type of property. Anything that originates from the "intellect" of the human mind is generally considered to be intellectual property. This covers items like creations and inventions, literary and creative works, names, symbols, pictures, and designs that are employed in businesses. It is common knowledge that the creator of an invention, a book, or a piece of music typically 'owns' their creation. Certain ramifications stem from this ownership, and you have undoubtedly been informed that we cannot just buy or reproduce their works without considering their rights. These are called intellectual property rights. One such form of intellectual property right is patents.

An invention is a product or a method that, in general, gives a new way of doing something or presents a novel technological solution to a problem. For such an innovation, an exclusive right is granted through a patent. Technical details of the invention must be made public in a patent application in order to get one. The unique power to forbid or restrict anyone from using the protected innovation for economic gain belongs, in theory, to the patent owner. When a patent is awarded, it usually has the effect of prohibiting anybody other than the patent owner from using the patented innovation for commercial purposes in the nation where the patent was granted, unless the owner consents in writing. To put it another way, patent protection prevents anyone from making, using, importing, selling, or distributing the innovation for profit without the patent owner's permission. The band-aid, electric iron, safety pin, ballpoint pen, telephone, and so on are examples of innovations.

II. HISTORICAL BACKGROUND OF THE PATENT SYSTEM

When it comes to intellectual property, patents hold quite a significant importance. The idea of patents dates back thousands of years. The Latin word "*Patente*," which means "to open," is where the term "patent" originates. Its beginnings have been traced back to Queen Elizabeth I's reign. It began to grow in the 12th century. By the 14th century, the innovators were granted exclusive rights by the

[1] Section 2(1)(j) of the Patents Act 1970.

crown to safeguard them as they established new companies using foreign technology.[2] It is for the most part acknowledged that Filippo Brunelleschi, a well-known architect, and designer who was among the pioneers of early Renaissance engineering in Italy, was granted the patent to begin with remote mechanical development in Florence in 1412. By the 17th century, most of the nations across the world had adopted exclusive patent laws.[3]

The Industrial Revolution had quite an impactful effect on nations all around the world in the promotion and development of mankind. The world adopted the Paris Convention for the Protection of Industrial Property in the year 1883, which covers a broad range of intellectual property, such as trade names, utility models, trademarks, industrial designs, service marks, geographical indications and most importantly, patents. It also addresses the prevention of unfair competition. The first significant step towards assisting artists in making sure their intellectual property was protected abroad was this international accord. The 1883 Paris Convention was updated in 1900, in Brussels, Washington, 1911, The Hague, 1925, London, 1934, Lisbon, 1958, Stockholm, 1967, and was changed again in 1979. All states across the world are welcome to join the Convention.[4]

The growing significance of intellectual property in global commerce led to the creation of the 1995 Agreement on Trade-Related Aspects of Intellectual Property Rights, or TRIPS Agreement. Standardised regulations were required as innovation and creativity are becoming more important to global trade. Through the establishment of minimal criteria for the protection of discoveries and works of art such as copyrights, patents, and trademarks, the TRIPS Agreement sought to close the gap between disparate national intellectual property laws and ensure fair commerce. This global framework promoted a more stable atmosphere that was conducive to the growth of commerce and innovation.[5]

Evolution of Indian Patent Legislation:

From the Indian perspective, Act VI of 1856 was India's first patent-related legislation, encouraging the creation of novel and practical products as well as pressuring inventors to reveal their trade secrets

[2] G B Reddy, "Law Relating to Patents in India." *Intellectual Property Rights and the Law* [2012] Gogia Law Agency 168–69.
[3] Peter Kurz, 'Brunelleschi and Galilei: Super-Early Patents in Florence and Venice' [2023] 8th IEEE History of Electrotechnology Conference (HISTELCON).
[4] 'Paris Convention for the Protection of Industrial Property: Summary' *World Intellectual Property Organisation (WIPO)* <https://www.wipo.int/treaties/en/ip/paris/summary_paris.html> accessed 3 March 2024.
[5] 'TRIPS — Trade-Related Aspects of Intellectual Property Rights' *World Trade Organization (WTO)* <https://www.wto.org/english/tratop_e/trips_e/trips_e.htm> accessed 3 March 2024.

were the goals of this law. Act XV of 1859, new legislation concerning "exclusive privileges," was introduced in 1859. Act II of 1911, the Indian Patents and Designs Act, superseded all earlier Acts. With the passage of this Act, the Controller of Patents became the first person to oversee patent administration. After India gained Independence in the year 1947, there was a demand to renew the patent laws concerning the economic and political conditions of the country and the primary focus on its development. Ultimately, The Justice N. Rajagopala Ayyangar Committee was established by the Indian government in 1957 to study the possibility of revising the Patent Law and provide recommendations to the government. On September 21, 1965, this measure was tabled in the Lok Sabha; unfortunately, it was never passed. Once more, in 1967, a revised draft was presented and referred to a Joint Parliamentary Committee. The Patents Act of 1970 was approved, nullifying all previous acts, based on the Committee's final recommendation. Later on, between the years 2002 and 2005, this was changed in relation to the current necessary modifications and the necessary changes based on the TRIPS Agreement of 1995.[6]

It is clear from studying the past that patent laws, which were originally characterised by subjectivity and territorial restrictions, have developed to support national interests, ease commerce between countries, and stimulate innovation in a variety of fields, including technology and medicines.

III. EXPLAINING ARTIFICIAL INTELLIGENCE

With the development of technology over the years, it is no surprise that humankind strives to build newer and better things to improve our lifestyle every single day. The rapidly developing innovation scenario is bringing about the rapidly evolving industrial environment where individuals are testing and employing smart technologies. These so-called "smart machines" are just devices that have artificial intelligence (AI) and cognitive breakthroughs like machine learning combined into them.

The term artificial intelligence (AI) describes a machine's capacity to demonstrate human-like intellect, such as the ability to solve a problem without the need for intricate, human-developed software. Machines may "learn" to do tasks like picture identification, audio recognition, text identification, information synthesis, inference, and forecasting by sifting through massive data sets and looking for patterns. AI is becoming more and more useful in a wider range of sectors as its capabilities have grown significantly. The definition of artificial intelligence is not a concept that is

[6] 'History of Indian Patent System' (*Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry, Government of India*, September 2019) <https://ipindia.gov.in/history-of-indian-patent-system.htm> accessed 3 March 2024.

accepted by everybody. The sector is developing quickly, and developers frequently combine different technologies to address certain issues. As a result, the phrase "AI" refers to a wide range of innovations and uses, some of which are new altogether and others of which are just advancements of previous methods (like machine learning). As humans get acclimated to earlier advancements, the meaning of artificial intelligence shifts, and there is actually no widely accepted theory of "intelligence."[7]

There is a general agreement on one thing, despite disagreements over where to draw the limits in this field: artificial intelligence (AI) is the next big wave of digital disarrangement.

It is believed that artificial intelligence is the product of human creativity over the past couple of years, but it is actually a concept that has been under development over decades, finding its formal roots in the early, 1950s, when it was described as a machine's capacity to carry out an activity that, in the past, would have needed human intellect. The symbolic approaches and problem-solving were the focus of early AI research. The US Department of Defence became interested in this kind of work in the 1960s and started teaching computers to simulate fundamental human reasoning. For instance, in the 1970s, the Defence Advanced Research Programmes Agency (DARPA) finished street mapping programmes. In 2003, DARPA developed intelligent personal assistants, far before Siri, Alexa, or Cortana were well-known. Decades of study and technical breakthroughs have led to modifications to this wide term.[8]

Artificial intelligence is regarded as one of the most advanced technologies and the main cause of the Industrial Revolution's expansion. The range of jobs that artificial intelligence (AI) is capable of performing is expanding in unison with scientific and technological advancements. It has probably been demonstrated that AI can produce inventions on its own. Because of this, artificial intelligence (AI) is credited with multiple inventions in recent years, some of which have been submitted for patent applications in various countries.[9]

Artificial intelligence (AI) refers to a collection of methods for achieving intelligent behaviour. While deep learning employs sophisticated neural networks for challenging tasks, machine learning algorithms use data to learn from and better at tasks. Machines can comprehend human language thanks to natural language processing, and they can analyse and interpret visual data thanks to

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[7] John McCarthy and others, 'A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence' [2006] AI Magazine 4.

[8] Kimberley Nevala, 'What is Artificial Intelligence?' (*SAS*, December 2023) <https://www.sas.com/en_gb/insights/analytics/what-is-artificial-intelligence.html> accessed 4 March 2024.

[9] Benita Rose Mathew, 'Dr Stephen Thaler speaks on how DABUS can invent' (*The Artificial Inventor Project*, 15 July 2020) <https://artificialinventor.com/467-2/> accessed 4 March 2024.

computer vision. Together, these techniques enable AI systems to carry out operations that were previously thought to be the exclusive purview of human intellect.[10]

IV. DEVELOPMENT OF AI THROUGH AGES

Systems of intellectual property (IP) have been developed to reward human creativity and invention. Such inventiveness and creativity were until very recently considered to be among the traits that distinguished the human species. The emergence of artificial intelligence (AI) as a multifaceted technology with extensive applications in all sectors of the economy and society raises important problems that are central to the current intellectual property systems like the need for incentives for AI and even the credibility of an invention developed by AI over the value of human creativity and novelty.

Francis Gurry, the former Director General of the World Intellectual Property Organisation, notes that "*Artificial intelligence is a new digital frontier that will have a profound impact on the world, transforming the way we live and work.*"[11]

It is crucial to understand the role both human intellect and AI play in the generation of an invention. Throughout history, the impact of humans in the invention process has had a huge impact on patentability. Patent laws all across the world traditionally protect inventions which have these characteristics: novelty (something new compared to its prior), an inventive step (it should resolve an unresolved problem) and the capacity to have industrial application.

In the initial phases of human development, the creation of inventions was primarily driven by human ingenuity and creativity. However, with the advent of advanced machines and technology, the process of invention and innovation has transformed. The integration of machines and automation has not only boomed the process of invention but also led to the creation of more complex and sophisticated inventions. As a result, the granting of patents has increased, leading to a proliferation of new ideas and products that have shaped the course of human history.

From the early 1970s, with the development of narrative and nature machine learning, the fields of artificial intelligence (AI) and machine learning (ML) were still in their infancy and were included in the patent system. During this time, machine learning and artificial intelligence applications were patentable, and the controversy over whether or not they should be allowed to continue continued.

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[10] Alyssa Schroer, 'Artificial Intelligence*'* (*Built In*, June 2023) <https://builtin.com/artificial-intelligence> accessed 4 March 2024.

[11] *WIPO Technology Trends 2019: Artificial Intelligence* (WIPO, 2019).

During these times, the patent laws weren't stringent concerning the inclusion of machines as contributors to the invention, since there was no way to precisely determine what could be considered an autonomous machine invention, ultimately letting go of the need for mentioning the use of such machines in the patent applications.

As the systems developed, the emphasis switched to "expert systems" in the 1970s, which could compete with human specialists in particular fields. An early expert system called Heuristic DENDRAL was able to evaluate results from mass spectrometry like a chemist. Its knowledge representation was chemistry-specific, nevertheless. To facilitate the development of expert systems, researchers pursued standardised knowledge representation in the 1980s. The pursuit of pragmatic answers in AI research has propelled advancements beyond the scope of pure philosophy.[12]

As time progressed, nations developed methods to recognise human intellect and efforts with that of an automated machine a natural learning model or artificial intelligence. In the US, AI ideas are subjected to a two-step review procedure by the US Patent Office to ensure that they have real-world uses as opposed to purely theoretical ones. Eliminating non-patentable notions such as mathematical formulae, abstract ideas, or natural facts is the first challenge. If the innovation stays out of these domains, the Office investigates further to see if it produces a tangible technological result. This test is usually passed by AI employed in robotics or self-driving automobiles since they can manipulate and control physical items and produce observable outcomes. This two-step analysis strikes a compromise between encouraging innovation and ensuring that AI patents are put to use in the actual world and don't only remain in the domain of theoretical concepts.[13]

Humans and robots are now engaging in creative collaboration as well as competition. In all technological domains, however, human researchers are the norm, and hence best reflect the skilled person standard. It's uncertain how much AI systems are inventing, even though they are: Owners of innovative machines could not be sharing the full scope of these devices throughout the creative process because they are worried about their patent eligibility or because businesses often withhold information about their organisational structures in order to preserve a competitive edge. This will incentivise early adopters of creative robots that can solve certain issues more effectively than human inventors and produce more than a talented person would.

For example, NASA used an autonomously creative machine in 2006 to develop an antenna for NASA's Space Technology 5 (ST5) mission, which involved flight. Launched on March 22, 2006,

[12] Stuart J Russell and Peter Norvig, Artificial Intelligence: A Modern Approach (2nd edn, Prentice Hall 2003) 22-24.
[13] United States Code, Title 35 [35 U.S.C.] (2024).

and ending on June 20, 2006, Space Technology 5 was a New Millennium Programme (NMP) mission. The NMP was established to find, develop, construct, and test novel technologies and ideas that may be used in upcoming missions.[14]

V. IMPACT OF GRANTING PATENTS TO AI INVENTORS

Artificial intelligence (AI) has become a game-changing technology that has the potential to completely change many industries, including manufacturing, transportation, healthcare, and finance. Machines can now learn from experience, adapt to new inputs, and carry out activities that humans would normally be unable to complete thanks to artificial intelligence (AI). The majority of AI examples that are discussed nowadays, such as machines that can play chess and self-driving automobiles, mostly rely on deep learning and natural language processing. With the use of these technologies, computers may be taught to process vast volumes of data and identify patterns in the data to do certain jobs.

The issue of patenting AI-related ideas has drawn a lot of interest from across the globe as the technology develops. Every nation uniquely handles this matter, based on its legal system, economic goals, and strategic objectives. However, AI-generated works need to be protected by patents as this would encourage innovation. While it won't directly drive AI, the possibility of obtaining a patent will inspire some of those who create, possess, and employ AI. Therefore, granting patents for AI-generated works would encourage the creation of creative AI, which will eventually lead to more innovation benefiting society. Furthermore, patents can encourage knowledge sharing and the commercialisation of goods with high social value. These objectives will be met by AI-generated works patents just like any other type of patent.

Effect of AI on Industrial Applications:

The biopharmaceutical sectors are attempting to use AI to improve drug discovery, lower costs associated with research and development, lower the rate of clinical trial failure, and eventually provide better medications.[15] AI is giving technological progress in the future a solid foundation. Artificial Intelligence will revolutionise the financial sector by providing opportunities for more customised and superior services, lower costs, and the creation of new business models. Roadmaps for the advancement of AI in Germany and Hessen, respectively, were recently released by the Federal

[14] 'Space Technology 5' (NASA JPL 2006) <www.jpl.nasa.gov/nmp/st5/ABOUT/about-index.php> accessed 5 March 2024.

[15] Prashansa Agrawal, 'Artificial Intelligence in Drug Discovery and Development' (6)(2) *Journal of Pharmacovigilance.*

and Hessen governments.[16] Numerous fundamental problems in the IT sector have been solved and optimised thanks to new developments brought about by the digital revolution and industry adoption of AI technology. AI is at the centre of development for practically every industry among all tech applications, information technology is one of the earliest. Integration of AI systems has increased production, ensured quality, and improved efficiency, all of which have lessened the workload for developers. Large-scale IT system development and deployment were formerly nearly impossible, but AI has made this feasible by developing sophisticated algorithmic capabilities.[17] Watson, created by IBM, is a computer programmed with artificial intelligence that can respond to natural language questions. In a sense, IBM Watson has surpassed human intellect and triumphed on Jeopardy over previous winners Brad Rutter and Ken Jennings.[18]

"Smart machines" of modern times:

The rapidly advancing technology landscape has led to a transformation in the industrial sector, with individuals exploring and integrating smart technologies. These "smart machines" incorporate artificial intelligence and machine learning as cognitive technologies. One such innovative approach is generative AI, which employs AI techniques and machine learning to empower computers to generate authentic text, images, music, films, and programs. By identifying the complex patterns in the input, the outputs generated are of unparalleled quality. The primary driving force behind this technology is governed by these algorithms. Examples of such software are ChatGPT, DALL-E, Perplexity AI, and Gemini. Examples of applications for generative AI include writing, transcribing, and sound editing; infographics; image editing; and architectural simulation; and a variety of sectors, from media and entertainment to automotive, medical, and scientific research.

DABUS: The First "AI" Patent Holder:

In an interesting turn of events, in 2021 South Africa became the first country in the world to grant a patent to an Artificial Intelligence (AI) system "DABUS". Device for the Autonomous Bootstrapping of Unified Sentience, or "DABUS" for short, is an artificial intelligence system that Imagination Engines Inc. President and CEO Dr Stephen L. Thaler developed that can simulate characteristics similar to that of human creativity and problem-solving. Its capabilities include the generation of creative and innovative ideas, concept ideas for books, designs, and technologies, and even the

[16] Stephan Bredt, 'Artificial Intelligence (AI) in the Financial Sector—Potential and Public Strategies' (*Frontiers*, 2019) <https://www.frontiersin.org/articles/10.3389/frai.2019.00016/full> accessed 6 March 2024.
[17] 'The Future of IT and Artificial Intelligence" (*MyComputerCareer*, 30 September 2023) <https://www.mycomputercareer.edu/news/the-future-of-i-t-and-artificial-intelligence/> accessed 6 March 2024.
[18] John Markoff, 'Computer Wins on 'Jeopardy!': Trivial, It's Not' (*The New York Times*, 16 February 2011).

generation of algorithms linked to optimisation, pattern recognition and problem-solving in the necessary domains depending on its training data.[19]

In 2019, Thaler applied for 2 patents across the world that were developed by DABUS: an enhanced beverage container which uses “fractal geometry” and a "neural flame" apparatus for use in CPR procedures. In the beginning, these applications were denied at the formal examination stage by nearly all patent law systems, including the European Patent Office, the US Patent and Trademark Office and the UK’s Intellectual Property Office. Surprisingly, DABUS was the first acknowledged as an inventor when the Companies and Intellectual Property Commission, South Africa's patent regulator, awarded it the aforementioned patents in 2021.

The Deputy Commissioner of Patents, Australia rejected the application on the ground that it isn’t a “person” and thus doesn’t comply with the legal provisions in the Act.[20] In the Federal Court, Dr Thaler requested a judicial review of the Deputy Commissioner's ruling. Following the norms and the facts of the case, his Honour overturned the Deputy Commissioner's ruling and concluded that an artificial intelligence system might qualify as an "inventor" for purposes of the Patents Act. The court concluded that Section 15 of the Patents Act 1991 does not explicitly define the word “inventor”, thus DABUS is eligible for patent registration.[21] This was the world's first legal ruling that gave AI inventors the green light.

When ChatGPT initially entered the public sphere on November 30, 2022, it had more than a million users in just one week. The world was shocked by ChatGPT's remarkable proficiency in doing remarkably intricate tasks. Teachers' opinions on ChatGPT's remarkable abilities to do challenging tasks in the field of education are divided since this advancement in AI seems to change the way that education is now practised.[22]

Economic Impact of AI:

Economic concerns are increasingly influencing the production of patent applications, which is where patent attorneys come in. Legal finances are under strain due to the increased demand for patent applications, especially in the field of patent services. By drastically reducing the time and resources required for patent preparation, generative AI may assist corporate legal departments in making the

[19] Dr Stephen L Thaler, 'Vast Topological Learning and Sentient AGI' (2021) 8(1) Journal of Artificial Intelligence and Consciousness 81.
[20] Reg 3.2C(c)(a) of Patents Act and the Patents Regulations 1991.
[21] Thaler v Commissioner of Patents [20201] FCA 879.
[22] Ian Schick, ‘Generative AI Is Here: Unraveling Its Impact on Patent Drafting (*LinkedIn*, 24 May 2023) <https://www.linkedin.com/pulse/generative-ai-here-unraveling-its-impact-patent-ian-schick-phd-esq.> accessed 6 March 2024.

most of their patent filing strategies and obtaining better, more comprehensive patent protection on a shoestring budget. This may reduce the typical attorney job duration from twenty to thirty hours to only three to four hours. In addition to automating the process of creating patent applications, AI also frees up patent attorneys to concentrate on strategic duties including supervising product manufacturing, counselling on patent strategy, and communicating with patent examiners. This modification enhances the efficacy of patent procedures and elevates the bar for customer support. By creating revenue or monetarily monetising their patents, patent holders can profit from their intellectual property rights. Technological and artificial intelligence developments have opened up new avenues for patent monetisation. These avenues include the ability to evaluate vast amounts of patent data, identify appropriate licensing partners, and predict the market potential for patented technologies.[23]

VI. LEGAL AND TECHNOLOGICAL CHALLENGES IN AI

Incentive vs Contract Theory:

Although many different legal theories support patent law, the main goals of the system are to safeguard intellectual property, defray investment costs, promote investment in the process of innovation, and grant owners the right and capacity to profit from the process's results. Over the long history of development, certain ideas may no longer be enough for patent protection when a new kind of invention, like artificial intelligence, arises. However, it seems that the intention and drive to safeguard AI-generated innovations still exist, according to the theories of contracts and incentives. The incentive theory argues that in order to maximise innovative activity and compensate inventors for their efforts, patents must be awarded to them under patent law. In contrast, the contract approach maintains that in exchange for disclosure to the public and society, a patent grants its owner the only right to the expenses, labour, and time used throughout the creative process.[24]

Recognition of AI as an inventor:

Patent laws across the globe and the protection of innovations produced by artificial intelligence (AI) are significantly impacted by the claim of inventorship rights, especially in situations involving AI. Whether or not AI innovations are treated equally with human inventions depends on whether or not AI inventorship status is granted. Because it removes the possibility of rejection based just on the

[23] *ibid.*

[24] NKH Nguyen and DH Quan, 'Artificial Intelligence and Inventorship Under the Patent Law Regime: Practical Development from Common Law Jurisdictions' Vietnamese Journal of Legal Sciences 25.

inventor's AI origin, this recognition makes AI-generated ideas more eligible for patent protection. It is crucial to emphasise that, despite its influence, inventorship does not determine patent protection; instead, it keeps its absence from impeding the patentability determination. Recognising AI as an inventor essentially fills in the gaps in patent law, allowing AI-generated ideas to be fairly considered and protected.[25]

The debate regarding AI inventorship and the patentability of innovations produced by AI is now being debated by several legal science scholars in public and private venues in addition to the judicial systems of the aforementioned legal systems. The majority of common law legal systems maintain that only natural beings should be acknowledged as inventors; as a result, AI is unable to become a recognised inventor. However, other academics contend that granting AI the role of inventorship would probably result in a significant shift in how people view humans and how technology and society interact, bringing up new issues and presenting moral conundrums.[26]

A two-step procedure was developed in the well-known US Supreme Court ruling in *Alice Corp. v. CLS Bank Intl.* to ascertain whether an innovation qualifies for a patent: If the alleged invention refers to a natural fact, an abstract idea, or a rule and if the invention is intended to address an abstract idea, consider if it contains an inventive thought that transcends the idea.

The difficulty with AI patents is proving how the AI system's functioning entails more than simply a mathematical formula or an abstract concept. It could be necessary to present the AI's useful applications, which might be difficult given how sophisticated AI systems are.[27] Any patent application mentioning artificial intelligence as the primary technology nowadays, or any model based on machine learning principles simply won't pass the application process with ease. According to the patent regulations, the creator of the invention must be a "person," which is a term that typically designates a human or other natural entity. Given that AI is not a person and is not a natural being, it does not meet the essential requirements to be legally recognised as an inventor. The IP laws in different jurisdictions only grant rights to an individual. But granting rights to a creation that an AI system has generated on its own, either completely or in part, without human involvement remains difficult in the absence of legislative or court ruling backing.

"*The right to a European patent belongs to the inventor or the successor in the title,*" states Article 60 of the European Patent Convention. It is widely accepted in this context that an "invention" is, as

[25] ibid.

[26] Van Anh, 'Is It Time to Recognise AI Inventorship in Patent Law?' (*Intellectual Property Law Et Al.,* 30 November 2022) <https://www.vananhle.net/?p=907#_ftn3> Accessed 6 March 2024.

[27] Alice Corp v CLS Bank International, 573 U.S. 208 (2014).

one prominent commentator puts it, "an intellectual thereby an individual achievement" and the "creation of the inventor, who remains a natural person." Innovation as a process is inextricably linked to intellectual and artistic activities. For this reason, "inventors" can only be natural people. Technology, such as computers, may be supportive and useful in shedding light on discoveries. However, the determination of an invention's legal protection will always come from human ingenuity.[28]

Court rulings against DABUS:

In *Thaler v. Commissioner of Patents* mentioned above, the Federal government decided in favour of Dr Thaler stating that AI can be granted a patent. But, in 2022, in an appeal by the Commissioner of Patents, the Full Court overruled the previous judgement, ultimately stating that since the provisions don't mention a clear-cut definition of who an "inventor" can be, it is only fair to go with the general definition of it and thus only a natural person can be held as the patent holder concerning the provisions under the patent act.[29]

This was followed by other nations as well, including the US, Europe and eventually the UK. In 2023, the UK Supreme Court in this landmark judgement gave the verdict that only a natural person can claim an invention, i.e., be named as the holder of a patent. Therefore, any invention created by AI will only cease to hold its patent status. This appeal towards the decision of the Comptroller's decision by Dr Thaler was unanimously dismissed in the Supreme Court, stating that the Comptroller's decision to withdraw the patent application before the expiry period was just and fair and well within the purview of The Patents Rules 2007.[30]

Indian patent laws on AI:

However, India is still in a grey area with these decisions. On one hand, the Patents Act of 1970, which establishes the legal parameters for patent issuance in India under Sections 3 and 4, serves as the foundation for that nation's patent policy. The Act establishes the parameters for patentability as well as what can and cannot be patented. An invention must meet specific criteria, such as novelty, inventive step, and industrial usefulness, in order to qualify for patent protection. These standards also apply to inventions pertaining to AI.

On the other hand, the exclusion of India's position on AI-related patents is notable in mathematical techniques and abstract concepts are not eligible for patent protection. This implies that abstract

[28] Margarete Singer, 'European Patent Convention (EPC)' Sing*er & Stauder: The European Patent Convention - A Commentary* (Sweet & Maxwell 2003)
[29] Commissioner of Patents v Thaler [2022] FCAFC 62.
[30] Thaler v Comptroller-General of Patents, Designs and Trademarks [2023] UKSC 49.

mathematical formulas or algorithms that have no practical or industrial use are not regarded as patentable subject matter.[31] On the other hand, an AI program or algorithm may qualify for patent protection if it exhibits technological innovation and practical industrial use.[32]

AI patent liability:

Another challenge that arises when granting patents to Artificial Intelligence is its position of liability in case of infringement. Even if AI "invents" a particular creation, with minimum human assistance and a completely new set of algorithms with a fractal theme, it still is working on the training database assigned by its human counterpart. Dr John R. Koza mentions in his study of genetic engineering that there is a possibility it might create something that infringes an already existing patent.[33] In the end, artificial intelligence is just a compilation of codes and computer programs, which can be considered as a blueprint and not a complete structure.

For instance, if an AI program creates something that infringes an already existing patent, then there are no legal provisions in existence which can guide the legal system as to who is responsible for this infringement. All the patent systems in traditional cases hold the natural person liable since he is responsible for infringing other person's patent rights. But, in the case of an AI, no law yet recognises a non-natural being responsible for the same. Since the program works on the data and modules fed to it by the human who created it, ultimately forms a "Principal – Agent" relationship, meaning that its creator, i.e., the human shall be responsible in any case of infringement. But if this is the case then a similar situation arises when the AI "creates" an invention and according to the aforementioned condition, the human creator shall hold the patent rights to the invention and not the AI itself. This dilemma is what raises the issue of the liability of AI being granted a patent.

In the *Dana-Farber* case, the Federal Circuit's panel of judges decided that some users of the BLAST software tool qualified as inventors on the disputed patent; however, it was not addressed whether the BLAST Program's developers could also be considered inventors. However, this case law does not account for AI's capacity to produce original material. Lawrence Lessig, a professor at Harvard Law School made the case in a Supreme Court amicus curiae brief that artificial intelligence (AI) technology would not have any legal rights without it. Lessig contends in his statement that a lack of rights might put the US economy at an unfair disadvantage and encourage owners of artificial

[31] Section 3(k) of the Patents Act 1970.

[32] Aksh IP Associates 'India's Stand on Patenting Artificial Intelligence-Related Inventions' (*LinkedIn*, 25 May 2023) <https://www.linkedin.com/pulse/indias-stand-patenting-artificial-intelligence-related/> accessed 6 March 2024.

[33] John R. Koza, 'Human-Competitive Results Produced by Genetic Programming' [2010] Genet Program Evolvable Mach 251—284

intelligence to keep new developments a secret. The fact that it would be procedurally impossible or impractical to add the countless technicians who made a significant contribution to the creation of the AI that produced or was utilised to produce or validate the invention to the patent is another factor to consider.[34]

VII. RESOLVING ERRORS IN THE SYSTEM

2022 was a phenomenal year in the growth of AI. The advent of OpenAI's famous ChatGPT to the incorporation of these complex nature-based models into every sector has had an impact everywhere. The use of Artificial Intelligence in all sectors is increasing every day as we speak. AI is advancing at an exponential rate, but human researchers are not. This implies that creative AI may contribute significantly to research and development, even in the short-to-medium term. When it occurs, it will be very troublesome if we don't have clear guidelines on who can and should be named as inventors, who owns the inventions and associated patents, and if AI-generated inventions may be protected. In a matter of decades, artificial intelligence (AI) may surpass human intelligence in a way that, if unprepared, could threaten humanity's ability to govern its creation and, by extension, its ability to determine its fate and secure the continuation of the species.[35]

There needs to be a change in the way machines and AI programs based on language models are granted patent status. Several ideas have been put out to address the issues of patentability and control over innovations produced by artificial intelligence. When evaluating the available options, it is important to remember that the goal of patent laws is to incentivise innovators to create novel and practical creations. It is critical that suitable guidelines be established for handling AI-generated content. From an economic perspective, creative AI may constitute a small portion of innovation today.

Legal reforms for AI-generated innovation

The legislatures of any country should plan the required changes in light of technological advancement in order to accomplish these aims. The removal of inventor-ship barriers for AI-generated innovations is necessary to guarantee a thorough assessment of their patentability. It is thus predicted that the inventor or author of an invention would not be included under the present definitions and interpretations as "persons." The inventor should be referred to as "individuals" instead. Furthermore, in order to identify "who have personally created such industrial property

[34] Dana-Farber Cancer Inst Inc v Ono Pharm Co, 964 F.3d 1365 (Fed. Cir. 2020).
[35] Mihalis Kritikos, 'Artificial Intelligence ante portas: Legal & ethical reflections' (*EPRS*, March 2019).

subject matters," the phrase "author of inventions" in the meaning of the Laws on Intellectual Property should be transferred to the word "inventor."[36]

Only the Companies and Intellectual Property Commission, South Africa and the Saudi Authority for Intellectual Property, Saudi Arabia are the ones that officially recognise AI as capable of being a patent holder. The Patent offices of countries like the US and Europe already have their intricate systems and guidelines to examine AI-based inventions but still need to revise these provisions as they lack the sufficient capacity to properly support the conditions required by an AI for the process of patent registration. The complex and unpredictable nature of AI is topped off by the fact that it is a non-natural being capable of neither suing nor being sued. The traditional methods of working on computer program-based systems don't necessarily work with these complex and diverse systems and thus require new and better laws.[37]

Position of India on AI-innovation

India's patent system faces challenges when it comes to these conditions. The amount of patent activity in any given country is seen to be a crucial sign of the present research and innovation climate. Due to several issues, including inadequate IP protections, limited R&D funding, inadequate infrastructure and resources for processing patent applications, and a general lack of patenting culture, India has historically fared poorly in terms of patent filings. But there has been a change of situations in the past few years. India is among the top 10 nations that produce AI patents, even though the country owns relatively few AI patents relative to the amount of AI research it produces. Since 2012, the country has seen a sharp rise in the number of AI patent applications, which is mostly attributable to the quick development of AI-related ideas. With a combined total of over 70% of all AI patents in India, the four most common categories of AI patents are life sciences, telecommunications, business, and personal devices and computing. This suggests that Indian innovators have concentrated on utilising AI in domains where they have historically excelled.[38]

In the recent case of *Microsoft v. Assistant Controller of Patents and Designs*, the Delhi High Court decided in favour of Microsoft over their patent application for securing access to sub-networks using a two-step authentication process with cookies. The Assistant Controller of Patents and Designs rejected the application on the ground that it violates Section 3(k) of the Patents Act of 1970, which

[36] NKH Nguyen, 'Artificial Intelligence and Inventorship under the Patent Law Regime: Practical Development from Common Law Jurisdictions' [2023] Vietnamese Journal of Legal Sciences 25-54.

[37] Arpita Bhattacharyya and others, 'Examining U.S. and Europe Patent Disclosure for AI Inventions' (*Finnegan*, 2 November 2023) <https://www.finnegan.com/en/insights/articles/examining-us-and-europe-patent-disclosure-for-ai-inventions.html> Accessed March 8 2024.

[38] Husanjot Chahal and others, 'Mapping India's Potential' [2021] CSET.

clearly mentions the exclusion of "computer programs per se" from the list of patentable inventions and thus making it ineligible for patent protection. The court in its decision expressed that this particular work by Microsoft isn't just a set of algorithms or instructions that falls under the view of the law, but rather is an innovative step to resolve a technical issue that can help with real-world simulations.[39] It regarded the novelty and innovative steps taken by this protocol. It recognised its industrial use, ultimately setting a precedent for the layout of AI-based patent applications in the future.

VIII. CONCLUSION AND SUGGESTIONS

The impact of Artificial Intelligence in our daily lives is growing day-by-day at a rapid pace. It is evident from history that laws must evolve with time to meet new challenges. Artificial Intelligence, though in existence for over 6 decades, has recently begun exploring it intellectual property over the last 20 years. It is fairly challenging for nations to keep up with the fast-growing area of AI because of its complex and unpredictable nature.

It is critical that adequate regulations are in force to handle AI-generated content. In terms of economic value, innovative AI may now be a little contributor to innovation. However, artificial intelligence is advancing at an exponential rate, whereas human researchers are not. Even in the short to medium term, innovative AI has the potential to play an important role in research and development. When it occurs, it will be extremely troublesome if there are no clear regulations governing whether AI-generated innovations may be protected, who or what should be identified as an inventor, and who owns these ideas and associated patents.

To fully control the potential of AI innovation and uphold existing legal principles, policymakers should consider implementing certain key measures.

1. Policymakers should consider amending and reviewing the existing patent laws and incorporate provisions which address the issues of AI inventorship, introducing measures that deal with the complexities of this new and enhanced technology.
2. To maintain global harmony, international conventions and agreements pertaining to AI protection should be formed to create standard guidelines for the nations to work on the upcoming technologies.

[39] Microsoft Technology Licensing LLC v The Assistant Controller of Patents and Designs [2023] C.A.(COMM.IPD-PAT) 29/2022.

3. Policymakers should implement support programs, incentive initiatives, and dedicated funding programs to help inventors in their research and innovation endeavours.
4. There should be provisions incorporated for technology transfer and knowledge sharing among AI experts and other researchers for developing diverse perspectives, fostering innovation, and resolving issues to develop sustainable solutions and boost economic growth.

The question of the status of the patentability and recognition of work generated by AI is still under scrutiny and all the nations are working relentlessly to interpret this as soon and efficiently as possible. When AI progresses from imitating human research to automating cognitive behaviour on a large scale, it may potentially replace the competent individual. An AI that is capable of consistently automating research is likely to discover more obvious results than an experienced individual. It may be challenging to intellectually reason about what an AI would consider evident. Countries, including India, must understand the unrestrained growth of artificial intelligence, its impact on the upcoming generation, and its potential to change the meaning of "innovation" as we currently see it.

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