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INTELLECTUAL PROPERTY IMPLICATION OF AI GENERATED CREATIONS

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Abstract

As artificial intelligence (AI) becomes a central role in the production of novel works, the intellectual property environment is going through a significant upheaval. This article examines the complex web of intellectual property implications raised by works produced by AI. It explores the subtleties of AI-driven innovations and their patentability, the difficult issues surrounding inventorship, and the changing ethical and legal parameters that govern this shifting environment.

Keywords: artificial intelligence, intellectual property implications, innovation, patentability, inventorship.

Introduction

We find ourselves on the verge of an enormous upheaval in a time when technology has dominated everything. Artificial intelligence (AI) has rewritten the very rules of creativity in this place, amidst the frenzy of development. It has bravely stepped into the spotlight and assumed the position of creators rather than passively accepting the job of assistants. It do this by testing the limits of human inventiveness and leading us on a deep tour of unexplored territory.

Our journey starts with the birth of artificial intelligence (AI) as an artist—a being that not only comprehends but also produces innovations and creations with a flair that transcends convention. Previously painted entirely by humans, the canvas of invention today showcases the artistic brilliance of AI. The distinctions between creator and creation, which were formerly clearly drawn, are blurred as we watch this evolution take place into a mesmerizing dance between humans and machines.

The ground of intellectual property, where the time-tested tenets of inventorship, ownership, and authorship have long reigned supreme, sits at the centre of our investigation. Now that AI is actively involved in the creative process, we are presented with a compelling story that calls into question current legal norms and

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urges us to reframe what innovation actually is.

The importance of the subject at hand becomes increasingly clear as we keep going because of the rapidly developing field of AI-powered creativity. AI's creative brilliance knows no bounds, from breaking new ground in science and technology to producing works of art and literary wonders. The distinction between the creator and the created, which was previously obvious in this evolutionary narrative, is now a fascinating interaction between human inventiveness and technological prowess.

Beyond the limits of ingenuity and invention, however, the ethereal world of ethics begs us to reflect. Deep questions are on the horizon as AI becomes more creative in its endeavours. We explore how to manage this technical marvel responsibly, the effects on human work and expression, and the moral code that governs our relationships with these sentient systems.

Our expedition sets out on new ground, a world of intellectual property in which the roles of creator, owner, and author experience significant change. They become fluid notions that are fashioned by the subtle dance between human inventiveness and the power of machines and are no longer constrained by traditional rules. As we make progress through this area, we solve puzzles, deal with moral conundrums, and chart a course that balances the traditional notions of intellectual property with the limitless possibilities of AI.
The ideas of inventorship and authorship have served as the sentinel foundations of intellectual property rights in the constantly changing world of innovation. These values have shaped how we perceive creativity and innovation because they are so firmly ingrained in our moral and legal systems. However, the once-clear concepts of invention and authorship today find themselves cloaked in doubt as artificial intelligence (AI) leave its transformational mark on this environment.

Historically, authorship and invention have stood for creativity and originality in humankind. The person who came up with an inventive idea is known as the inventor. People frequently conflate authorship with patent inventorship, or they presume they are synonymous. However, they are separate ideas. On the other side, an author is praised for having the original idea that led to a literary or creative masterpiece. The conventional wisdom that creativity and invention are the results of human effort, vision, and intellect is reflected in these concepts.

In the modern narrative, AI shows itself to be a strong collaborator—a partner that not only offers assistance but also independently produces new ideas and artistic creations. AI's creative portfolio exceeds the limits of human imagination, from technological and scientific advances to the creation of mind-boggling paintings

and resonant symphonies. The question that then emerges is whether we should modify these conventional definitions to include our AI colleagues as co-creators or whether we should redefine inventorship and authorship in this new era?

The rise of AI as a creative force opens the door to a slew of ethical and legal problems. Who should be given the credit for inventions that AI systems independently create? Who is the true inventor —the programmer who created it, the company that owns the AI, or the AI itself? The answers to these concerns are still obscured by the law because copyright and patent laws were created when the idea of machines as creators was still in its infancy.

History

The Act VI of 1856[8], which contained India's first patent law, was later abolished by the Act IX of 1857 since it was passed without the British Crown's consent. Another piece of legislation for the granting of "exclusive privilege" was introduced in 1859. The act in question is referred to as Act XV of 1859[9]. The previous law is modified in a few ways by this legislation, including the restriction of exclusive privileges to valuable discoveries, the expansion of the priority period from six to twelve months, and the exclusion of importers from the category of investors. The Act of 1859 was combined in 1872 to offer protection for designs. Under Act XIII of 1872[10], which was later amended in 1883, the law was titled "The Patterns and Designs Protection Act" and became effective that year.

This law was changed once more in 1888 after remaining in effect for 30 years. All of the earlier legislation were repealed by the Indian Patent and Design Act of 1911[11]. In 1972, the current Patent Act, 1970[12], which further amended and combined the prior law dealing to patents in India, went into effect. The Patents (Amendment) Act, 2005[13] further updated this law by extending the application of product patents to all or any technological disciplines, including those involving food, pharmaceuticals, chemicals, and microorganisms. Provisions relating to Exclusive Marketing Rights (EMRs) were deleted by this

[8] Indian Penal Code, 1860, https://www.indiacode.nic.in/repealed-act/repealed_act_documents/A1856-6.pdf (Accessed November 15, 2022).
[9] Indian Penal Code, 1859, https://www.indiacode.nic.in/repealed-act/repealed_act_documents/A1859-15.pdf (Accessed October 15, 2023).
[10] The Indian Evidence Act, 1872, https://www.indiacode.nic.in/repealed-act/repealed_act_documents/A1872-13.pdf (Accessed October 15, 2023).
[11] The Indian Treasure Trove Act, 1878, https://www.indiacode.nic.in/repealed-act/repealed_act_documents/A1911-2.pdf (Accessed October 15, 2023).
[12] The Patents Act, 1970, https://ipindia.gov.in/writereaddata/Portal/IPOAct/1_31_1_patent-act-1970-11march2015.pdf (Accessed October 15, 2023).
[13] The Patents (Amendment) Act, 2005, https://ipindia.gov.in/writereaddata/Portal/IPOAct/1_69_1_patent_2005.pdf (Accessed October 15, 2023).

amendment, but pre-grant and post-grant opposition as well as the ability to award a compulsory license were added.

The main goal of the patent legislation is to support scientific research. Patents are granted for original creations and models that aid in the nation's continued development. Patents promote innovation as well. Numerous worldwide events have enriched the history of patent law. In this sense, there have been several agreements and accords. Additionally, it is crucial for us to go forward with the world community's approval of the patent laws since when they were first implemented in India, it was still a British colony. India enacted its statute later in 1970. Patent laws were first established in the USA in 1790. More patent laws had been developed internationally than in India.

The main goals of international treaties on intellectual property rights have been to establish global minimum standards for the protection of intellectual property and to prohibit discrimination against foreign right holders. This is the main justification for the significance of these treaties and agreements. The Indian Constitution grants the Union the power to conclude treaties and accords with foreign nations and to carry out treaties, agreements, and conventions with such nations under Schedule VII Entry 14 of List I[14].

The Statute of Ann[15] was drafted by the British congress in 1710. It marked the birth of the narrative. It's seen as a turning point in the development of patent law. It marked the dawn of the narrative. It's seen as a turning point in the development of patent law. The British parliament acknowledged copyright regulation by the authorities and not by private persons for the first time. Due to the need for major patentee rights protection as a result of the industrial revolution, which was taking place at the time.

US Patent Act (1790)[16] – President George Washington inked the legislation on April 10, 1790. It was a turning point in the development of patent law for a number of reasons. for the very first time, patents were recognized as an inventor's right rather than a privilege bestowed by a higher authority. The US Patent Act of 1790 established rigorous requirements for concepts that sought to obtain patent rights by providing a method to assess patents.

[14] International Treaties and Agreements: Practice of India (https://www.mea.gov.in/Images/pdf1/S7.pdf) (Accessed October 15, 2023).
[15] Anne: The Statute of Anne (1710)", Copyright History, https://www.copyrighthistory.com/anne.html (Accessed October 15, 2023).
[16] Patent Act of 1790, https://www.ipmall.info/sites/default/files/hosted_resources/lipa/patents/Patent_Act_of_1790.pdf (Accessed October 15, 2023).

Paris Convention (1883)[17]- The earliest and oldest international pact governing intellectual property is the Paris convention. Convention in Paris is also known as the Paris Convention on Industrial Property. The World Intellectual Property Organization oversees this treaty. Patents, utility models, industrial designs, trademarks, etc. are all protected by this convention. The Paris Convention, which is regarded as historical in the context of intellectual property rights, made an integrated effort to defend Industrial Property rights. It not only established the member states' rights to priority but also calmed the coordinated effort to defend patent and intellectual property rights.

Bern Convention 1886[18]- The basic tenet of this agreement was to safeguard and protect creative creations. The Bern Convention of 1886 gave the original authors of the work rights over their creations, according to the WIPO. Today, all other creators own the right over their work, which include authors, poets, artist, musician etc. Now they hold the power on the way their works will be utilized. Only they can determine what terms will allow them to use their work.

World Intellectual Property Organization: A global platform for intellectual property (IP) services, policy, information and cooperation. WIPO is a self- supporting association of the UN with 193- member countries. The ambition of WIPO is to encourage the creation of an effective, practical, and effective transnational system of intellectual property rights that will foster global invention and creativity for the good of all people. The WIPO Convention founded WIPO in 1967. This agreement was ratified in 1970 after being signed in Stockholm on July 14, 1967.

AI as a creative force: Redefining innovation and creativity

In the current digital period, artificial intelligence (AI) has surfaced as a crucial technology that has a significant influence on numerous aspects of life, including creativity and invention. The world around us is changing snappily due to artificial intelligence (AI), and creativity may be no exception. AI has been employed in recent times to produce a wide range of creative works, from music and art, to scientific discoveries and profitable strategies.

Automation of formerly manual work is one of the most significant ways that AI is affecting creativity. This enables creative people to concentrate on more inventive and strategic work. AI may be used, for case, to come up with content ideas, gather information, and make prototypes. This may help artists save a lot of

[17] Paris Convention for the Protection of Industrial Property 1883, https://www.unido.org/sites/default/files/2014-04/Paris_Convention_0.pdf (Accessed October 15, 2023).

[18] Berne Convention for the Protection of Literary and Artistic Works, https://www.wipo.int/edocs/lexdocs/treaties/en/berne/trt_berne_001en.pdf (Accessed October 15, 2023).

time and trouble, enabling them to explore new ideas and induce better work.

AI is utilized to create new ideas and concepts in addition to automating chores. Several approaches, including machine education, deep learning, and natural language processing, are used to achieve this. AI may be used, for case, to examine enormous databases of textbook, music, or photos in order to spot patterns and trends. also, with this knowledge, one might come up with fresh conceptions for cultural endeavours.
AI is also being employed in creative collaboration with people. There are several approaches to accomplish this, including using co-creation tools, virtual reality, and augmented reality. AI may, for case, help designers in creating 3D models of their creations or musicians in creating new musical compositions. Although AI in creative endeavours is still in its infancy, it has the power to fundamentally alter how humans create. Artificial intelligence (AI) may assist creative workers in producing higher-quality work and exploring new possibilities by automating activities, coming up with ideas, and working with humans.

Current applications of AI in the creative industries:

Art: New types of art, including paintings, sculptures, and music, are being developed using AI. For instance, Deep Dream[19], an AI-powered application, generates abstract visuals by analysing enormous collections of photos and finding patterns[20].

Music: AI is being used to compose new songs, as well as remix and modify music that already exists. For instance, the AI-powered application Jukebox[21] generates original music by examining enormous song files and looking for trends.

Literature: New literary genres including poems, short tales, and essays are being created by AI. For instance, the AI-powered application GPT-3[22] is capable of producing realistic and cohesive writing, such as plays, poetry, and news stories.

Television and film: AI is being used to write screenplays, direct movies, and produce special effects. For instance, Industrial Light & Magic[23], a software driven by AI, was utilized to produce the visual effects for the movie Avatar.

[19] Khwab Kalra, DeepDream - KHWAB KALRA, Medium (July 20, 2023), https://medium.com/@khwabkalra1/deepdream-51f42802a4db.
[20] Lauren Goode, What AI-Generated Art Really Means for Human Creativity, WIRED (Nov. 17, 2022), https://www.wired.com/story/picture-limitless-creativity-ai-image-generators/.
[21] Paige Leskin, This AI is creating some surprisingly good bops based on music by Katy Perry and Kanye West — listen to some of the best, BusinessInsider India (May 5, 2020), https://www.businessinsider.in/tech/news/this-ai-is-creating-some-surprisingly-good-bops-based-on-music-by-katy-perry-and-kanye-west-x2014-listen-to-some-of-the-best/slidelist/75544310.cms.
[22] Bernard Marr, What Is GPT-3 And Why Is It Revolutionizing Artificial Intelligence? (Oct. 5, 2020), https://www.forbes.com/sites/bernardmarr/2020/10/05/what-is-gpt-3-and-why-is-it-revolutionizing-artificial-intelligence/?sh=34e0fa59481a.
[23] ILM steps in to help finish 'Avatar' visual effects, CNET (Dec. 19, 2009), https://www.cnet.com/culture/ilm-steps-in-to-help-finish-avatar-visual-effects/.

These are but a handful of the numerous applications of AI that are now found in the creative sectors. AI will probably change the way humans produce in much more profound ways as it advances.

The application of artificial intelligence (AI) to the creative and innovative processes has raised the bar for patent law's level of complexity. The once simple principles of inventorship and ownership issues are today clouded by controversy and uncertainty. Who may be acknowledged as the inventor and legitimate owner of AI-generated things becomes a crucial concern as AI plays a more active part in the generation of innovations.

Owner or Programmer? The curious conundrum

If AI is not recognized as an inventor, a complex web of ownership concerns arises, focusing attention on the creator or owner of the AI system. This conundrum results from the fact that AI is fundamentally a tool designed, educated, and managed by humans. It is, in essence, a product of human creativity. This makes us wonder if the owner or the programmer should assert their claim to inventorship rights[24].

But there are certain complications with this idea. The AI system itself acts freely, developing solutions based on its algorithms and data processing, even while the programmer or owner might be considered as supporting AI's creative capacity. This distinction between human engagement and autonomous creative activities by AI raises concerns about the level of human involvement necessary for invention. The distinction between an invention and a tool gets increasingly hazy.

Rethinking ownership norms in the age of AI

There is a ground-breaking argument that AI should be acknowledged as a creator and thus be given ownership rights[25]. This viewpoint is in sharp contrast to traditional ownership standards, which traditionally have only acknowledged human inventors as legitimate intellectual property owners. This perspective pushes us to think about AI as a separate entity that not only generates but also asserts ownership over what it produces.

The consequences of AI acting as a creative go far beyond the purview of intellectual property. Redefining authorship in the domains of art, music, literature, and other creative endeavours, it also redefines the dynamic between humans and machines in the creative process. This reassessment forces us to consider what it means for a machine to have creative autonomy and if it is possible for it to have legal ownership rights.

[24] Who Owns an AI-generated Invention? Bird & Bird (Dec. 5, 2019), https://twobirds.com/en/insights/2019/global/who-owns-an-ai-generated-invention.

[25] Blurring the lines: how AI is redefining artistic ownership and copyright, Discover Artificial Intelligence (Nov. 20, 2023), https://link.springer.com/article/10.1007/s44163-023-00088-y.

Human Control: Tipping the Scales

The idea of human monitoring makes identifying the creator and proprietor of ideas produced by AI much more difficult. A key issue in the current discussion is the degree of human involvement or control in the creative process. How much human involvement is necessary for an AI-generated innovation to be recognized as having a human creator?[26]

There are many unanswered questions about the delicate balance between autonomous creativity in AI and human direction or control. Determining whether to assign inventorship rights to the AI, its programmer, or owner depends on this balancing. It also makes us reevaluate how we think about creative cooperation and the complex interplay between human creativity and technological prowess[27]

Patentability of AI inventions in India

Novelty

The need of uniqueness is principally covered in Sections 2(1)(l)[28] and 25[29] of the Indian Patents Act, 1970. Section 2(I) - "New Invention" Definition: The Patents Act's definition of a "new invention" is given in this section. It indicates that an invention is deemed fresh or innovative if it hasn't been utilized in India or anywhere else prior to the date the patent application was filed, nor has it been predicted by publication. The foundation for comprehending what qualifies as a novel invention for the purposes of patentability is laid forth in this section. Innovation is a crucial factor in assessing an invention's possibility for patent protection. A novelty or new invention is defined as "no invention or technology published in any document before the date of filing of a patent application, anywhere in the country or the world", "The complete specification, that is, the subject matter has not fallen into the public domain or is not part of state of the art".

Section 25[30] - It deals with the publishing and examination of patent applications. The uniqueness of an invention is determined throughout the evaluation process. The Indian Patent Office reviews applications after they are submitted to ascertain if an invention satisfies the requirements for patentability, including novelty. The patent application can be turned down if it's determined that the invention is not innovative.

The enormous amount of pre-existing data and previous art that AI systems may access and evaluate is one of the major disputes or issues linked to patenting AI technologies, specifically regarding the novelty

[26] Artificial intelligence and copyright, (May 3, 2017), https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.

[27] Creativity in crisis: are the creations of artificial intelligence worth protecting? (Aug. 12, 2021), https://www.jipitec.eu/issues/jipitec-12-3-2021/5352.

[28] Indian Patents Act, 1970, § 2(1)(l).

[29] Indian Patents Act, 1970, § 25.

[30] Indian Patents Act, 1970, § 25.

criterion. AI systems are able to analyse huge information and find patterns and answers, especially those driven by machine learning and deep learning[31]. Based on data and knowledge already in existence, AI can provide breakthroughs that are patentable.

An invention must not have been utilized or disclosed to the public prior to the filing date of the patent application in order to qualify as new for patent protection. However, because they frequently rely on evaluating pre-existing data or expertise, AI-generated creations may face challenges in terms of originality.[32]

Some artificial intelligence technologies, such as neural networks and deep learning models, can become incredibly complex and unintelligible. One cannot accurately decide whether or not an innovation is really novel: one simply does not know how the AI has generated its creation/ decision.[33] Another disagreement concerns whether the creator of the AI system should be regarded as the AI system itself or as the human operator of the AI system.[34] The involvement of AI systems affects the traditional patent law attribution of discoveries to human inventors.

Inventive steps

"Inventive step" is defined under Section 2(1) (ja)[35] of the Indian Patents Act, 1970. When analysing the patentability of AI-related innovations, the notion of inventive step is essential. The application of Section 2(1) (ja) to the patentability of AI innovations is as follows:

Technical Advance: For an invention, particularly those relating to AI, to satisfy the inventive step criterion, it must reflect a technical advance above the current level of knowledge. This means that in the context of AI, the innovation should show a non-obvious technological advancement or resolution.[36]

Economic Significance: An AI-related invention should have economic importance in addition to being technically advanced. The need for a useful and practical application is further emphasized by the need that it provides practical advantages or have economic worth.

[31] The Impact Of Artificial Intelligence In Patent Law, https://www.legalserviceindia.com/legal/article-14289-the-impact-of-artificial-intelligence-in-patent-law.html

[32] Student, Ravid.Liu.39.6.5, (July 9, 2018), http://cardozolawreview.com/wp-content/uploads/2018/08/RAVID.LIU_.39.6.5-1.pdf.

[33] Tammy Xu, AI Makes Decisions We Don't Understand. That's a Problem., Built In (July 19, 2021), https://builtin.com/artificial-intelligence/ai-right-explanation.

[34] Nitant Narang, Patently Unpatentable: Can AI Be Considered an Inventor? Relativity Blog https://www.relativity.com/blog/patently-unpatentable-can-ai-be-considered-an-inventor/.

[35] Indian Patents Act, 1970, § 2(1)(ja).

[36] Sonam Singh, What is Inventive Step: An Indian Perspective | HavingIP, HavingIP HavingIP (Oct. 23, 2022), https://havingip.com/what-is-inventive-step-an-indian-perspective-havingip/.

Non- Obviousness: Inventions, especially those utilizing AI, must not be clear to a person with the requisite expertise. It should entail an original or imaginative step beyond what is currently known in the field.
The evaluation of creative step can be particularly significant in the context of AI inventions. It's critical to show that the innovation is more than just a logical amalgamation of already existing technology or processes since AI technologies frequently entail complicated algorithms, data analysis, and machine learning. AI-related innovations must demonstrate how they offer a novel and cutting-edge fix to a problem. Finding the right balance between recognizing AI's capacity for innovation and ensuring that those innovations actually represent non-obvious advancements is one of the major conflicts and challenges in patenting AI inventions, particularly with regard to the requirement of inventive step (non-obviousness).
Massive datasets may be processed and analysed to find patterns, connections, and potential solutions using AI systems, particularly machine learning and deep learning models. This capacity for analysis can result in the development of original solutions.

An invention must not be obvious to a person competent in the relevant area in order to meet the inventive step criteria for patentability. Nevertheless, there is room for debate with regard to whether the suggested solutions by AI system are novel and how much their basis is in already available information.
However, with the use of artificial intelligence, specifically neural networks and deep learning models, decision making could become complex than humans comprehend. It can be difficult to determine the innovative step since AI systems might be opaque, making it difficult to grasp how an AI came up with a certain innovation.[37]

Analysing the value of human contribution to the creative process can be challenging. AI systems may create innovations on their own in some situations or in conjunction with human operators in others. It might be difficult to assess the degree of human involvement and how it affects the innovative step.[38]
While avoiding the issuance of patents for insignificant, gradual, or obvious advances, it is crucial to guarantee that AI patents protect genuine inventions and developments that benefit society.

Industrial Applicability: Section 2(1) (ac)[39] defines the term "invention" and discusses the need for industrial application in some detail. It asserts that if an innovation can be produced or employed in any industry, it is said to be capable of industrial application. The term "invention" is used to refer to any novel

[37] Dave Gershgorn, We don't understand how AI make most decisions, so now algorithms are explaining themselves, (Dec. 20, 2016), https://qz.com/865357/we-dont-understand-how-ai-make-most-decisions-so-now-algorithms-are-explaining-themselves.
[38] https://academic.oup.com/grurint/article/69/5/443/5854752.
[39] Indian Patents Act, 1970, § 2(1)(ac).

and useful technique, device, production, or composition of materials, as well as any novel and advantageous improvement thereto. The phrase "capable of industrial application" denotes that the innovation should have real-world applications in a business or industrial setting. It ought to be more than simply a theoretical idea; it ought to be practical and beneficial in everyday situations.[40]

This section essentially emphasizes the requirement that an invention serve a useful and defined function in industry or trade. In terms of patentability, an innovation that cannot be used in industry could not be eligible for patent protection making sure that AI-generated discoveries have specific and useful applications in industry or commerce is one of the major issues and problems associated with patenting AI inventions, particularly with regard to the necessity of industrial applicability.

Based on data analysis, AI, in particular machine learning and deep learning models, may produce conceptual answers. Though theoretically novel, these methods might not necessarily have an immediate, useful use in the industrial or commercial setting.

Certain AI algorithms may be quite specialized and created for certain tasks or areas. The immediate industrial application of the answers produced by AI systems to those particular jobs may be constrained by this specialization.

It can be difficult and expensive to incorporate AI-generated innovations into current industrial or commercial operations. It could need more money, a better technical foundation, and modified workflows.

AI-generated inventions should be both industrially applicable and have the potential to be profitable. They ought to provide useful advantages, address certain issues, and be in demand on the market.

AI developments must adhere to industry norms and standards, notably in sectors like healthcare and finance. For AI-generated solutions to be applicable in the industrial setting, it is crucial that they satisfy these parameters.

Subject Matter: Identifying whether the invention corresponds to a patent subject matter is the most crucial factor. The Patents Act lists non-patentable subject matter in Sections 3[41] and 4[42]. The invention is a topic for a patent unless it falls under one of the provisions of the Sections.

Determining the limits of what may be patented and separating patentable from non-patentable components

[40] https://law.berkeley.edu/files/Duffy_paper.pdf.
[41] Indian Patents Act, 1970, § 3.
[42] Indian Patents Act, 1970, § 4.

of AI technology is one of the major controversies and obstacles in patenting AI inventions, particularly with regard to the subject matter.Deep learning and machine learning in particular include complicated algorithms and models that may have several parts and functionalities. It might be difficult to decide which features of an AI system are patentable and which are not.

Although AI mainly relies on software and algorithms, patent law frequently disallows the patenting of computer programs, mathematical techniques, and abstract notions. When determining the patentability of AI-related software and algorithms, this raises a dispute.Patent law normally places more of an emphasis on defending functional parts of innovations than non-functional or abstract ideas. It can be difficult to differentiate functional elements from abstract concepts in AI.[43] Data-driven insights are frequently used by AI to produce solutions. It might be difficult to tell the difference between simple data analysis and truly unique processes that need patent protection.

A further level of complexity develops when comparing human and artificial intelligence inventorship. Should the AI system's human operators or programmers be given credit as the inventors, or should the AI system itself? The decision may have an effect on the patent's subject matter.

Inventors who aren't artificial beings (Natural Persons)

In the context of AI-generated inventions, particularly when AI systems independently produce innovations, the concept of inventorship has grown complex and is still developing.

Natural beings are traditionally considered to be the inventors under patent rules, honouring their creative and intellectual contributions to breakthroughs.[44]

Inventions have traditionally been attributed to natural beings, such as scientists, engineers, researchers, or inventors.

AI as Tool:

The use of AI technology is frequently seen as a tool or instrument that may facilitate and improve the creative process[45]. In this instance, a normal human uses the AI system as a tool to assist in the creation.[46]

[43] https://ttconsultants.com/drafting-patent-applications-for-ai-innovations-navigating-challenges-and-finding-solutions/.
[44] Inc.Com, https://www.inc.com/kit-eaton/only-natural-persons-can-patent-things-in-us-as-ruling-leaves-ai-inventors-out-in-digital-cold.html.
[45] David Bull1, Artificial intelligence in the creative industries: a review, Artificial Intelligence Review (July 4, 2023), https://link.springer.com/article/10.1007/s10462-021-10039-7.
[46] H. James Wilson, How Humans and AI Are Working Together in 1,500 Companies, (July 1, 2018), https://hbr.org/2018/07/collaborative-intelligence-humans-and-ai-are-joining-forces.

AI as a Creative Entity:

Some arguments and points of view contend that AI, especially sophisticated machine learning systems and neural networks, can display some degree of creativity when coming up with answers, designs, or novel ideas.[47]

The question of whether AI systems may be regarded as independent creative creatures has been debated in light of AI's capacity to analyse large datasets, spot patterns, and suggest fresh solutions.

Issues with Attribution:

When AI systems independently produce inventions without direct human involvement, a problem occurs. In these situations, it's unclear whether the human operator, the AI system, or another entity should be acknowledged as the creator.[48]

It's possible that traditional patent systems lack provisions that take into account the special inventorship dynamics connected to AI.

Ethical and Policy Considerations:

Beyond the legal implications, there are ethical and political issues surrounding the invention of AI. These factors include concerns about accountability, responsibility, and the effects of AI on human creativity and labor.

AI-Based Innovation: Patentable or Excluded

The first possibility is to deem AI-generated innovations ineligible for patent protection[49]. However, this route is fraught with difficulties and dangers. It requires a precise description of what an "AI invention" is. It would be difficult to define this, and there would be a lot of disagreements over whether some inventions fit this description. The primary motivation behind the patent system, which attempts to promote innovation by offering exclusive rights in exchange for disclosing ideas to the public, might be undermined by the development of disputes since it would add risks and expenses.[50]

Think about the possibility that AI plays a key role in the identification of novel pharmaceuticals that can treat diseases that would otherwise go undetected. Considerations that AI ideas are not patentable may deter pharmaceutical businesses and researchers from investing in AI-driven drug discovery, preventing potentially game-changing medical advances.

[47] How Generative AI Is Redefining Creative Innovation, Venngage (Dec. 19, 2023), https://venngage.com/blog/how-generative-ai-is-redefining-creative-innovation/.

[48] Solidity Law, Legal Aspects of AI-Generated Virtual Beings: Intellectual Property, Rights, and Personhood, (June 19, 2023), https://www.linkedin.com/pulse/legal-aspects-ai-generated-virtual-beings-intellectual-property/.

[49] Taylor Wessing, Patenting AI-generated inventions – is patent law acting the luddite?, (Sept. 21, 2023), https://www.taylorwessing.com/en/insights-and-events/insights/2023/09/patenting-ai-generated-inventions.

[50] AZLawJet Editorial Board, Why Artificial Intelligence Shouldn't Be a Patent Inventor - Arizona Law Journal of Emerging Technologies, Arizona Law Journal of Emerging Technologies - Uni (Apr. 29, 2022), https://azlawjet.com/2022/04/v5a5/.

The second choice goes in a different direction. It claims that AI shouldn't make an otherwise patentable idea unpatentable on its own.[51] The innovative incentives that support the patent system's existence are protected by this strategy. However, it raises a maze of challenging issues about inventorship.

By granting patents for ideas produced by AI, researchers, businesses, and developers are strongly encouraged to invest in the technology and explore the almost endless potential of innovative AI-driven solutions. The possibility of obtaining exclusive rights to an AI breakthrough might spur innovation in a market that is competitive. It encourages people and businesses to devote considerable resources to AI research and development, promoting a culture of constant advancement and inquiry. The innovation ecosystem flourishes as more participants enter the market, resulting in ground-breaking advancements in AI technology. The competition to patent AI discoveries pushes the boundaries of what is feasible and leads to major improvements in a variety of fields.

In addition to encouraging research, promoting patent protection for AI advancements also promotes economic growth on several fronts[52]. AI-driven discoveries act as economic growth's catalysts by establishing new markets, industries, and employment possibilities. When cutting-edge AI technologies are used in real-world settings, completely new industries are created.[53] For instance, AI-powered healthcare solutions may give rise to a growing sector that not only advances medicine but also creates jobs. Increased investments, new job creation, and technical innovation are all results of this economic diversification and expansion. Additionally, it raises a country's GDP, which contributes to general economic success.

An essential layer of protection for innovators' intellectual property is provided by the patent system. They may protect their AI-generated ideas, get exclusive rights, and manage their marketing thanks to this. This protection serves as a critical catalyst for further invention and goes beyond simple recognition. Inventors are more likely to devote their time, money, and creative energies to creating novel AI solutions when they are certain that their efforts will be protected from copying and unlawful use. The protection of intellectual property guarantees a conducive environment for more creativeness by inventors and innovators in the world of AI hence increasing inventiveness in the sphere of AI.

[51] Nicol Turner Lee, Patents and AI inventions: Recent court rulings and broader policy questions, Brookings (Aug. 25, 2022), https://www.brookings.edu/articles/patents-and-ai-inventions-recent-court-rulings-and-broader-policy-questions/.
[52] Kristalina Georgieva, AI Will Transform the Global Economy. Let's Make Sure It Benefits Humanity., (Jan. 14, 2024), https://www.imf.org/en/Blogs/Articles/2024/01/14/ai-will-transform-the-global-economy-lets-make-sure-it-benefits-humanity.
[53] Andrew Rapacke, The AI Patent Boom: Why companies are racing to protect their artificial intelligence IP, The Rapacke Law Group (Jan. 20, 2023), https://arapackelaw.com/patents/the-ai-patent-boom/.

Sharing of information regarding the invention, which is one crucial aspect of a patent system, involves revealing everything about an invention. By facilitating public access to knowledge on AI-generated inventions, it greatly adds to the body of collective knowledge. Researchers, scientists, and engineers can benefit greatly from these releases. They share information that may be used to expand on current breakthroughs while providing insights into the most recent developments in AI. As AI-generated patents increase in number, they jointly expand the database of knowledge, increasing the state of the art in AI technology and enhancing society. It's a cycle where greater disclosure leads to more invention, which breeds advancement and enlightenment.

Conclusion

We have investigated the crucial issue of whether AI inventions need to be patentable in the context of the developing landscape of AI-generated works and intellectual property. The argument has many facets and is characterized by difficult problems and exciting prospects. Key conclusions and insights from our investigation have illuminated the future course.

The patent system and artificial intelligence are friends in advancing innovation, not rivals. A major incentive for academics, businesses, and developers to invest in AI technology is the ability to grant patents for ideas produced by AI. By developing new markets and industries, this investment fosters substantial breakthroughs across a number of sectors and promotes economic growth. Additionally, patent protection protects creators' intellectual property, encouraging them to keep extending the capabilities of AI. Researchers and technologists gain from the mandated disclosure requirement of the patent system, which progressively broadens society's body of collective knowledge.

Accepting AI-generated discoveries into the patent system does present some difficulties, though. AI-related invention determination raises complicated ethical and legal issues that require solutions. It is crucial to strike a compromise between the narrower objectives of innovation and social benefit and intellectual property protection.

In order to overcome these difficulties, it is recommended:

Clarifying Inventorship: Create precise rules for identifying the original creator of AI-generated inventions. This may entail thinking about the roles played by real people in creating the AI and their contributions to the creative process.

Examine possible revisions or additions to the intellectual property rules to account for the distinctive features of works produced by AI. New laws may achieve a balance between encouraging creativity and

ensuring that AI technology is used responsibly.

Discuss the ethical ramifications of AI in the invention process in an open and considerate manner. Encourage discussion on the ethical application of AI technology and how it affects human creativity and labor. Collaboration Between Humans and AI: Highlight the significance of human and artificial intelligence (AI) cooperation. Understanding this symbiotic relationship is crucial since AI is a tool that increases human creativity.

Human ingenuity continues to be crucial in the era of technological advancement. AI works with humans as a partner, enhancing and magnifying their creativity. Together, humans and AI have the capacity to transform whole sectors, find new solutions to challenging issues, and build a future full of exciting possibilities. We can make sure that innovation flourishes, society gains, and human creativity keeps thriving by tackling the issues presented by AI-generated works within the framework of intellectual property.

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