Artificial Intelligence and Intellectual Property: Impact and Legal Implications

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Abstracts

The rapid spread and development of artificial intelligence technologies has raised important questions that have an impact on laws and regulations related to intellectual property. In light of this, the research aims to explore the impact of artificial intelligence on intellectual property laws and regulations, and to examine the legal implications of the innovations generated by artificial intelligence on authorship, invention, ownership, infringement, and enforcement of intellectual property laws. In light of the great concerns about its impact on intellectual property laws and regulations and the uncertainty and ambiguity in the application of intellectual property laws, the researcher considered it a problem of the study as it leads to potential risks and challenges for creators, inventors, and intellectual property rights holders. The research followed the comparative approach to provide a view of the different approaches regarding this topic, and to help shed light on the main difficulties faced in applying the law in such an evolving context. The study reached many conclusions, but the most important of them is that artificial intelligence threatens office jobs due to its ability to generate high-quality content quickly and at a low cost, and intellectual property laws will continue to be breached, which necessitates the need for the law to adapt to establish rules of conduct and limits of human work, and recommends engaging in an international dialogue to unify laws and manage disputes related to intellectual property across borders.

Keywords: Artificial intelligence, legal, property Intellectual, Impact, implications.

Introduction

Artificial intelligence (AI), as an emerging technology, is regarded as a significant revolution that has profoundly transformed various aspects of our lives, including the creation and management of intellectual property (IP). Nowadays, nearly every human worldwide is influenced by AI. As AI technology evolves, its impact on human life is becoming increasingly

significant. According to Gartner forecasts, 75% of global enterprises will apply decision intelligence practices. By 2027, spending on AI software will grow to $297.9 billion[1].

The widespread accessibility of AI, regardless of an individual's familiarity with technology, and the vast array of solutions it offers, have led to a reevaluation of the definition of human creativity and its legal implications. Since the emergence of AI, numerous questions have arisen concerning the nature of intellectual property, including authorship, inventorship, ownership, infringement types, and the enforcement and management of IP laws. Since the proliferation of AI tools throughout the world, plenty of ethical and legal challenges have raised to the surface requiring quick answers.

Research Problem

The increasing use of Artificial Intelligence (AI) in various fields has raised significant concerns about its impact on Intellectual Property (IP) laws and regulations. The lack of clear guidelines and regulations on AI-generated creations has created uncertainty and ambiguity in the application of IP laws, leading to potential risks and challenges for creators, inventors, and owners of IP rights. Furthermore, the use of AI in decision-making processes, including in courts and judicial decision-making, has raised ethical and legal concerns about transparency, fairness, and accountability.

Research Questions:

1. How do current IP laws and regulations address the challenges posed by AI given the legal constraints and gaps?
2. How can IP laws and regulations be adapted or modified to address the challenges posed by AI?
3. How can international dialogue and harmonization of laws address these challenges?

Aim & Objectives of the Research

The aim of this research is to explore the impact of Artificial Intelligence (AI) on Intellectual Property (IP) laws and regulations, and to examine the legal implications of AI-generated creations on authorship, inventorship, ownership, infringement, and enforcement of IP laws.

1. Analyze the legal implications of AI-generated creations on authorship, invention, ownership, infringement, and enforcement of intellectual property laws.
2. Examine the need for new legal frameworks and systems.
3. Examine the role of jurisprudence in determining what is and is not protectable in AI-generated creations.
4. Examine the challenges posed by local and international legislators and their lack of transparency in AI environments.

Methodology and scope

This paper is based primarily on literature review of academic research documents, legal cases related to AI and its legal implications on Intellectual property. Secondly this paper analyzes existing legal framework from different sources locally and internationally. This comparison

[1] Gartner forecast, https://www.gartner.com/en/documents/4925331 (accessed 09 November 2023).

provides a landscape of different approaches regarding this topic and try to find the best practices that may be uses as recommendations. It also helps to highlight the main difficulties that are faced in relation to the application of law in such evolving context.

Literature review

Kumar, A., & Chaudhary, A. (2022)[2] The increasing use of Artificial Intelligence (AI) in creative tasks is leading to a reevaluation of traditional notions of authorship and inventorship. As AI systems become more advanced, there is a growing assumption that the AI machine, rather than the human involved, should be considered the author or inventor of the resulting intellectual property. This challenges the conventional understanding of authorship and inventorship under intellectual property law. To address this, this study delves into the technical aspects of AI systems and examines how humans interact with AI to produce intellectual output. The research argues that humans use AI as a tool to solve problems and create desired outcomes, and therefore, it is the human actor who should be credited as the author and inventor of the resulting intellectual property, not the AI system itself.

Jacques, S. (2020).[3] A key challenge lies in the fact that AI-related inventions often rely on computer implementation, which can lead to patentability issues similar to those encountered with software inventions. While patent offices have made efforts to adapt, algorithm-based inventions remain a gray area, with algorithms themselves not qualifying as patentable inventions. Even when they do overcome this hurdle, concerns arise regarding the application of patentability requirements, such as novelty, where national differences persist. This research aims to assess the suitability of the novelty requirement in the context of AI-inventions, where many underlying concepts and technologies are not novel. By conducting a comparative analysis of excluded subject matters and the novelty requirement in Europe (EPC countries), Japan, and the United States, this study seeks to evaluate the adequacy of the patent system in protecting AI-driven innovations.

Hilty, R., Hoffmann, J., & Scheuerer, S. (2020)[4] This research reexamines the necessity of intellectual property (IP) protection in the context of AI markets, considering the fundamental principles of IP protection from both legal and economic perspectives. Traditionally, IP rights are granted to recognize and reward human creators' efforts and personality, as well as to address market failures in public goods markets. The purpose of IP is to stimulate creation and innovation through market forces. However, the widespread adoption of AI applications may have changed the justification for IP protection in certain cases, particularly when it comes to AI tools. The chapter argues that the traditional rationale for IP protection may not apply to AI tools, but the

[2] Kumar, A., & Chaudhary, A. (2022). Untangling the Author/Inventor(Ship) Issues in the Artificial Intelligence-Intellectual Output. SSRN Electronic Journal, (0). https://doi.org/10.2139/ssrn.4220854

[3] Jacques, S. (2020). Patenting Algorithms in an Internet of Things and Artificial Intelligence World:Pathways to Harmonizing the Patentable Subject Matters and Evaluation of the Novelty Requirement. In ueaeprints.uea.ac.uk. 1. Retrieved from https://ueaeprints.uea.ac.uk/id/eprint/77062/

[4] Hilty, R., Hoffmann, J., & Scheuerer, S. (2020, February 11). Intellectual Property Justification for Artificial Intelligence. Retrieved from papers.ssrn.com website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3539406

case for protecting AI-generated outputs may be different. It reassesses the justification for IP rights in AI markets, considering the altered market implications of AI applications.

Definition of Artificial Intelligence

Artificial Intelligence (AI) is a technology that enables computers or computer-control robots to perform tasks that are usually made by intelligent beings. This technology enables computers to learn, write, create, analyze and even decide without human direct intervention. It "enables machines to imitate various complex human skills"[5].

International Organization for Standardization (ISO) defines AI as "a technical and scientific field devoted to the engineered system that generates outputs such as content, forecasts, recommendations or decisions for a given set of human-defined objectives"[6].

Technically AI is defined as "systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals"[7].

Concretely, AI developers proceed by educating and training a program making it able to produce a product that is similar to human output or even better. The procedure entails the education of artificial intelligence system by exposing it to a variety of data including thousands of images and artworks files. This method serves to instruct the program to synthesize the exposed data and subsequently generate unique artistic creations.

AI categories and types

AI is not a single technology, it is rather a variety of applications that perform smart functions that may be divided into two main categories, weak AI and strong AI[8].

Weak AI embodies specific applications that may fulfill limited functions within a limited scope of intelligence. Examples of weak AI include the SIRI voice assistant, instant response systems, Chabot, navigation software, autocorrect features applications…etc. All these applications perform specific functions based on the analysis of large datasets and following specific algorithms, but do not possess broad general intelligence.

Strong AI is an advanced form of AI able to perform complex tasks akin or surpassing human capabilities. This includes designing, learning, applying knowledge…etc. Strong AI is endowed with cognitive capabilities that would rival human intelligence. It may undertake a wide array of tasks such as:

- Writing essays and engaging interactive conversations.
- Creating music, drawing, sketching, sculpting.
- Making new models for industries.
- Programming.

[5] Sheikh, H., Prins, C., Schrijvers, E. (2023). Artificial Intelligence: Definition and Background. In: Mission AI. Research for Policy. Springer, Cham. https://doi.org/10.1007/978-3-031-21448-6_2

[6] *ISO/IEC 22989:2022, Information technology — Artificial intelligence — Artificial intelligence concepts and terminology*, ISO, Edition 1, 2022, https://www.iso.org/standard/74296.html

[7] Sheikh, H., Prins, C., Schrijvers, E. (2023). Artificial Intelligence: Definition and Background. In: Mission AI. Research for Policy. Springer, Cham. https://doi.org/10.1007/978-3-031-21448-6_2

[8] *What is artificial intelligence (AI)?*,ISO, https://www.iso.org/artificial-intelligence/what-is-ai

- Building architecture.
- Conducting fully automated vehicles…etc[9].

In general, these two main categories of AI can vary from the simplest to the most complicated as follow:

- Reactive machines: this system is limited to predefined rules and tasks. It has not the ability to learn from new data or new experience. It has a predefined list of functions, based on a given data from which it generates responses (e.g., Chatbots). So, it cannot evolve or create any output.
- Limited memory AI: endowed with limited memory this technology has the ability to use and learn from historical data to make fitted decisions and interactions based on specific training. (eg., Self-driving car).
- Theory of mind: It is a type of AI that can understand human emotions, then uses them to predict future actions. It enables robots to make decision autonomously. (eg., Social robotics).
- Self-aware AI: It is a technology that has similar awareness like human beings. Self-consciousness gives AI the possibility to be aware of its own existence and understand the emotional state of others. This type of AI is still hypothetical and can be found in science fiction movies. The swift and ongoing advancements in artificial intelligence makes that what is currently fictional could potentially be materialized in near future.

Thanks to its multiple impressive capacities AI has now the ability to autonomously execute comprehensive tasks and exhibit creativity. Across the world more artists, designers and companies use AI technologies to produce attractive new products[10].

The advent of artificial intelligence has certainly transformed the landscape of creative industries. However, it also was the source of significant challenges in the realm of intellectual property rights and their enforcement. Consequently, a careful examination of existing intellectual property frameworks is necessary to address any legal issue in accordance with legal requirements.

AI and intellectual property- legal uncertainty

The interaction AI and IP was a source of new business opportunities. At the same time this interaction has generated serious legal issues that may endanger the essence of human creation. The impact of AI on IP is so huge that the distinction between human creation and machine creation has become insignificant. Problems of ownership, patentability, copyright infringement and data protection are all current challenges that jurist has to solve.

In 2018, the French art collective "Obvious" gained prominence with their "Edmond de Belamy" portrait[11]. Obvious, used AI system to generate the portrait, marking a significant moment of interaction between technology and art. The artwork was sold at auction for $423,500. The sale

[9] Murár, P., & Kubovics, M. (2023). Using AI to Create Content Designed for Marketing Communications. European Conference on Innovation and Entrepreneurship, 18(1), 660–668. https://doi.org/10.34190/ecie.18.1.1638
[10] Dr. Mohd Akhter Ali & M. Kamraju, "Impact of Artificial Intelligence on Intellectual Property Rights: Challenges and Opportunities" (2023) 1(1) OUJIPR, 21 https://ouipr.in/oujipr/vol1/iss1/2
[11] Edmond De Belamy – Obvious. (n.d.). https://obvious-art.com/portfolio/edmond-de-belamy/

was remarkable not only for its excessive price, but also because it was created using AI program. The work was made of two parts: generator and discriminator. The developers fed the system with data of 15,000 portraits painted between the 14th century and the 20th century. The generator produced a new portrait, then the discriminator introduced its touch to make the portrait like human made in real life. This case has brought to the forefront a variety of inquiries concerning copyright authorship and AI impact on intellectual property law.

Artificial Intelligence (AI) is revolutionizing our approach of legal frameworks and the creation of intellectual property (IP). As the law grapples to catch up these rapid changes, the methods of infringing IP rights are becoming increasingly sophisticated and diverse.

The constant shifting landscape in which AI operates, makes it difficult to any legislator to establish any relevant framework. The AI is evolving at a breakneck speed; this creates significant risk for any amendment of law to become quickly obsolete and completely inadequate.

The prevailing ambience of ambiguity, characteristic of global legislative frameworks, gives the original proprietors of intellectual property outputs the opportunity to initiate claims against AI generators or their operators.

Moreover, the relationship between law and information technology is marked by a fundamental dichotomy. On one hand, information technology in general and AI in particular is largely governed by principles of globalization and internationalization. On the other hand, legal frameworks are predominantly confined within national boundaries. This cleavage often results in a large discordance between law and technology application. This juxtaposition highlights the challenges in legal frameworks harmonization with this global technology.

In such situation, only a jurisprudential dynamic approach can play a decisive role in effectively and rapidly adapting law to any changing context of artificial intelligence or any other new technology[12].

Intellectual property ownership:

Intellectual property rights are intangible assets. The common types of intellectual assets that are covered by intellectual law are mainly copyrights, patent, industrial design, and trade secret…etc.

Ownership of intellectual property depends on the type of property being protected, for example:

- Copyright: the creator of work is usually the author. In some circumstances, the employer can become the owner if the creation is made within the scope of the contract of employment.
- Patent: inventions are usually owned by inventor, but the employer may become owner if invention is made within the scope of employment.
- Trademarks: the owner of the trademark is the person or the business that first used the mark in business.

[12] Khan, A., & Muhammad, N. (2023). Expanding the boundaries of jurisprudence in the era of technological advancements. IIUM Law Journal, 31(2), 393–426. https://doi.org/10.31436/iiumlj.v31i2.856

- Trade secrets: the owner is the person that developed or acquired the information by legitimate means[13].

All categories of intellectual property are significantly affected by the application of AI. Nowadays, various AI tools are used to create novels, movies, music, computer programs, logos, trademarks…etc., and even inventions. What usually needs months to be created by human intelligence, becomes feasible within minutes and almost for free[14].

Ownership in intellectual property is assigned to human author or inventor. For example, under Copyright law, authors are granted authorship automatically upon creation of their original work. Applying this logic to AI generated or AI assisted works would mean that either AI itself, or the creator of AI-assisted or AI-generated work would be treated as author. This probability poses both ethical and legal dilemmas. Remembering that the bedrock of IP systems worldwide is to foster and protect human creativity and invention.

The US supreme Court defined an "author" in copyright as "he to whom anything owes its origin; originator; maker; one who completes a work of science or literature."[15] The use of "he" refers evidently to human being. This makes objects such as AI, outside the definition coverage.

The question arises when a protection application is made for an AI generated or AI assisted output. In such case it is not clear who should be designed as creator or inventor. Most legal frameworks didn't treat the new context where there is AI generated creation or invention. This ambiguity creates an atmosphere of uncertainty regarding ownership, right protection. Most of the legal frameworks were written at a time when there was no artificial intelligence. Regulations have been primarily established only to deal with human generated work.

The main question arises when it is about the use of AI in intellectual property works. Should we assign the creation or the invention to the person or the business who used such technology to generate that work? Or should we assign it to the AI or the organization that has the control on the AI and its algorithms?

Many jurisdictions and official organizations have early adjudicated the issue. The UK Supreme Court, the United States Patent Office (USPTO), and the US Federal Court as well as the European Patent Office (EPO) and many other instances have concluded that AI cannot be considered as inventor and cannot apply for patent rights[16]. The main requirements for a work to be copyrightable are originality and creativity. Originality is the cornerstone of copyright. These key terms were not formally defined in international instruments such as Berne

[13] Exception copyright and trade secret, inventions and Trademarks need registration to be protected.
[14] Haliti, B., & Bajrami, S. M. (2024). Utilizing artificial intelligence in Digital Marketing: Opportunities and challenges for marketers. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.4810565
Murár, P., &Kubovics, M., (2023). Using AI to Create Content Designed for Marketing Communications, *European Conference on Innovation and Entrepreneurship, 18* (1), 660-668. https://doi.org/10.34190/ecie.18.1.1638
[15] Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53 (1884).
[16] Richard M., & others (2024), Can AI be an Inventor? The US, UK, EPO and German Approach, International Arbitration Legal and Case Developments. https://www.mayerbrown.com/en/insights/publications/2024/01/can-ai-be-an-inventor-the-us-uk-epo-and-german-approach

Convention[17] or the TRIPS Agreement[18]. By contrast, some national jurisdictions defined the terms and considered them as main requirements. According to American law, the main requirements for a copyrightable work are:

- Originality: meaning that the work must be "independently created by the author", without copying[19].
- Creativity: it means that the work must have "some minimum degree of creativity"[20].

Some other jurisdictions added fixation as condition for copyrightable works. This means that the work must be fixed in a tangible medium of expression. A work is considered to be fixed so long as it is sufficiently permanent or stable. So, it can be afterword perceived, reproduced, communicated.

For Industrial property, the requirements vary across countries. We can list three main requirements that are common in most countries, which are:

- Novelty: meaning that the invention must not have been made public before, not even by the inventor himself.
- Inventive: it means that the solution must not be obvious.
- Useful: meaning that the invention must have an industrial application.

The application of these conditions to an AI work poses many legal issues, in particular the problem of adaptability of current legal frameworks with the new challenges of intellectual property. However, it is crucial to make a clear distinction between human-aided works and those autonomously generated by AI. The legal impact varies significantly based on the level of human contribution.

AI and Intellectual Property ownership-international law perspective

Most of International instruments and national laws do not specify if the protectable intellectual property output must be human made or not. But, some intellectual property authorities have clarified this point.

The US Copyright Office has already received many registration applications for AI-generated works. In 2018 the Office has rejected a registration claim for a visual work which was "autonomously created by a computer algorithm running on a machine"[21]. The rejection was based on the absence of any human authorship. After a series of Appeals, the office finished by confirming its position, stating that the work cannot be registered because it was made "without any creative contribution from a human actor."[22] In February 2023 the US Copyright Office received a registration application for a graphic novel containing a human authored text

[17] Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979)https://www.wipo.int/wipolex/en/text/283693
[18] Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), https://www.worldtradelaw.net/document.php?id=uragreements/tripsagreement.pdf
[19] Feist Publications, Inc. v. Rural Telephone Service Co., Inc., 499 U.S. 340, 347 (1991)
[20] Feist, 499 U.S. at 358, 362.
[21] U.S. Copyright Office Review Board, Decision Affirming Refusal of Registration of A Recent Entrance to Paradise at 2 (Feb. 14, 2022), https://www.copyright.gov/rulings-filings/review-board/docs/a-recent-entrance-to-paradise.pdf
[22] Id. at 2-3. The Office's decision is currently being challenged in Thaler v. Perlmutter, Case No. 1:22-cv-01564 (D.D.C.).

combined with AI generated images. The Office concluded that the work was copyrightable, but the images themselves couldn't be protected by copyright[23].

In Burrow-Giles Lithographic Co. v. Sarony case the US Supreme Court extended the copyright to photographs "so far as they are representatives of original intellectual conceptions of the author"[24].

Furthermore, the US Copyright Office stated in the Guide on The Copyrightability Of AI-Assisted Works that such works "may be copyrightable as long as there is sufficient human authorship"[25]. As outlined by the Office the following conclusions can be drawn:

- It is not forbidden to use technological tools in copyright works.
- Applicant for copyright must disclose the inclusion of AI-generated content, with an explanation of human author's contribution.
- AI cannot be listed in a protection claim as author or even co-author.

In conformity with this position, the US Copyright Office issued on March 2023 a statement of policy on Artificial Intelligence, indicating that works including "human-authored elements combined with AI-generated images" are copyrightable"[26].

The Copyright office stated precisely in response to the copyrightability for AI generated work that "The answer will depend on the circumstances, particularly how the AI tool operates and how it was used to create the final work."[27] The key factor is the degree to which human has "creative control over the work's expression and actually formed the traditional elements of authorship".[28]

In summary, US Copyright office requires for the registration of any copyright the existence of an "original work" provided that the work was made prominently by human being. The copyright will only protect "the fruit of intellectual labor" that "are founded in the creative power of mind"[29].

Like American law, Chinese law still requires the involvement of human author to create a copyrightable work[30]. On November 2023, the Beijing Internet Court has issued the first decision that addresses the copyrightability of AI-generated work. [31] In this case the plaintiff has created several images using an open source AI tool that creates images from textual prompts. After

[23] U.S. Copyright Office, Cancellation Decision re: Zarya of the Dawn (VAu001480196) at 2 (Feb. 21, 2023), https://www.copyright.gov/docs/zarya-of-the-dawn.pdf
[24] Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 58 (1884)
[25] Guidance for registering Works Containing Material Generated by Artificial Intelligence by the U.S. Copyright Office, 3/16/2023, https://public-inspection.federalregister.gov/2023-05321.pdf
See also https://copyright.gov/ai/ai_policy_guidance.pdf
[26] Federal Register: Request Access. (2023, March 16). Unblock.federalregister.gov. https://www.federalregister.gov/documents/2023/03/16/2023-05321/copyright-registration-guidance-works-containing-material-generated-by-artificial-intelligence
[27] Ibid.
[28] Ibid.
[29] Trade-Mark Cases, 100 U.S. 82, 94 (1879). https://www.loc.gov/item/usrep100082/
[30] Art. 11 of the Chinese Copyright Law.
[31] Wen, T. (2024). Beijing Internet Court recognizes copyright in AI-generated image. Journal of Intellectual Property Law & Practice. https://doi.org/10.1093/jiplp/jpad127

publishing images, the plaintiff discovered that defendant had used one of published images to illustrate an article on a different website.

The court stated the disputed image was copyrightable under four conditions:

1. The work must be belonging to the field of literature, art or science;
2. The originality of the work;
3. Having a form of expression;
4. Being the result of "intellectual achievement".

According to the court, intellectual achievement refers to intellectual creation, which must reflect a human being contribution. In the disputed case, human being contribution may be deduced through the following elements:

- The choice of a particular AI tool that may provide the desired image style;

- The design of the character and the background of the image by entering positive and negative parameters (Shape, color background…etc);

- The parameters order and adjustment that enables the personalization of the image…etc.

The court concluded that the disputed image was sufficiently original because it reflects the plaintiff personality. Indeed, to create the image the plaintiff selected over 150 prompts, ordered them and set specific parameters. He continued to adjust the parameter until the final image was created. In other words, without specific instructions and repetitive refinement of the results, the plaintiff wouldn't be able to achieve such intellectual work[32].

In the same direction, in relation with patent applications for AI invention or AI assisted inventions, the United States Patent and Trademark Office (USPTO), stated that inventors must be human being[33].

The United States Patent and Trademark Office (USPTO) issued on October 2023 a Guidance[34], in which it was stated that AI-assisted inventions are not categorically unpatentable[35]. According to the USPTO, "Patent applications and patents for AI-assisted inventions must name the natural person(s) who significantly contributed to the invention as the inventor or joint inventors"[36].

A specific analysis of human contribution must be made to decide whether the invention is patentable or not. According to the USPTO, human contribution must be significant in the

[32] Wininger, A. (2024, January 22). Beijing Internet Court Releases Translation of Li vs. Liu Recognizing Copyright in Generative AI. China IP Law Update. https://www.chinaiplawupdate.com/2024/01/beijing-internet-court-releases-translation-of-li-vs-liu-recognizing-copyright-in-generative-ai/

[33] *AI and inventorship guidance: Incentivizing human ingenuity and investment in AI-assisted inventions*. (2024, February 12). Uspto.gov. https://www.uspto.gov/blog/ai-and-inventorship-guidance-incentivizing

[34] Inventorship Guidance for AI-Assisted Inventions, February 13, 2024 (89 FR 10043) https://www.federalregister.gov/documents/2024/02/13/2024-02623/inventorship-guidance-for-ai-assisted-inventions

[35] Kim, C., Kumar, S., & Sked, M. (2024). Inventorship guidance for AI-assisted inventions. https://www.uspto.gov/sites/default/files/documents/inventorship-guidance-for-ai-assisted-inventions.pdf

[36] Kim, C., Kumar, S., & Sked, M. (2024). Inventorship guidance for AI-assisted inventions. https://www.uspto.gov/sites/default/files/documents/inventorship-guidance-for-ai-assisted-inventions.pdf

invention to be patentable. To evaluate human contribution in AI assisted invention, standard Pannu Test should be applied.

Under the Pannu factors, each joint-inventor must:

1. "Contribute in some significant manner in the conception;
2. Make a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and;
3. Do more than merely explain to the real inventors, well-known concepts and/or the current state of the art"[37].

The idea of the USPTO is to find the right balance between "awarding patent protection to promote human ingenuity and investment for AI-assisted inventions while not unnecessarily locking up innovation for future developments"[38].

The position of various jurisdictions on the patentability of artificial intelligence systems aligns closely with the stance of intellectual property authorities. This consensus ensures a uniform approach regarding the legal protection of AI generated inventions.

One notable case in the realm of intellectual property and AI generated inventions, is the "DABUS" patent case. The case revolves around an application for patent made by Dr. Stephen Thaler for his AI called DABUS ("device for the autonomous bootstrapping of unified sentience"), a machine that he has created to generate inventions. He listed it as sole inventor in the application.

Since 2018, Dr Thaler applied for patent for his AI DABUS in many countries, including UK, Australia, Germany, South Korea, European Union…etc)[39].The application of Dr Thaler was declined by all countries except South Africa. The rejection was always made due to the lack of a human inventor in the patent application.

According to the European Patent Office (EPO), the application was rejected because an inventor must be a "natural person" who has "legal capacity"[40]. According to the European authority, "Machines should not own patents. They do not have legal personality or independent rights and cannot own property"[41]. Meaning that the person must be able to be subject to rights and duties.

On 2021, the Australian Patent Commissioner also rejected Dr Thaler application, because he hadn't named a human as inventor inventor. Dr. Thaler appealed to the Federal Court for judicial review of the decision. The primary judge found that a machine can be considered as an inventor and ordered to set aside the decision of the Patent Commissioner. The Commissioner then appealed to the Full Federal Court which found that "the statutory language, structure and history of the Patents Act, and the policy objectives underlying the legislative scheme", meant that only

[37] Pannu v. Lolab Corp., 155 F.3d 1344, 1351 (Fed. Cir. 1998), https://caselaw.findlaw.com/court/us-federal-circuit/1253324.html
[38] Quach, K. (2024, February 13). US patents boss cannot stress enough that inventors must be human, not AI. Theregister.com; The Register. https://www.theregister.com/2024/02/13/uspto_ai_patents/
[39] The latest news on the DABUS patent case | IP STARS. (n.d.). Www.ipstars.com. https://www.ipstars.com/NewsAndAnalysis/The-latest-news-on-the-DABUS-patent-case/Index/7366
[40] J 0008/20 (Designation of inventor/DABUS) 21-12-2021 | Epo.org. (n.d.). Www.epo.org. https://www.epo.org/en/boards-of-appeal/decisions/j200008eu1
[41] European Patent Office (EPO), (J 0008/20), Designation of inventor/DABUS, 21 December 2021, https://www.epo.org/en/boards-of-appeal/decisions/j200008eu1

natural person may be named as inventor[42]. The decision was then confirmed by the High Australian Court[43].

On August 2022, in the United States the Court of Appeals for the Federal Circuit held in DABUS case, that term "inventor" under the United States Patent Act must be human being[44]. In a similar case ("Hormel" case), the Federal Circuit has rejected to grant patent to the plaintiff because the "alleged contribution of preheating meat pieces using an infrared oven is insignificant in quality,"[45].

In the light of the evolving legal landscape, OpenAI which provides ChatGPT declared in its policy page that the company doesn't own the "input" and output content, as a precautionary measure. It is also outlined that user is "responsible for Content, including ensuring that it does not violate any applicable law"[46]. However, the company retains the right to use any provided content to improve the company's services.

Similarly, in UK the Supreme Court has unanimously decided on December 2023, that Dr Thaler cannot design AI as an inventor. According to the Court an inventor, for the purposes of the Patent Act 1977 (the Act), must be a "natural person"[47]. This decision was a confirmation of the UK intellectual Property Office (UKIPO) for which "machines do not have a legal personality and cannot own property"[48]. Consequently, machine without legal capacity cannot exercise such inventor's rights.

In contrast, Dr Thaler application was accepted in South Africa for a particular reason which was not substantial. Indeed, the South Africa Intellectual Property Office granted Thaler's application not because machine could be named as inventor, but because the patent office is not asked to check the legitimacy of patent attribution. It only checks for basic formal requirements.

The South African groundbreaking decision has certainly marked a significant change in the legal position of Artificial intelligence, as it was the first case where patent was granted to a machine. However, South African Patent Office, unlike other offices didn't undertake substantive examination of patent applications. It was a just a decision based on formality, without addressing the substantive merits of the case.

Moreover, South African Patents Act refers to the inventor as "him", which proves that the patent rightholder is supposed to be a natural person. Anyway, South Africa has become the first jurisdiction in the world to recognize the AI as inventor, which is considered in itself a revolutionary decision.

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[42] FEDERAL COURT OF AUSTRALIA Thaler v Commissioner of Patents [2021] FCA 879. (n.d.). Retrieved August 12, 2024, from https://www.adams.africa/wp-content/uploads/2024/01/AU-High-Court-Thaler-v-Commissioner-of-Patents-2021-FCA-879.pdf

[43] Thaler v Commissioner of Patents [2022] HCATrans 199 (11 November 2022). (2022). Austlii.edu.au. https://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/HCATrans/2022/199.html?context=1

[44] Thaler v. Vidal, 43 F.4th 1207 (Fed. Cir. 2022), https://cafc.uscourts.gov/opinions-orders/21-2347.OPINION.8-5-2022_1988142.pdf

[45] Hip, Inc. v. Hormel Foods Corporation, No. 2022-1696 (Fed. Cir. May 2, 2023), https://cafc.uscourts.gov/opinions-orders/22-1696.OPINION.5-2-2023_2120058.pdf

[46] OpenAI policies, https://openai.com/policies/terms-of-use/

[47] UK Supreme Court, *Thaler (Appellant) v Comptroller-General of Patents, Designs and Trade Marks*, 20 December 2023, https://www.supremecourt.uk/cases/docs/uksc-2021-0201-judgment.pdf

[48] UK Intellectual Property Office, Patent decision, O/741/19, Stephen L Thaler, 04, December 2019, https://www.ipo.gov.uk/p-challenge-decision-results/p-challenge-decision-results-bl?BL_Number=O/741/19

New obligations for AI developers and creators

The use of AI for intellectual creation is considered as a great upheaval in the history of intellectual property. AI developers often use copyrighted works such as images, videos texts and other medias, in the training process of AI systems. This process enables AI programs to create works based on entered data and training process. This data is usually taken directly from Internet. Midjourney AI application for example uses 5 billion images scraped from the Internet for training purposes[49]. Technically, this means that the original owner could claim against an AI generator or the AI's creator for copyright infringement from rightsholders. The emergence of this new context necessitated the implementation of appropriate safeguards for AI operators.

On June 2024, the European Union has issued the first Regulation on artificial intelligence, the EU Artificial Intelligence Act[50]. The aim of the Regulation is to make the AI safe, transparent, traceable, non-discriminatory and environmentally friendly. One of the main characteristics of this act is its global impact. Although de jure, the regulation "does not apply to areas outside the scope of Union law"[51]; de facto it has a real global impact thanks to what is called "Brussels effect"[52]. This effect pushes other countries to align with European legislation, because strong companies oppose to rules that would create conflicts with European standards.

The European AI Act imposes certain obligations for providers, deployers and users, that must be met by General-Purpose AI (GPAI) systems. However, it's the developer who bear the greatest share of responsibility, because the main process is carried out by him.

These obligations which are needed to meet copyright transparency requirements include the following:

- Disclosing the content generated by AI;
- Designing an AI model that prevents the generation of illegal content;
- Publishing summaries of copyrighted data used for AI training.

As a result, each content generated or modified by AI needs to be labelled as AI generated, so user will be aware of the origin of that content. In practice AI providers must adapt to these new requirements, considering how to train their models in a way that doesn't infringe European new regulation. This involves a detailed documentation and policies to ensure a transparent disclosure of training data in conformity with IP requirements.

The extensive use of AI presents a significant risk of IP infringements, that may incur legal implications and substantial cost. It is imperative for any business to conduct thorough audit of their intellectual property assets. Potential infringement of third party rights may result in legal

[49] Natalie. (2023, March 29). GPT-4 and Midjourney 5 Weave a New Era of Generative AI. Consumer Insights | Social Listening | KOL Analysis. https://www.tocanan.ai/gpt-4-and-midjourney-5-weave-a-new-era-of-generative-ai/

[50] Regulation (EU) 2024/1689, of the European Parliament and of the Council of 13 June 2024, laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act). https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202401689

[51] EU, Artificial Intelligence Act, P9_TA(2024)0138, 13 June 2024. https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32024R1689

[52] Engler, A. (2022, June 8). The EU AI Act will have global impact, but a limited Brussels Effect. Brookings. https://www.brookings.edu/articles/the-eu-ai-act-will-have-global-impact-but-a-limited-brussels-effect/

actions against the business. This requires an appropriate understanding of its own and third party rights.

Therefore, companies should develop appropriate intellectual property policies that determine the outlines of the company strategy to protect their own IP assets and third party IP rights. AI developer should also ensure that they are in compliance with law regarding their acquired data used to train their models.

AI itself can be useful to detect any infringement of company's rights. One of the benefits of AI is the creation of a common environment where all participants, including creators and potential infringers, operate together in the same shared space. This shared environment enhances the ability to monitor any infringement enabling prompt and effective enforcement actions.

Conclusion:

In the past technological advancements threatened blue-collar jobs in industries because of automation. Today AI threatens white-collar jobs, because of its proficiency in generating high quality content, more quickly and almost for free. However, it is essential for the world to evolve with this technology. Instead of opposing to the increasing use of AI, we should enhance it in order to take profit of its huge potentials. Human remains the most crucial component of our world thanks to his exclusive critical functions and attributions. Every AI creation still requires human oversight to edit, evaluate, modify, refine and validate…etc. There is still long way to understand the impact of AI on the application of law in general and on intellectual property in particular. At the same time, it is clear that AI is invading more and more areas and becoming a common place for different actors. IP laws will continue to be breached in varied ways and law will try to defend its position as social ideal that establishes the rules of conduct and draws the limits of human action. At the same time Many legal ambiguities need to be clarified to ensure security transparency and ethical use of this technology. Global divergence in legislations calls for further international dialogue to harmonize laws and manage cross-borders intellectual property disputes. Meanwhile, AI has already started to make its way inside courts and inside decision making process. AI is now assisting judges in making their judicial decision. However, AI is also a "black box" because of its complexity, which makes the judge mission more and more complicated. No legislation can provide a general standard for every IP work. The jurisprudential role will stay significantly relevant for each case, to determine what is protectable and what is not[53]. The lack of transparency in AI environment makes any decision based on this technology subject to criticism and debates affecting its legitimacy and even credibility. Requirements of insight, transparency and fairness are sometimes difficult to achieve for lack of response.

Results

1. AI threatens office jobs because of its ability to generate high-quality content quickly and at low cost.

[53]Artificial Intelligence Law SAUDI ARABIA. (n.d.). https://www.lw.com/en/people/admin/upload/SiteAttachments/Lexology-In-Depth-Artificial-Intelligence-Law-Saudi-Arabia.pdf

2. Human oversight remains essential for AI creations, requiring editing, evaluation, modification, refinement, and verification.
3. AI is increasingly being used in a variety of fields, including law and intellectual property.
4. IP laws will continue to be disruptive, and the law will need to adapt to set rules of conduct and boundaries for human action.
5. The importance of the jurisprudential role in determining what can and cannot be protected in intellectual property cases.

Recommendations

1. Promote AI technology to realize its potential while ensuring human oversight and critical functions.
2. Clear legal ambiguities to ensure security, transparency, and ethical use of AI technology.
3. Engage in international dialogue to unify laws and manage cross-border IP disputes.
4. Develop guidelines for transparency, fairness, and insight in AI-related decision-making processes.

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