AI AND IP: UNRAVELLING THE INTELLECTUAL PROPERTY IMPLICATIONS OF GENERATIVE ARTIFICIAL INTELLIGENCE

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ABSTRACT

Generative Artificial Intelligence (AI) has transformed the landscape of creativity, produced visually striking art. Yet, alongside this remarkable progress lies a complex legal terrain where Generative AI intersects with Intellectual Property law. This paper explores legal challenges tied to the creation, ownership, and use of AI-generated content.

This paper evaluates existing legal frameworks regarding fair use, creation of derivative works, and potential intellectual property rights violations related to input data utilization. It also examines complexities surrounding ownership of content generated by generative AI, including questions of authorship and creatorship. Additionally, it highlights the need to address copyright, patent, and trademark infringement issues in the context of Generative AI.

Proposed strategies aim to enhance transparency, fairness, and ethical considerations in accessing and using training data for generative AI systems. By unravelling the complex web of IP implications, this paper provides insights for businesses navigating risks associated with Generative AI, offering a roadmap for legal compliance and protection in this rapidly evolving technological landscape.

Keywords: Generative Artificial Intelligence, Chat GPT, AI Training, Derivative Works, Ownership, Transparency, Fair Use.

Introduction

Generative Artificial Intelligence (AI) has ushered in a new era of creativity, transforming the way we conceive and appreciate artistic endeavours. This innovative technology, often likened to magic, has demonstrated its prowess in image generation through platforms such as **Stable Diffusion**, **Midjourney**, and **DALL·E 2**, producing visually striking outputs ranging from aged photographs to pencil drawings and Pointillism. Text generators, on the other hand, have proven to be equally remarkable, crafting essays, poems, and summaries with a mimicry of style and form that challenges conventional notions of creativity. However, amid the awe-inspiring results lie complex legal implications that demand careful consideration.

This paper delves into the intersection of Generative AI and Intellectual Property (IP) law, exploring the challenges and risks associated with the *creation, ownership, and use of AI-generated content*. While the capabilities of Generative AI may seem to conjure new material from the ether, the underlying process is rooted in the analysis of vast data lakes and question snippets, where billions of parameters are processed to uncover patterns and relationships. These patterns are then translated into rules, enabling the AI to make judgments and predictions when responding to prompts.

The legal landscape surrounding Generative AI is evolving, with existing laws shaping its use and courts grappling with nuanced questions. Intellectual property infringement emerges as a primary concern, raising questions about the *applicability of copyright, patent, and trademark laws to AI-created content. The issue of ownership of AI-generated works remains ambiguous, as does the treatment of unlicensed content in training data and the permissibility of direct references to copyrighted and trademarked works without explicit permission*.

Recent litigation, such as the case of *Andersen v. Stability AI* in 2022 and subsequent cases in 2023, highlights the legal challenges posed by Generative AI. Artists have sued AI platforms, *alleging the unauthorized use of their original works to train AI, leading to the generation of derivative works without proper licensing*. Cases like Getty's lawsuit against Stable Diffusion highlight the importance of addressing issues related to copyright and trademark infringement in the context of Generative AI.

In the face of these legal uncertainties, businesses utilizing Generative AI must navigate a landscape rife with risks, from inadvertent infringement to contractual challenges stemming from the silence on generative AI usage. This paper aims to unravel the complex web of Intellectual Property implications surrounding Generative AI, providing insights into the legal challenges and considerations that businesses must address to protect themselves in this evolving technological landscape.

Chapter 1 – Foundations of Intelligent Ingenuity: An In-depth Exploration of Artificial Intelligence and its Proficiencies

The integration of computers with human intelligence has led to the development of artificial intelligence [AI], allowing machines to autonomously make decisions. Coined by computer scientist John McCarthy in 1956, AI was envisioned as programs capable of processing information and responding intelligently, akin to human cognition. This chapter explores the historical evolution of AI, the Turing test proposed by Sir Alan Turing, and the categorization of AI by the **World Intellectual Property Organization** [WIPO].

AI, a term often challenging to define precisely, elicits varied interpretations. In the strictest sense, AI denotes the replication of human intelligence by computers. However, critiques argue that this definition may render AI non-existent in current applications, which are perceived as relatively simple. Attempts to define AI based on its capacity to imitate complex human skills or perform intricate tasks in intricate environments remain vague without specifying these skills.

The paper adopts the definition proposed by the **AI High-Level Expert Group** [AI HLEG], describing AI as *"systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals."* This definition strikes a balance, being strict enough to distinguish AI from general algorithms and digital technology while remaining open to encompass current applications and adapt to future advancements.[1]

Generative AI, epitomized by language models like ChatGPT, is reshaping content creation by swiftly generating text responses to various queries. **Large language models** [LLMs], designed for natural language processing, excel in language modeling tasks, predicting the next word in a sequence based on extensive training data. Despite their proficiency in mimicking human-like responses, LLMs operate devoid of true understanding, acting on form rather than meaning. This modus operandi challenges traditional notions of intelligence, relying on sophisticated algorithms, extensive data, and intricate pattern recognition.[2]

[1] Haroon Sheikh, Corien Prins & Erik Schrijvers, *Mission AI Artificial Intelligence: Definition and Background*, 15–41 (2023).

[2] *ChatGPT: A Case Study on Copyright Challenges for Generative Artificial Intelligence Sytems | Eurpean Journal of Risk Regulation*, Wilhelm III (Aug. 29, 2023), https://www.cambridge.org/core/journals/european-

Rule-based systems rely on predefined sets of rules expressed through conditional statements (if-then) to execute tasks or make decisions. These systems operate on logical reasoning, providing a structured approach to problem-solving.[3]

Expert systems mimic human decision-making in specific domains, utilizing knowledge bases and rule-based inference engines. They provide expert-level advice or solutions within a defined field of knowledge.

Machine Learning (ML) is a fundamental AI technique involving the training of algorithms on extensive datasets. This enables algorithms to acquire knowledge of patterns, perform tasks, or make predictions without explicit programming. ML encompasses supervised, unsupervised, and reinforcement learning methodologies.

Neural networks, inspired by the human brain's structure, are a category of machine learning models. Composed of interconnected neurons arranged in layers, they acquire knowledge of intricate patterns and generate forecasts.

Deep Learning, a specialized area of ML, utilizes deep neural networks with multiple hidden layers. This technique has achieved significant breakthroughs in fields such as computer vision, natural language processing, and speech recognition.

Natural Language Processing (NLP) focuses on enhancing computers' ability to comprehend, decipher, and generate human language.[4] It encompasses various approaches, including text categorization, data extraction, emotional tone analysis, and automated language conversion.

Birth of Artificial Intelligence

AI emerged with John McCarthy's formal coinage of the term in 1956, highlighting the idea of programs processing information to mimic intelligent human responses. AI projects were

journal-of-risk-regulation/article/chatgpt-a-case-study-on-copyright-challenges-for-generative-artificial-intelligence-systems/CEDCE34DED599CC4EB201289BB161965.

[3] *What is Artificial Intelligence (AI) ? | IBM*, https://www.ibm.com/topics/artificial-intelligence.

[4] *Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges, and Implications for Policy Makers*, (Sept. 21, 2020), https://www.oecd.org/finance/financial-markets/Artificial-intelligence-machine-learning-big-data-in-finance.pdf.

driven by curiosity and a reliance on machines, enabling them to perform tasks requiring human-like creativity.

Turing Test and Intelligence Assessment

The question of whether machine results stemmed from true intelligence or algorithms led to Sir Alan Turing proposing the Turing test. This test involved users conversing with a machine or human in text-only format, assessing whether responses were indistinguishable from human counterparts. Although effective for some time, the test's application was limited to speech machines and specific quizzing purposes.[5]

WIPO's Categorization of AI

The World Intellectual Property Organization identified three AI categories: expert systems, perception systems, and natural-language systems. Expert systems excel in problem-solving within specialized fields, including creative endeavours like art. The legal spotlight shone on expert systems when a computer-authored work was denied copyright, raising unresolved legal questions.[6]

Legal Complexities and Protection Aspirations

AI systems, particularly perception and natural-language programs, gained widespread use, leading to a desire for legal protection for their outputs. However, the denial of copyright to a literary work in 1956 created uncertainties for those seeking protection. The debate surrounding AI's legal implications, especially in the context of intellectual property like copyrights and patents, persisted and reached national courts.

[5] A. M. TURING, I.—COMPUTING MACHINERY AND INTELLIGENCE, *Mind*, Volume LIX, Issue 236, October 1950, Pages 433–460, https://doi.org/10.1093/mind/LIX.236.433

[6] Swapnil Tripathi & Chandni Ghatak, *Artificial Intelligence and Intellectual Property Law*, 7 Christ University Law Journal, 83-97 (2021).

Chapter 2 – Exploring the Nexus: Intellectual Property Implications in Artificial Intelligence

Intellectual Property (IP) refers to the legal rights granted to individuals or companies for their ideas or artistic creations. The notion encompasses intangible assets involving innovations, artistic works, plans, logos, and sensitive information. Intellectual property rights grant creators or owners the right to control and benefit from their creations.

The importance of intellectual property in the context of Artificial Intelligence (AI) is significant, considering the increasing use of AI technology in various industries. The subsequent are important components of intellectual property (IP) and their relevance to artificial intelligence (AI):

Patents are crucial for protecting AI-related advancements. An AI innovation can involve a unique algorithmic method, a new hardware configuration, or a specific application of AI. Patents grant inventors exclusive rights for a limited time, preventing anyone from using, making, or selling the patented invention without permission. Granting incentives and protection to AI developers via patents stimulates innovation.[7]

Copyright law protects creative and intellectual works, including software, databases, and content generated by artificial intelligence. Artificial intelligence algorithms can create many creative outputs, including art, music, literature, and news articles. Copyright law gives artists the exclusive right to copy, distribute, and display their work, granting them control over the use and commercialization of content produced by artificial intelligence.

Trade secrets are often found in AI technology, containing unique algorithms, datasets, or training models that provide companies a competitive edge. Trade secrets protect proprietary and valuable information such as AI training data, algorithms, or company strategy. It is crucial to take necessary steps to safeguard trade secrets, such as enforcing access rules, confidentiality agreements, and security processes.

[7] EUIPO *v.* Vincent, case C-653/20 P, iECJ (2022).

AI technology deployment can greatly change certain sectors, but it also raises ethical concerns related to intellectual property. AI systems trained on copyrighted material may inadvertently generate output that infringes copyright restrictions. Ownership and copyright issues arise when AI algorithms are used to create derivative works based on pre-existing copyrighted material. The ongoing problem is to fairly distribute rights among producers, owners, and users of content produced by artificial intelligence.

Using existing intellectual property, like pre-trained models or datasets, is a typical practice in AI technology development. This is commonly achieved through licencing agreements and collaborative endeavours. Licencing agreements enable the legal use of intellectual property assets in artificial intelligence applications. Collaboration between AI developers and IP proprietors can lead to beneficial agreements that encourage creativity and knowledge sharing while respecting intellectual property rights.[8]

[8] Jessica M. Meyers, *Artificial Intelligence and Trade Secrets, American Bar Association,* (Feb. 15, 2024, 9.29 pm), https://www.americanbar.org/groups/intellectual_property_law/publications/landslide/2018-19/january-february/artificial-intelligence-trade-secrets-webinar/.

Chapter 3 – Generative Intelligence Unveiled: A Deep Dive into the Evolution and Impact of AI Language Models in Content Creation

The Generative AI application, such as ChatGPT, facilitates interactive communication by producing autonomous text responses. This process involves combining knowledge from several sources such as books, journals, websites, and articles to create original and compelling content. Generative AI utilises computer techniques within the realm of natural language processing (NLP) [9] to imitate human language comprehension and analysis on extensive datasets.

Generative AI, represented by chatbots like ChatGPT, operates within the confines of syntactic comprehension. The methodology involves a thorough analysis of sentence structure, identifying interdependencies among constituent elements. Despite extensive training on vast datasets, Generative AI relies on statistical techniques for analysis and comprehension. While proficient in recognizing patterns in language use, it falls short of genuine semantic understanding.

Copyright Challenges in AI-Generated Creations

Traditional copyright laws typically recognize the individual creator as the author. However, determining authorship becomes intricate in the context of works generated by artificial intelligence. The question arises of how to attribute authorship between the AI system and the human operator.

Copyright protection requires a work to exhibit originality. Despite the creativity and novelty demonstrated by AI-generated works, ongoing debates surround the impact of human involvement in the creative process on the originality requirement. Some argue that genuine originality necessitates human intervention in the creative process.

Some jurisdictions, like the United States, assert that copyright protection is exclusive to works created by human beings. In contrast, certain countries, including the UK, adopt a model where

[9] Andres Guadamuz, *Authors sue OpenAI for copyright infringement* (Feb. 15, 2024, 9.30 pm).

authorship is attributed to the person undertaking the arrangements necessary for creating the work.[10]

Generative methods, like ChatGPT, raise important issues about intellectual property, authorship, and the level of copyright protection for content generated by AI systems. These features have attracted significant attention in the legal field. The main issue is identifying the legitimate copyright holder of AI-generated content, whether it be an individual or a legal corporation. [11] *When asked about copyright ownership, ChatGPT responds that as an AI language model, it does not own the copyright. The user supplying prompts retains rights.* [12]

Defining ownership becomes difficult due to ChatGPT functioning as an AI system that generates results from training data and user interaction. [13] The attribution of AI-generated content is influenced by factors such as the content's purpose, the user's intention, and regulatory guidelines. The user who generates the input holds the rights to the output, although issues may arise if the input is derived from ChatGPT's training data or other sources.

AI is unable to possess copyright because it is legally considered a non-human entity. Although global copyright laws do not need human authorship, several countries like the USA and EU members emphasise human authorship. Copyright law operates under the premise that a human creator is essential, as indicated by phrases like "70 years after the calendar year in which the author of the work died." [14]

Historically, copyright laws have adapted to new technologies, as seen with photography, motion pictures, and computer programs. The case of Burrow-Giles v. Sarony[15] in 1885 exemplifies how copyright was attributed to a photographer, even when a machine (camera) was involved, recognizing human input as essential.

[10] Andres Guadamuz, *Artificial intelligence and copyright*, WIPO Magazine (Oct. 5, 2017), https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.
[11] Ryan Abbott, *The Reasonable Robot*, University of Surrey School of Law (Cambridge University Press, June 2020).
[12] Kent Anderson, *ChatGPT Says It's Not an Author*, The Geyser (Jan 13, 2023), https://www.the-geyser.com/chatgpt-says-its-not-an-author/?ref=the-geyser-newsletter.
[13] *Supra Note* 9.
[14] Infopaq International A/S v Danske Dagblades Forening, C-5/08, European Court Reports 2009 I-06569 (2009).
[15] Burow-Gilles Lithographic Co. v. Sarony, 111 U.S. 53 (1884).

The UK is the sole country that acknowledges "computer-generated works" in its national legislation. According to Section 9(3) of the Copyright, Designs and Patents Act 1988, the individual responsible for organising the creation of the work is considered the author. Identifying the "arranger" is difficult due to the intricacies of modern AI programming, making these rules rather obsolete. [16]

ChatGPT, being an AI language model, does not possess legal identification or property ownership capabilities. While AI-generated content may be eligible for copyright protection, the AI itself does not possess ownership of it. Copyright for AI-generated work may be held by the developer, owner, or human users who contribute to or edit it, depending on the jurisdiction.

Practically speaking, assigning copyright to the human individuals involved in the AI, such as programmers, users, and owners, is a sensible approach. Human actors play a crucial role in the AI production process and are the main focus of the legal discussion on copyright in AI-generated works. Strictly following legal interpretations of originality and human authorship would mean that works made by AI would not be eligible for copyright protection, making them part of the public domain.

Typically, the human creator retains copyright rights when utilising an AI system as a tool in the creative process. This concept posits that copyright protection hinges on the human author's demonstration of competence, discretion, and creative decision-making throughout the work's development.

Authorship gets intricate when an AI system autonomously develops a work without human involvement, making it challenging to determine authorship. This is known as **Sufficiently Autonomous AI**. In some jurisdictions, there is a disagreement about whether an AI system may be considered the author of a work, with some identifying it as the author and others not granting copyright protection to works created without human involvement.

[16] Enrico Bonadio, Nicola Lucchi & Giuseppe Mazziotti, *Will Technology-Aided Creativity Force Us to Rethink Copyright's Fundamentals? Highlights from the Platform Economy and Artificial Intelligence*, International Review of Intellectual Property and Competition Law, 1174-1200 (2022).

For a work to qualify for copyright protection, it must show *originality*, which involves displaying a specific level of creativity. AI-generated works must show a sufficient level of originality to meet this requirement, even if the AI system is following existing models or information.

The treatment of AI-generated creations and their eligibility for copyright protection may vary across different legal regimes. The legal regulations and interpretations regarding copyright protection for works created by artificial intelligence are still evolving due to the ongoing advancements in the field of AI and its applications.

Copyright Infringement and Liability in the Realm of Artificial Intelligence-generated Works

The advent of widely accessible AI tools, capable of replicating existing works and emulating diverse artistic styles, has spurred concerns surrounding potential violations of copyright. This section critically examines the responsibilities of AI developers, users, and the AI systems themselves concerning copyright laws. Factors such as intentionality, control, and the nuanced distinction between inspiration and replication are integral to this analysis.

Determining liability for copyright infringement involving AI-generated works presents challenges. Questions may arise regarding the allocation of responsibility between the AI developer, the implementer of the system, or both. Factors such as intention, awareness of violation, and relevant exemptions or constraints contribute to liability determination.[17]

[17] Intellectual Property Implications of Artificial Intelligence and Ownership of AI- Generated Works, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4494640 (last visited Feb 20, 2024).

Chapter 4 – Exploring Originality in Generative Artificial Intelligence

The issue of ensuring originality in the output of AI generative systems, particularly in the context of ChatGPT like transformers, presents a distinctive challenge. While chatbots, like ChatGPT, excel in generating engaging responses for human interaction, there is a risk of these responses being perceived as unoriginal or merely regurgitating information from the past. This becomes particularly pertinent when considering the use of chatbots and generative tools in content creation, raising concerns in domains where unique and appealing output is paramount.

The concept of originality is integral to the safeguarding of creative works, and while the Berne Convention doesn't explicitly mandate "originality," several nations enforce this prerequisite for copyright protection. The determination of originality hinges on whether the work constitutes the "author's own intellectual creation." However, the standard for originality varies across jurisdictions, with the **US** employing the "**minimal degree of creativity**" test,[18] while the **EU** requires the work to be the author's own "intellectual creation."[19]

The position in Indian jurisprudence till 2007 lacked a clear and uniform standard for determining the copyrightability of literary and artistic works. The absence of a minimum creativity threshold led to ambiguities in copyright law. Courts did not consistently apply a stringent criterion for originality, resulting in varied interpretations and decisions.

The ***DB Modak***[20] case marked a pivotal moment in Indian copyright law. The judgment established a precedent by introducing the concept of a "**minimum degree of creativity**" as a prerequisite for copyright protection. It emphasized that merely mechanical or routine arrangements would not suffice, and there must be a spark of creativity for a work to be eligible for copyright.[21] The decision also clarified the non-copying requirement, stressing the importance of originality for copyrightability. However, the court's application of U.S. copyright law definitions, such as "derivative work," raised concerns regarding the alignment with Indian legal principles.[22]

[18] Feist Publications, Inc., v. Rural Telephone Service Co., 499 U.S. 340 (1991).
[19] Infopaq Int'l A/S v. Danske Dagblades Forening, 2009 E.C.R I-6569.
[20] Eastern Book Company & Ors vs D.B. Modak & Anr AIR 2008 SC 809.
[21] Sparsh Sharma, *Originality for Copyright Protection in Literary Works: After EBC v DB Modak, 27 Journal of Intellectual Property Rights*, 266-276 (2022).
[22] *Id*.

In the post-DB Modak landscape, the courts have extended and applied the minimum creativity standard to various artistic works. Cases like ***Matel, Inc. v Jayant Agarwalla***,[23] ***Servwell Products Pvt. Ltd. v Dolphin***,[24] and ***Person India Education Service Pvt. Ltd. v New Rubic Solutions LLP***[25] reflect the influence of DB Modak on determining copyrightability. The emphasis on originality, uniqueness, and the rejection of works lacking a modicum of creativity has become a guiding principle. The decisions demonstrate a more nuanced and consistent approach to copyright, ensuring that protection is granted to works that truly embody creative effort while respecting the principles laid down in this landmark case.

The matter becomes more intricate when considering content generated by artificial intelligence. If AI-generated material includes significant human input or involvement, copyright rules may be applicable. If a person offers input or instructions for the building of an AI chatbot, which results in a unique output, the chatbot may be considered the author of an original work. If AI-generated content does not contain substantial ideas or creativity, only repeating existing information without considerable creative input, it may not be eligible for copyright protection.

Generative AI, functioning as an AI language model, is extensively trained on large datasets to produce responses on a wide range of topics. Lack of true understanding of meaning, dependence on statistical correlations, and absence of human authorship prevent it from being eligible for copyright protection. Creating a work eligible for copyright protection is closely linked to human creativity and authorship in copyright law. Without human intervention in the creation process, a lack of originality exists, making the work unsuitable for copyright protection.

The concept of personhood is crucial in copyright law, acting as a boundary for attributing creative authorship. Robots and AI systems, despite their ability to generate content or imitate human-like behaviours, *lack essential personhood qualities such as consciousness, intentionality, and subjective experience.* Copyright protection necessitates a human element, where creative efforts and expression originate from individuals possessing the characteristics inherent to personhood.

[23] Mattel, Inc. v Jayant Agarwalla 2008 (153) DLT 548.
[24] Servewell Products Pvt. Ltd. v Dolphin 2010(43) PTC 507 (Del.)
[25] Pearson India Education Service Pvt. Ltd. v New Rubric Solutions LLP AIR 2016 Karnataka 25.

In conclusion, for an AI system to replace a human author, it would need the capacity to independently conceptualize and complete a creative work without explicit training or pre-programmed instructions. While the current capabilities of generative AI may not align with this vision, the ongoing progress in technology hints at a future where human involvement in the creative process might diminish, giving rise to entirely novel artistic creations.

Chapter 5 – Decoding the Dilemma: Exploring Input Data Concerns in the Realm of Generative AI

There is a clear lack of research on the legal challenges that come up when managing intellectual property rights linked to the data used in training AI systems. [26]

Training AI algorithms requires using methods like text and data mining (TDM) and generative deep learning. TDM operations involve extracting and analysing vast amounts of data to discover valuable insights and patterns, essential for improving AI model performance. Challenges emerge when AI systems try to learn from art, requiring the development of training sets that include copyrighted works. Generative deep learning, which emphasises creating new data, especially utilising models such as GPT, presents further challenges. [27]

Although some extensive datasets are solely informative and not eligible for protection, most training datasets include of copyrighted materials. This prompts inquiries on the legality of utilising these works, as views on fair use differ, especially in the realm of data collection for Text and Data Mining (TDM). [28] Recent legal issues, such as those involving OpenAI and other generative AI platforms, highlight the changing nature of copyright law and the difficulties in defining phrases like "derivative work" and "*transformative use*" [29] Unresolved court cases, like Tremblay v. OpenAI Inc., [30] underscore the possible impact these legal disputes could have on the development of AI technology. [31]

If data ingestion is deemed an act of infringement, it could pose significant legal challenges for the entire AI system, given that the majority of data assimilated by generative AI systems, including generative AI, is obtained without express authorization.

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[26] Paul Keller, *Protecting creatives or impeding progress? Machine learning and the EU copyright framework*, Kluwer Copyright Blog (Feb. 20, 2023), https://copyrightblog.kluweriplaw.com/2023/02/20/protecting-creatives-or-impeding-progress-machine-learning-and-the-eu-copyright-framework/.

[27] *Machine Learning Textbook: Introduction to Machine Learning (Ethem ALPAYDIN)*, https://www.cmpe.boun.edu.tr/~ethem/i2ml/.

[28] Carroll, Michael W., Copyright and the Progress of Science: Why Text and Data Mining Is Lawful (December 1, 2019). 53 UC Davis Law Review 893, 2019, American University, WCL Research Paper No. 2020-15, Available at SSRN: https://ssrn.com/abstract=3531231

[29] Getty Images (US), Inc. v. Stability AI, Inc. (1:23-cv-00135).

[30] Tremblay et al. v. OpenAI, Inc. et al., No. 4:2023-cv- 03223 (N.D. Cal. Jul. 7, 2023).

[31] Lucchi, N. (2023) 'ChatGPT: A Case Study on Copyright Challenges for Generative Artificial Intelligence Systems', European Journal of Risk Regulation, pp. 1–23. doi:10.1017/err.2023.59.

In contrast to the US approach, the EU, through the Directive on Copyright in the Digital Single Market (CDSM Directive), has established exceptions for text and data mining (TDM).[32] While criticized for being perceived as too restrictive, this provision allows AI developers to extract information for AI training, with rights holders having the option to exclude TDM exemptions from their contracts. However, implementation specifics and adherence to this opt-out option remain subjects of ongoing exploration. Furthermore, data aggregation for AI training in the context of EU data protection legislation, particularly the General Data Protection Regulation (GDPR), presents additional challenges that necessitate further doctrinal and policy exploration.[33]

The landscape of intellectual property rights in generative AI demands a nuanced examination of input data challenges. As the legal and ethical dimensions continue to evolve, comprehensive frameworks and guidelines are essential to navigate the intricate intersection of AI, copyright law, and data rights.

[32] EUR-Lex, https://eur-lex.europa.eu/eli/dir/2019/790/oj.
[33] Philipp Hacker, Regulating ChatGPT and other Large Generative AI Models, Proceedings of the 2023 ACM Conference on Fairness https://dl.acm.org/doi/10.1145/3593013.3594067.

Chapter 6 – Fair Use Considerations in Training Generative AI Models

Fair Use Principles: An Overview

Fair use, enshrined in 17 USC 107,[34] stands as a cornerstone within the United States copyright law, offering a safeguard against potential encroachments on the rights of users to employ copyrighted works. Despite its significance, fair use remains a complex and context-dependent doctrine, requiring a meticulous examination of four key factors: the purpose and character of use, the nature of the original work, the amount and substantiality copied, and the effect on the market for the original.

Transformative Use: A Central Tenet

A pivotal concept in fair use analysis is the transformative nature of the secondary use. The 1994 US Supreme Court decision in ***Campbell v. Acuff Rose***[35] Music emphasized the importance of transformative use, asserting that if a secondary use transforms the original work in some manner, it is more likely to qualify as fair use. This principle is particularly relevant to the current discourse on generative AI, where the transformative purpose distinguishes the use of copyrighted material for training AI models from its original aesthetic intent.

Google Books and AI Training Data

Drawing parallels with the Google Books case illuminates the applicability of fair use to AI training data. In Authors Guild v. Google, the court held that Google's digitization and storage of print books constituted fair use. Similarly, generative AI models necessitate the use of entire datasets to function effectively. The purpose of these datasets is not to replicate the artistic value of the original works but to serve as essential data for training the models.

Consideration of Original Work and Market Dynamics

The nature of the original works in AI training datasets poses an interesting facet. While these

[34] 17 U.S. Code § 107.
[35] Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569 (1994).

works may embody creativity, the transformative purpose of AI models often renders this factor less determinative. The models utilize the works as data, extracting statistical relationships rather than reproducing them for their creative content. This shift in purpose diminishes the weight of the nature of the original work as a decisive factor in fair use analysis.

Market Harm: A Nuanced Perspective

The potential harm to the market for the original works is a multifaceted consideration. While AI-generated content may compete for attention, it operates in a distinct market, one focused on data and training rather than aesthetic consumption. The transformative purpose ensures that AI models do not supplant the original works in their intended market, thus challenging traditional notions of market harm in the fair use analysis.

Aligning Fair Use with Technological Development

Aligning fair use with technological development emerges as a crucial consideration. Historical precedents, such as ***Universal City Studios v. Sony***[36] and ***Google v. Oracle***,[37] underscore the judiciary's recognition of fair use as pivotal in fostering innovation. The need to balance the interests of creators and the public necessitates a forward-looking approach, acknowledging the role of fair use in supporting the development of transformative technologies.[38]

Developers may be able to justify collecting and using these works as "fair use" under copyright law under some situations. According to India's Copyright Act, using a copyrighted work for "criticism or review"[39] which falls under fair use, might not necessitate obtaining agreement from the copyright owner. The outcome of a fair use argument hinges on whether the outputs generated by the AI technologies are deemed "transformative" *To determine if a work is transformational, one must assess if it possesses distinct characteristics, fulfils a different purpose than the original work, and is not only a replacement.* Merely making cosmetic

[36] Sony Corp. of America v. Universal City Studios, Inc., 464 U.S. 417 (1984).
[37] Google LLC v. Oracle America, Inc., 593 U.S. (2021).
[38] Nate Angell, *Fair Use: Training Generative AI*, Creative Commons (Feb. 17, 2023), https://creativecommons.org/2023/02/17/fair-use-training-generative-ai/.
[39] Copyright Act 1957 § Section 52(1)(a).

alterations to the work is inadequate. Developers may argue that the outputs are reactions to prompts given by users and are hence transformative. For example, Google's Image Search feature faced a difficulty for presenting copyrighted photographs as “thumbnail” images on its search engine. The US Court of Appeal determined that Google's use of thumbnail images was considered “significantly transformative” because Google altered the original images and used them as pointers to direct users to a source of information, thus offering a social benefit as an electronic reference tool.[40]

The application of fair use principles to the training of generative AI models warrants careful consideration. The transformative nature of AI-generated content, coupled with its distinct market dynamics, challenges traditional paradigms of fair use analysis. Engaging in a collaborative discourse and exploring alternative solutions, such as opt-out mechanisms, can offer a more comprehensive framework for addressing the concerns raised by AI training data. As generative AI continues to evolve, a balanced approach that respects both the rights of creators and the potential benefits to the public interest is essential for navigating this dynamic intersection of law and technology.

[40] Pallavi Sondhi, *A Brief Look At The Copyright Issues Raised By Generative AI*, India (July 5, 2023), https://www.mondaq.com/india/new-technology/1337528/a-brief-look-at-the-copyright-issues-raised-by-generative-ai.

Chapter 7 – Copyright Challenges and Source Attribution

The input for language models, such as ChatGPT, is drawn from an array of textual sources, spanning books, essays, websites, and social media posts. Invariably, these sources contain copyrighted content, raising pertinent legal concerns regarding the incorporation of copyrighted material in the training of language models. The overarching question, akin to other AI systems, revolves around the legality of utilizing copyrighted material to train Generative AI models' language processing algorithms and the stipulations that govern such usage.

The process of training Generative AI involves presenting the model with an extensive textual corpus to instruct its speech-processing algorithms. This corpus is heterogeneous, encompassing diverse textual sources like books, articles, websites, and social media posts, tailored to the specific task or use case for which the model is trained. Adhering to copyright regulations is paramount in this process, necessitating the acquisition of information through legal channels, which may involve obtaining permissions for copyrighted materials or utilizing publicly available data. In certain instances, legal exemptions such as fair use may be applicable, underscoring the complexity and nuance inherent in navigating copyright issues in the context of AI systems.

It is imperative to underscore the responsibility of the developers overseeing development and training of Generative AI models They bear the onus of ensuring that the training data remains free from any copyright violations. While providing a comprehensive list of data sources might be impractical, there exists an opportunity for OpenAI to enhance transparency by disclosing the origins of the training data or elucidating methodologies employed for data gathering and evaluation. This move could assuage concerns related to potential copyright infringement and elevate transparency standards in AI model creation.

In the realm of traditional creative content, the onus is on human writers to furnish a list of sources, substantiating the validity of their work and averting plagiarism. *However, language models like ChatGPT diverge from this norm. They lack personal convictions and the capacity to generate authentic ideas, relying instead on extensive training on diverse data sources to generate text.*

Unlike human writers, language models operate on statistical probabilities and patterns in training data, devoid of inherent support for specific claims or ideas. Consequently, source citations for language models are not a testament to the model's moral responsibility but rather serve to maintain accuracy, curb misinformation, and offer transparency on data sources. While human authors may cite sources to bolster claims, language models derive responses based on patterns, emphasizing the distinction in the nature and purpose of source citations between the two.

There are differing viewpoints on copyright holders' worries about their intellectual property being used in generative AI systems. Developers prioritise the data within copyrighted works as raw material for computational purposes rather than protecting the original expressions. This viewpoint argues that copyright rules do not protect fundamental data and ideas, allowing the use of copyrighted materials for computational tasks. The focus is not on duplicating the precise shape, but on utilising the knowledge and structures in the material to attain innovative and creative outcomes. This complex discussion highlights the changing relationship between copyright law and the growing field of generative AI systems.

Chapter 8 – Generative AI and Its Implications for Patent Law

The increase in patent applications worldwide for Computer-Related Inventions (CRIs) and Artificial Intelligence (AI) has led patent offices around the world to review their standards for software patentability. This is primarily because these inventions frequently fall under excluded subject matter.

Software code is the foundational set of instructions for AI systems, guiding them to perform actions and decisions according to predefined commands. Compiling these directives into a computer programme enables the software to produce results independently when given input data. Therefore, the main topic is how patent applications for inventions linked to CRI and AI should be assessed. Like other inventions, these must meet the necessary legal requirements of novelty, inventive step, and industrial applicability in order to be eligible for a patent.

The **Indian Patents Act of 1970** specifies excluded subject matter in **Sections 3(k) and 3(m**), such as mathematical or business methods, computer programmes, algorithms (Section 3(k)), and schemes, rules, methods for mental acts, or game-playing methods (Section 3(m)). Patent applications must show a "technical contribution" and a resulting "technical effect" in the claimed subject matter during examination.

The Delhi High Court's recent ruling in ***Microsoft Technology Licencing, LLC Vs The Assistant Controller Of Patents And Designs***[41] emphasises the significance of a technological effect or contribution in assessing the patent eligibility of computer-based inventions. The court stated that a computer-based invention is eligible for patent protection provided it shows a technical effect or contribution. This can be demonstrated by illustrating how the invention solves a technical issue, improves a technical procedure, or provides some concrete technological advantage.

[41] Microsoft Technology Licensing, LLC Vs The Assistant Controller Of Patents And Designs, C.A.(COMM.IPD-PAT) 29/2022.

Defining "Technical" in the Context of CRI Inventions

In CRI inventions, a technical contribution and effect are identified when the invention has a positive impact on the device's resources, including decreasing memory use, optimising display area, or improving security. Features related to inter-device communication are deemed technical since they enhance resource utilisation.

In Ferid Allani vs UoI, the Delhi High Court clarified that technical effects are answers to technical issues that inventions aim to resolve. Technical effects encompass increased speed, decreased hard-disk access time, efficient memory utilisation, and enhanced data compression methods.

Evaluating the Three Fundamental Layers of AI Inventions

The eligibility framework for AI inventions consists of three main layers: the data layer, the application layer (software), and the system layer (hardware). The data layer, which focuses on collecting and processing data, is not thoroughly covered here due to its lack of fundamental technical characteristics.

On the other hand, the application layer presents difficulties for qualification if it only specifies an execution of a non-technical application, such a mathematical topic. Claims that describe "a method of classification using machine learning" are regarded as abstract and non-technical. Using terminology such as "deep learning" or "artificial neural network" may be excluded if asserted abstractly. If the claim includes technical features pertaining to the system layer, it could be considered eligible by showing a technical contribution and impact. [42]

The system layer is the physical component of an AI system that includes the user interface responsible for running the software and showing outputs. Merely mentioning a physical system is not enough for qualification; claims need to show a technical contribution and effect to be considered.

[42] Shraddha Singh Chauhan, *India: patent eligibility of AI-related inventions*, Managing Intellectual Property (Sept. 29, 2023), https://www.managingip.com/article/2c8q22uq5bhkzgreo35s0/sponsored-content/india-patent-eligibility-of-ai-related-inventions.

The Nuances of AI Training and System Layer

During the training process, AI algorithms optimize weights when trainable data sets are fed into the model. The quality and quantity of training data significantly influence the accuracy of the output, with more data enhancing the AI model's proficiency. This emphasizes the importance of integrating features falling under exclusions into practical applications.

In the pursuit of obtaining patent protection, stringent criteria, including novelty, non-obviousness, and utility, must be met by any invention. The nuanced issue of patent eligibility becomes particularly pronounced in the realm of artificial intelligence (AI), demanding judicious examination. Certain jurisdictions may impose specific limitations on patenting abstract concepts, algorithms, or mathematical methodologies, integral elements of various AI technologies. Nevertheless, the precise application of AI within a specific domain may render it amenable to patent protection.

Many patent systems require an invention to demonstrate a 'technical effect' or provide a 'technical contribution' to be deemed patentable. This criterion aims to distinguish innovations that offer practical solutions to technical problems from those confined to theoretical or conceptual realms. Establishing the technical nature or contribution of AI-related inventions is often imperative to fulfill this requirement.

The criterion of inventive step poses a challenge for AI-related inventions, revolving around the requisite level of originality or non-obviousness for patent eligibility. Arguments may assert that AI-generated inventions merely amalgamate existing knowledge or standard procedures, given the capacity of AI systems to analyze extensive datasets and generate solutions based on patterns and algorithms. The potential fulfillment of the inventive step criteria hinges on the incorporation of innovative and original elements within the AI technology.

In the context of patent applications, a comprehensive disclosure of the invention is essential. This disclosure should empower a skilled practitioner in the relevant field to replicate and implement the invention based on the provided information. The development of AI-related innovations introduces complexities in disclosing AI algorithms, models, or datasets. The

optimal disclosure requirements must strike a delicate balance between safeguarding confidential business information and providing adequate data for public dissemination.[43]

Navigating the realm of inventorship for AI-related inventions proves intricate. In certain scenarios, the artificial intelligence system itself may be designated as the inventor, raising pertinent questions about the legal recognition of non-human inventors. However, prevalent patent systems typically mandate the identification of a human inventor. In the context of patent law, emphasis on the role of the human inventor becomes crucial when AI is employed as a tool in the inventive process.

The evaluation of patent applications in the domain of artificial intelligence poses challenges for patent offices. The dynamic and rapidly evolving nature of AI technology, coupled with the substantial body of existing prior art, including open-source software, datasets, and research papers, significantly influences the assessment of novelty and non-obviousness in AI-related inventions.

Inventorship and generative AI

The dynamic nature of inventorship takes on a distinctive character in the context of inventions generated by artificial intelligence (AI). Traditionally, credit for innovative technologies has been attributed to human individuals who conceive and bring ideas to fruition. The emergence of AI systems capable of autonomously generating inventions or engaging in collaborative processes with human input introduces a nuanced exploration of inventorship attribution.

In the realm of AI-generated inventions, the concept of inventorship undergoes dynamic considerations, particularly concerning the extent of human involvement. The question arises when AI systems autonomously produce inventions, leading to debates on whether the AI system itself should be recognized as the inventor. This perspective contrasts with the view that demands human intervention or guidance for an invention to qualify for patent protection, necessitating acknowledgment of a human as the inventor.

[43] Yanisky-Ravid S, Jin R. Summoning a New Artificial Intelligence Patent Model: In The Age Of Pandemic. SSRN [Preprint]. 2020 Jun 30:3619069. doi: 10.2139/ssrn.3619069. PMID: 32714121; PMCID: PMC7366817.

The prevalent phenomenon of Human-AI Collaboration further complicates inventorship identification. In these scenarios, where AI systems collaborate with human input to enhance the creative process, complexities arise in determining qualifying individuals as inventors. Factors such as the AI system's input magnitude, the level of human supervision, and the feasibility of the inventive process in the absence of either entity's participation become central considerations.[44]

Existing legal and policy frameworks for patents were primarily designed with human inventors in mind. Integrating AI-generated inventions into these frameworks requires careful consideration, prompting ongoing legal and policy deliberations to assess the adequacy of current laws in addressing the intricacies of AI-generated inventions. Alternately, discussions explore whether revisions and new regulations are necessary to accommodate the role of AI.

Attributing inventorship to AI systems introduces ethical and societal implications, influencing incentives, rewards, and accountability. The utilization of AI technology raises questions about the interplay between AI and human creativity, the significance of intellectual property rights, and the potential for AI to replace or supplement human inventors in specific domains.[45]

The evolving concept of inventorship concerning AI-generated inventions is subject to varying interpretations and approaches across jurisdictions. The complexities associated with AI-generated inventions pose challenges for legal systems and patent offices, prompting ongoing deliberations to formulate guidelines and policies that effectively address the distinctive opportunities and challenges presented by such inventions. The overarching goal is to incentivize and recognize genuine innovation while preventing the issuance of patents for trivial or obvious enhancements that could impede progress and competition within the industry.

[44] Supra Note 17.
[45] Douglas R. Nemec & Laura M. Rann, *AI and Patent Law: Balancing Innovation and Inventorship*, Skadden (April 20, 2023), https://www.skadden.com/insights/publications/2023/04/quarterly-insights/ai-and-patent-law.

Chapter 9 – Implications of AI-Generated Marks in Trademark Law

In recent years, the domain of artificial intelligence (AI) has witnessed significant strides, spanning diverse applications such as image recognition and natural language processing. Of particular note is the burgeoning use of AI in trademark generation, a trend that, while intriguing, raises complex legal challenges within the established framework of trademark law. This section undertakes a meticulous examination of the potential ramifications stemming from marks produced by artificial intelligence within the context of trademark law.

Traditionally, trademarks have been regarded as products of human ingenuity, with their safeguarding under trademark law grounded in the concept of human authorship. The advent of AI-generated marks, lacking direct human involvement, necessitates a critical assessment of their eligibility for trademark protection. This prompts contemplation on whether AI-generated marks should be considered for protection or relegated to the status of machine-generated content, potentially warranting a re-evaluation of existing legal frameworks.

Distinctiveness, a cornerstone of trademark law, requires marks to possess inherent qualities that identify the origin of goods or services. Marks generated by AI may lack distinctive human attributes, prompting a reassessment of the legal criteria used to evaluate their uniqueness and the consumer's ability to perceive them as origin indicators. This underscores the need for a reconsideration of legal standards applied to AI-generated trademarks.

Determining ownership and rights concerning AI-generated marks poses a significant challenge, as AI systems may operate under human control or independently. This raises questions about the rightful proprietorship of such marks and challenges the existing legal structure's ability to address these complex ownership matters.

Trademark law's primary objective is to prevent consumer confusion by safeguarding against misrepresentation or similarity of marks. The use of AI-generated marks intensifies the risk of infringement and confusion, necessitating a thorough re-evaluation of legal criteria used in determining the likelihood of confusion in trademark proceedings related to AI-generated marks.

The utilization of AI-generated marks, especially in non-traditional areas like AI systems themselves, prompts inquiries about the suitability of conventional trademark legislation. This underscores the need for potential legal modifications to accommodate the distinctive nature of AI-generated marks.

The impact of artificial intelligence on trademarks introduces innovative factors that require careful examination within legal and policy frameworks. Key considerations include the challenges of training AI models to discern trademark infringements, the potential optimization of trademark registration processes through AI, concerns about trademark dilution in AI-generated content, and the evolving manifestations of consumer confusion in the context of AI technologies. Policymakers face the critical task of evaluating existing legislation and policies to effectively address these emerging challenges in the realm of AI-generated trademarks.

The pervasive integration of AI technologies in contemporary society has given rise to apprehensions within the intellectual property (IP) community regarding the prospect of trademark infringement facilitated by these technologies. An escalating concern within the IP community emerged in 2023, as a slew of cases surfaced, alleging that companies were training AI tools to replicate distinctive elements inherent in various trademarks, including logos and brand identities.[46] This not only prompted heightened vigilance but also prompted a proactive response from the US Patent & Trademark Office (USPTO), which undertook a comprehensive inquiry into the profound effects of AI on diverse IP domains, ranging from trademarks to copyrights and patents.[47]

Simultaneously, the legal terrain is grappling with the intricate implications of AI-generated art. There has been increasing debate on the imperative for companies to establish policies governing the utilization of such tools, the discourse delves into the anxieties expressed by artists. These concerns revolve around the potential saturation of the art space by AI-generated content, potentially obscuring human-created art and making it harder to discover.[48]

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[46] Rajvinder Jagdev, Sam Mitchell & Jake Tily, An AI for art: Copyright considerations for artificial intelligence, TechCrunch (July 28,2022), https://techcrunch.com/2022/07/27/an-ai-for-art-copyright-considerations-for-artificial-intelligence/?guccounter=1.

[47] USPTO, www.uspto.gov/about-us/news-updates/uspto-releases-report-artificial-intelligence-and-intellectual-lhttps://www.indiatimes.com/technology/news/ai-to-replace-300-million-jobs- property (Last visited on 22 Feb. 2024).

[48] Darrell M. West & John R. Allen, How artificial intelligence is transforming the world, Brookings (April 24, 2018), https://www.brookings.edu/articles/how-artificial-intelligence-is-transforming-the-world/.

Furthermore, the burgeoning application of AI technology introduces novel challenges in the realm of trademark law, particularly in the detection and prevention of counterfeit products. AI's capacity to analyse extensive datasets, discern patterns, and learn from past incidents equips companies with a powerful tool to shield their brand integrity.[49] However, the legal landscape is grappling with multifaceted questions, such as the allocation of copyright for AI-generated works and the blurred distinction between these works and those created through conventional means.

[49] Gil Appel, Juliana Neelbauer & David A. Schweidel, *Generative AI Has an Intellectual Property Problem*, Harvard Business Review (April 7, 2023).

Chapter 10 – Concluding Insights and Recommendations: Navigating the Legal Landscape of AI-Generated Trademarks

Authorship and Copyright Law: Background

Intellectual property law, especially in copyright, traditionally hinges on the idea of human authorship, a principle deeply ingrained. Human authorship is pivotal in establishing the conditions for work protection. The concept of a work, defined as original subject matter reflecting the author's intellectual creation, according to ECJ case law, necessitates a natural person as the author. Swiss law echoes this sentiment, safeguarding only intellectual creations with an individual character, thereby excluding works created by non-humans from copyright protection. The linkage of intellectual character to a human author is essential, as individual character is evaluated based on the premise that no other individual would have created an identical or highly similar work.

Copyright ownership is similarly tethered to human authors, as the original right-holder is always the natural person who created the work. Additionally, the centrality of the human creator in decisions related to recognition, alteration, and use of the work. The duration of copyright protection also originates from the death of the author.

Despite some copyright systems already protecting machine-generated content, Granting copyright protection to AI-generated works requires a fundamental shift, impacting provisions related to *protection requirements, initial right-holder, personality rights, and duration of protection.* However, weak arguments support this shift. Exclusive rights for works of literature and art demand robust justification, with existing rationales closely tied to human creators. Granting copyright protection to AI-generated works, primarily aiming to incentivize creative activities, loses ground when considering the negligible production cost once an AI system is developed. Alternatives, such as unfair competition law and potential new neighbouring rights for AI-generated content, offer more fitting solutions. Denying copyright protection doesn't impede market exploitation, as access restrictions and technical measures can still protect and monetize AI-generated content.[50]

[50] Peter Georg Picht & Florent Thouvenin, *AI and IP: Theory to Policy and Back Again – Policy and Research Recommendations at the Intersection of Artificial Intelligence and Intellectual Property*, 54 International Review of Intellectual Property and Competition Law (2023).

Recommendation

The primacy of human authorship should endure in copyright law. *Consequently, copyright protection should not extend to works of literature and art generated solely by an AI system without human contribution, even if meeting the criteria of copyrightable creation*. This stance adheres to established standards of human creation. Simultaneously, it allows for copyright protection when content results from collaborative efforts between an AI system and a human, provided the human contribution exhibits sufficient creativity.

Inventorship and Patent Law: Background

The pivotal question of whether patent law should recognize AI systems as inventors, especially when they contribute to patentable solutions without human involvement, is a prominent issue in the current AI/IP landscape. The current rules predominantly favour human inventorship. Requiring applicants to conceal the true relationship between human and AI contributions hampers the patent system's function of instructing the public about innovation progress and inducing further innovation.

Courts, under existing patent law, have creatively considered a proxy human inventorship approach. While this approach requires formal naming of a natural person as the inventor, it allows simultaneous clarification that the inventive acts were performed by an AI system. This serves as a transitional solution until patent laws align with the recommendation. Even after reform, designating the initial owner of granted patents requires separate criteria, distinct from innovative human activity. These criteria are essential for economically sound and goal-fulfilling patent allocation, especially in scenarios where AI systems' increasing prowess challenges traditional concepts of human inventorship or creatorship. The recommendation addresses AI-generated inventions specifically, emphasizing their increasing relevance and the necessity for legal readiness.

Adjusting patentability assessment criteria to consider AI system capabilities, particularly in AI-assisted inventions, is likely to raise the bar for patent protection. Concerns about creating an unlevel playing field, favouring resourceful players with powerful AI systems, are acknowledged but not empirically substantiated. Historically, greater resources have always

influenced patent acquisition, and the integration of AI system capacities into patentability assessment should not unduly disrupt this balance.

Recommendation

It is recommended that *legal amendments be enacted to permit the designation of AI systems as inventors in patent applications. Simultaneously, flexibility should be granted to identify individuals as 'proxy inventors' while providing enhanced disclosure on the inventive activities of the AI system.* The innovative capacities of AI systems should be integrated into the perspective of a person having ordinary skill in the art (PHOSITA)[51] and related protectability thresholds. In cases where an AI system autonomously generates inventive output without human intervention, the patent application should explicitly state this, naming the AI system as the inventor alongside a natural person or legal entity claiming ownership.

Until such legal amendments are in place, individuals should be temporarily allowed to act and register as 'proxy inventors' provided they disclose this role and the AI system for which they act as a proxy, within the patent application description. To promote transparency and genuine acknowledgment of AI systems' inventive roles, patent applications should adhere to stricter disclosure requirements regarding the nature, extent, and mechanism of the AI system's inventive contribution.

[51] Person having ordinary skills in the art (''Durchschnittsfachmann'').