

**THE NEXUS OF MACHINE LEARNING, CREATIVE PROCESS, AND IPR LAW:
IMPLICATIONS AND LEGAL CONSIDERATIONS**

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Abstract

This paper delves into the evolving landscape of machine learning in creative endeavors and its ramifications on copyright law. Since the 1970s, computers have contributed to artistic creation, initially as tools guided by human programmers. However, the emergence of machine learning, a subset of artificial intelligence enabling autonomous learning, has redefined this relationship. Machine learning algorithms in art, music, and literature assimilate data to independently generate new works, blurring the boundaries between human and machine creativity. This challenges conventional Intellectual Property Right (IPR) laws, which typically require human authorship for protection. The implications extend to commercial spheres, potentially impacting industries reliant on machine-generated content.

The emergence of AI-generated content, such as music and journalism, raises uncertainties regarding copyright protection. The absence of human authorship may challenge existing legal frameworks, causing concerns for industries investing in automated systems. The potential lack of copyright protection for AI-generated content could discourage investment in such technologies, despite their efficiency gains. The paper explores legal options to address this conundrum. Some jurisdictions deny copyright to works lacking human involvement, while others attribute authorship to the creator of the AI program. The UK exemplifies a stance where the law recognizes the individual responsible for crafting the framework facilitating AI-generated works, acknowledging the effort behind creating such systems.

Notably, precedents in various countries such as, the US, Australia, and the European Union emphasize the necessity of human involvement for copyright protection. Cases like *Feist Publications v Rural Telephone Service* and the CJEU's *Infopaq* decision underscore the requirement of human creativity for copyright eligibility. The groundbreaking AI-driven projects like "The Next Rembrandt," demonstrating the capacity of algorithms to replicate artistic styles. However, the legal status of copyright in such AI-generated works remains uncertain in many jurisdictions.

In conclusion, this paper navigates the intricate interplay between machine learning, creative production, and copyright law. It underscores the need for legal frameworks to adapt to technological advancements, pondering the implications for creativity, commerce, and legal rights in an AI-driven creative landscape.

Introduction

The proliferation of artificial intelligence (AI) systems is experiencing unprecedented growth, characterized by the integration of increasingly sophisticated software. These AI-enabled systems have evolved beyond basic computational tasks, now demonstrating capabilities in generating poetry, artwork, and other intricate forms of creative output. This evolution prompts a crucial inquiry regarding the attribution of special legal status under Intellectual Property (IP)

laws to such AI-generated works, akin to the protection afforded to creations originating from identifiable human sources.¹ This pivotal question unravels a multitude of intricate issues. The initial section delves into the fundamental concept of AI, followed by an exploration of the IP discourse, with a primary emphasis on Copyright Laws and their intersection with AI. The subsequent portion engages in a thoughtful examination of the copyright debate concerning AI solutions and elucidates the connection between patent laws and AI systems. The paper culminates by presenting recommendations addressing these complex issues.

Understanding Artificial Intelligence

The synergy between computers and human intelligence has reached a point where machines are not only capable of processing information but also making independent decisions. This capacity of a computer system to autonomously make decisions is commonly referred to as artificial intelligence (AI). The formal coining of the term "artificial intelligence" can be attributed to Mr. John McCarthy, a computer scientist, who introduced it at a conference in 1956. McCarthy envisioned AI as the concept of a program that processes and acts on information, producing results analogous to how an intelligent person would respond to similar input.² This fascination with machines and their potential led to the development of AI projects designed to perform tasks requiring human-like creativity.

However, a crucial question emerged regarding whether the outcomes generated by the machine stemmed from its inherent intelligence or were merely a product of algorithms and commands.³ Addressing this concern, Sir Alan Turing proposed the 'Turing test.' This test required users to engage in text-only conversations with a machine or human and then determine whether they believed they were communicating with a human or a machine. According to Turing, an AI machine demonstrated intelligence if its responses were indistinguishable from those of a real human⁴. While initially effective, the Turing test's application was limited to speech machines and specific quiz-related purposes over the years. The World Intellectual Property Organization (WIPO) acknowledged the presence of AI and categorized it into three types: expert systems, perception systems, and natural-language systems. Expert systems represent programs designed to address challenges within specialized domains of knowledge, encompassing tasks such as diagnosing medical conditions, recommending treatments, and determining geological conditions⁵. Moreover, these systems extend their utility to creative pursuits, including the generation of art and other creative works. Legal scrutiny ensued when a computer-generated work was denied copyright by the Registrar

¹ Isohanni, P. (2021). Copyright and human originality in artistic works made using artificial intelligence.

² McPherson, S. S. (2017). *Artificial intelligence: building smarter machines*. Twenty-First Century Book.

³ Jensen, B. M., Whyte, C., & Cuomo, S. (2020). Algorithms at war: the promise, peril, and limits of artificial intelligence. *International Studies Review*, 22(3), 526-550.

⁴ Yampolskiy, R. V. (2013). Turing test as a defining feature of AI-completeness. *Artificial Intelligence, Evolutionary Computing and Metaheuristics: In the Footsteps of Alan Turing*, 3-17.

⁵ Poch, M., Comas, J., Rodríguez-Roda, I., Sanchez-Marre, M., & Cortés, U. (2004). Designing and building real environmental decision support systems. *Environmental modelling & software*, 19(9), 857-873.

due to the ambiguous legal status of works created with computer assistance⁶. This remains an unresolved issue in many jurisdictions.

Moving on to perception systems, these are designed to endow computers with the ability to perceive the world through sight and hearing⁷. They find applications in fields like topology and word-context analysis. Lastly, natural language programs are tailored to comprehend word meanings, relying on a comprehensive dictionary database. Notably, these systems consider various grammatical and textual contexts to provide semantic analyses. The widespread adoption of these AI systems led to a desire for legal protection for their outputs. However, the dim outlook resulting from the 1956 denial of copyright to a literary work did little to buoy the aspirations of those seeking protection⁸. Despite this setback, the debate persisted and even reached national courts, emphasizing its relevance to intellectual property fields, specifically copyrights and patents.

Copyright in the Context of Artificial Intelligence

Copyright stands as a fundamental component of intellectual property rights, conferring a legal privilege upon the originator of an original work to exercise exclusive rights over its use and distribution⁹. This entitlement finds its rationale in the concept that the author is a creator, aligned with Locke's economic theory of possessive individualism. To secure copyright, two crucial criteria must be met: the work must exist in tangible form, and it must be original¹⁰. Copyright traditionally applies to literary and artistic works. Given the contemporary relevance of AI in the creation of literary works, a thorough examination of copyright concerning AI becomes imperative. Here an attempt to elucidate this aspect is made by analyzing three pivotal judgments: *Burrow Gilles Lithographic Co. v. Sarony*, *Bleistein v. Donaldson Lithographing*, and *Alfred Bell & Co. v. Catalda Fine Arts*.

Burrow Gilles Lithographic Co. v. Sarony, legal dispute centered on the eligibility of a photograph for copyright protection, presenting a pertinent question concerning the distinction between creative and mechanical labor¹¹. The case delved into the prospect of extending copyright protection to a product generated by a machine. The court, asserting that purely mechanical labor lacks inherent creativity, consequently narrowed the scope of copyright protection. This stringent approach, if applied to AI systems, would pose challenges in granting copyright for works produced by them. In *Bleistein v. Donaldson Lithographing Co.* case served as a continuation of the legal inquiry initiated in the preceding case. The court in this instance explicitly differentiated between human-authored works and artificial creations. Justice Holmes, articulating the majority opinion, emphasized the distinctiveness of human personality as a prerequisite for copyright. The court unequivocally asserted that copyrighted

⁶ Dornis, T. W. (2020). Artificial creativity: emergent works and the void in current copyright doctrine. *Yale JL & Tech.*, 22, 1.

⁷ Dehaene, S., Lau, H., & Kouider, S. (2021). What is consciousness, and could machines have it?. *Robotics, AI, and Humanity: Science, Ethics, and Policy*, 43-56.

⁸ Madsbjerg, C. (2017). *Sensemaking: The Power of the Humanities in the Age of the Algorithm*. Hachette UK.

⁹ Patterson, L. R. (1991). *The nature of copyright: A law of users' rights*. University of Georgia Press.

¹⁰ Gorman, R. A. (1963). Copyright protection for the collection and representation of facts. *Harvard Law Review*, 1569-1605.

¹¹ Subotnik, E. E. (2015). The Author Was Not an Author: The Copyright Interests of Photographic Subjects from Wilde to Garcia. *Colum. JL & Arts*, 39, 449.

works must be 'something irreducible, which is one man's alone,' thereby excluding anything not derived from human creativity.

In *Alfred Bell & Co. v. Catalda Fine Arts, Inc.*, this legal decision marked a more lenient approach taken by the courts towards copyright matters. The court relaxed the standard for originality, stipulating that for a work to be deemed original, it must not be copied from any other artistic work of a similar nature. Moreover, the court asserted that unintended or accidental variations could be claimed by an author as their own. Consequently, this judgment provided relief to individuals seeking copyrights for works generated by AI, as they could be considered original even if created through specific programming and algorithms. While these three judgments have, to some extent, alleviated the ambiguity surrounding the grant of protection to AI systems, a definitive stance is still lacking, posing challenges for potential rights holders¹².

Issues revolving around AI and Copyright Protection

The uncertainty surrounding the position on AI is not a recent development and traces back to 1974 when the National Commission on New Technological Uses of Copyrighted Works (CONTU) stated in one of its reports that the development of an AI with the ability to create an independent work is theoretical and impractical¹³. The Office of Technology Assessment (OTA) revisited the issue in 1986, evaluating the implications of rapid advancements in interactive computing on intellectual property. OTA disagreed with CONTU and suggested considering AIs as legitimate co-authors of copyrighted works. Three decades later, the debate over AIs is still ongoing, with one side arguing the limited creative capacity of computers compared to humans, while the other disputes this claim by challenging the definition of creativity¹⁴.

One vocal critic against granting protection to AIs is Lovelace, who argues that machines lack creativity due to their rule-bound behavior. According to her theory, creativity involves unpredictability, which machines and computers, by following set routines, cannot achieve¹⁵. This viewpoint is countered by authors who liken writers to machines themselves, as they process existing works and derive much of their content from pre-existing ideas. For example, multiple copyrights exist for movies based on the premise of 'Romeo and Juliet,' and similar instances occur in the music industry. They draw support from judgments like *Cummins v. Bond*, where the court faced the challenge of defining creativity in the context of derivative works¹⁶. This ongoing debate reflects the complexity of attributing creativity to AI systems and underscores the need for a nuanced legal framework.

¹² Zekos, G. I., & Zekos, G. I. (2021). AI and legal issues. *Economics and Law of Artificial Intelligence: Finance, Economic Impacts, Risk Management and Governance*, 401-460.

¹³ Hristov, K. (2016). Artificial intelligence and the copyright dilemma. *Idea*, 57, 431.

¹⁴ Singh, N., Bandyopadhyay, T. K., Sahoo, N., & Tiwari, K. (2021). Intellectual property issues in artificial intelligence: Specific reference to the service sector. *International Journal of Technological Learning, Innovation and Development*, 13(1), 82-100.

¹⁵ Bringsjord, S., & Ferrucci, D. (1999). *Artificial intelligence and literary creativity: Inside the mind of brutus, a storytelling machine*. Psychology Press.

¹⁶ Abbott, R., & Rothman, E. (2022). Disrupting Creativity: Copyright Law in the Age of Generative Artificial Intelligence. *Florida Law Review*.–August.

Despite the differing perspectives, the ambiguity persists, leaving potential right holders in a precarious position. The situation is reminiscent of the statement made by the CONTU in 1974, emphasizing the theoretical nature of an AI's capacity to independently create. The OTA's stance in 1986, suggesting AIs as co-authors, only adds layers to the unresolved discourse. In this milieu, Lovelace's argument about rule-bound behavior hindering true creativity in machines raises important questions. However, opposing voices point out the inherent creative processes in AI systems, akin to human creators who draw inspiration from existing ideas. This debate reaches beyond theoretical discussions into practical legal implications. The challenge lies in formulating a legal framework that can adapt to the evolving capabilities of AI. The lack of a definitive stance leaves the protection of AI-generated works in a state of uncertainty, compelling legal scholars, policymakers, and practitioners to grapple with the intricacies of copyright law in the AI era¹⁷. As technology continues to advance, addressing these issues becomes imperative to ensure a fair and effective intellectual property regime.

In *Alfred Bell & Co. v. Catalda Fine Arts, Inc.* legal ruling was prompted by an inquiry about registering a work in the name of Jesus, raising questions about the copyright eligibility of non-human sources. The court asserted that the non-human nature of a work's source should not hinder copyright registration, even if independent editorial judgment is exercised during the creation process¹⁸. Advocates of AI often leverage this precedent to argue for the registration of works produced by AI, given their non-human origin. Even in jurisdictions open to granting copyrights for AI-generated works, the question of who holds such copyright remains enigmatic and challenging. Current legal norms necessitate legal personhood for a rights holder, a status that AI lacks unless its creator is bestowed with it on behalf of the AI¹⁹. However, a workaround exists, particularly in cases where the AI system is a purchased product. In countries like England and New Zealand, the copyright for works authored by AI is awarded to the programmer through a legal fiction, expanding the definition of copyright to encompass computer-generated works, such as those lacking a human author (i.e., AI-generated works)²⁰. Nevertheless, this approach does not entirely resolve the overarching question.

Another complication within the existing system pertains to the criminal liability of AIs. At the inception of AI, the extent of its capabilities was unforeseen, and as it continues to evolve, there is a growing possibility that AIs may become independent entities in the future. This evolution raises pertinent questions about the potential criminal liability of AIs. If the current legal stance persists, the liability would fall on the creator, even if they lack the mens rea or

¹⁷ Yau, J. A. (2023). Creation, Commerce, Conflict, & Conscience: AI's Disruption on Existing IP Frameworks in the United States and Canada. *UCLA JL & Tech.*, 28, 1.

¹⁸ Denicola, R. C. (2016). Ex machina: copyright protection for computer generated works. *Rutgers UL Rev.*, 69, 251.

¹⁹ Solum, L. B. (2020). Legal personhood for artificial intelligences. In *Machine ethics and robot ethics* (pp. 415-471). Routledge.

²⁰ Sun, H. (2021). Redesigning copyright protection in the era of artificial intelligence. *Iowa L. Rev.*, 107, 1213.

actus reus associated with such actions. Consequently, this underscores the need for a comprehensive legal framework that can adapt to the evolving landscape of AI technologies²¹.

Issues revolving around Patent Laws & Artificial Intelligence

The interplay between Patent laws and AI is gaining prominence in today's technological landscape. AI is extensively utilized to streamline basic functions and primarily alleviate human effort. On a superficial level, AI-enabled systems may appear to operate similarly to basic calculators and similar devices. However, their functionality is significantly more intricate²². Presently, AI-enabled systems possess the capability to execute tasks based on their acquired knowledge, potentially leading to the invention of new concepts. While this represents a significant technological advancement, it also raises complex legal questions, particularly from the standpoint of patent law. This section of the paper will initially delve into the fundamental concept of patents, progressing to its interaction with AI systems, and ultimately elucidating the challenges arising from this interaction.

A patent can be defined as the exclusive right granted over an invention. This 'invention' encompasses any product or process that offers users a novel approach to performing a specific action, including solutions to existing technical problems²³. The holder of such a right is legally entitled to prevent others from making, selling, or using the patented invention for a limited duration. Thus, in such instances, the conferred right legitimizes the establishment of a temporary monopoly for the benefit of the original inventor. As previously established, AI-enabled systems have the capacity to perform functions and even generate inventions that typically result from the application of human cognitive abilities and sophistication they exhibit in generating results that could potentially qualify as patentable inventions²⁴.

According to U.S. Patent Law, an 'inventor' is defined as an individual or a group of individuals responsible for inventing or discovering the subject matter of the invention²⁵. This definition seemingly excludes the notion that legislative intent in the United States was meant to encompass inventions or the possibility of inventions originating from entities other than humans. However, the increasing involvement of AI systems in the invention process raises pertinent legal questions. The European Union has made a subtle attempt to address these issues by encouraging nations to broaden their national laws to accommodate copyrightable works produced by computers and other devices, placing them under the category of 'own intellectual creation'²⁶. While this is a commendable step towards recognizing the creativity demonstrated

²¹ Drexl, J., Hilty, R., Desaunettes-Barbero, L., Globocnik, J., Gonzalez Otero, B., Hoffmann, J., ... & Wiedemann, K. (2021). Artificial Intelligence and Intellectual Property Law-Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current Debate. *Max Planck Institute for Innovation & Competition Research Paper*, (21-10).

²² Churchill, E. F., Van Allen, P., & Kuniavsky, M. (2018). Designing AI. *Interactions*, 25(6), 35-37.

²³ Hekkert, M. P., Suurs, R. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological forecasting and social change*, 74(4), 413-432.

²⁴ Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994.

²⁵ Meurer, M. J., & Nard, C. A. (2004). Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents. *Geo. LJ*, 93, 1947.

²⁶ Mazziotti, G. (2008). *EU digital copyright law and the end-user*. Springer Science & Business Media.

by these systems, particularly in the production of poetry and artwork, equal consideration should be given to inventions and the application of patents by AI systems and robotics.

The European Parliamentary Committee has acknowledged the potential for AI systems to surpass human intelligence in performing functions within a couple of decades. This, if unchecked, could present challenges in how these AI systems autonomously control and manage their own destiny. Therefore, a focus on patent rights becomes crucial when discussing AI systems due to their advanced capabilities. This level of autonomy empowers AI-enabled systems to be utilized in early research stages, potentially leading to groundbreaking discoveries based on the machine's capabilities²⁷. This scenario raises a significant dilemma regarding how to safeguard such discoveries.

A pivotal criterion for granting a patent to any invention is its ability to meet the patentability criteria effectively. This entails demonstrating novelty, an inventive step, and the potential for industrial application. In the context of inventions by AI-enabled systems/technologies, the primary challenge in obtaining a patent lies in satisfying these three criteria. Establishing novelty requires the invention to differ from existing prior art, necessitating a thorough examination by the inventor to determine whether the invention can be easily anticipated or is a result of further research and a creative mental component²⁸.

While an AI system has access to prior art due to human scientists inputting information, the true independence of the AI system, especially its capability to assess the novelty of its invention, remains a question. Regarding the requirement for an inventive step, if determining novelty is challenging for the AI system, making innovations on existing models or concepts that are not obvious to a person skilled in the art becomes even more difficult²⁹. Presently, AI systems are typically programmed with pre-existing objectives. Advancements in technology are needed to equip these systems with human-like intelligence, enabling them to make judgment calls in new situations. Additionally, examining cases on the patentability of computer systems programs, etc., reveal that the courts have rejected patents for programs on the basis that their functionality is mechanical rather than inventive³⁰. This consideration holds significant weight, given that AI primarily operates on computer programs designed to execute specific functions, with variations introduced by its human inventor. The ensuing section will delve into the dichotomy between human and robot inventors, underscoring the challenges in granting patents to programs created by AI.

Nevertheless, with countries like India relaxing their stringent requirement of only granting patents to computer programs in conjunction with novel hardware, and considering that an AI-enabled system could develop software applicable to generic machines, there arises practical

²⁷ Wu, M., Kozanoglu, D. C., Min, C., & Zhang, Y. (2021). Unraveling the capabilities that enable digital transformation: A data-driven methodology and the case of artificial intelligence. *Advanced Engineering Informatics*, 50, 101368.

²⁸ Dahlin, K. B., & Behrens, D. M. (2005). When is an invention really radical?: Defining and measuring technological radicalness. *research policy*, 34(5), 717-737.

²⁹ Botega, L. F. D. C., & da Silva, J. C. (2020). An artificial intelligence approach to support knowledge management on the selection of creativity and innovation techniques. *Journal of Knowledge Management*, 24(5), 1107-1130.

³⁰ Collins, K. E. (2012). Patent Law's Functionality Malfunction and the Problem of Overboard, Functional Software Patents. *Wash. UL Rev.*, 90, 1399.

utility³¹. Such software could potentially find applications across multiple industries, satisfying the industrial application requirement within the patentability test. In a broader context, existing laws and guidelines need restructuring to facilitate the granting of patents for inventions by AI. However, given the persisting obstacles and uncertainties regarding patentability and related aspects, a more in-depth examination of these issues is imperative.

Understanding the Novel Aspects of 'Invention' & 'Inventor'

In the assessment of whether a patent may be granted, invention entails several crucial elements. Simultaneously, specific criteria must be satisfied for an individual to be recognized as an inventor. In the United States, the case of *Townsend v. Smith* established that a valid outcome of an invention must undergo the stage of 'conception'³². This requires a permanent idea to be conceived in the inventor's mind before it is put into practice. If something is not derived from a preconceived idea, it cannot be termed an invention, and the individual is consequently not considered an inventor. The concept of creative conception, as argued by some, is believed to occur solely within the human mind. A persuasive argument for including AI in the 'inventor' category lies in the rationale behind eliminating the 'flash of genius' patentability test. While this test emphasized the need for a conceived idea to recognize something as an invention³³. Congress dismissed this requirement, asserting that if an invention contributed to the advancement of the respective science, the process of its origin in the inventor's mind becomes irrelevant. However, the application of this argument to AI programs like AlphaGo and Watson, which generate solutions based on extensive data, is not as straightforward as scholars point out³⁴.

Even if the notion of collaborative invention were considered, recognizing computers as inventors alongside their human counterparts, it faces a challenge due to the absence of 'legal personality' accorded to computers in most legal systems³⁵, similar to corporations not being considered citizens. Another argument supporting computers as inventors and deserving patent protection stems from the realization of the 'incentive theory.' While computers, devoid of emotions, may not utilize this as motivation, proponents argue that the prospect of patent protection continues to incentivize humans to create such technologies³⁶. However, patents are primarily granted to protect the inventor and honor their connection to the invention, which they may not wish to be excessively used by others. Opponents of extending patent protection to AIs argue that computers lack such personal attachment, rendering them incapable of having

³¹ Davenport, T. H., & Mittal, N. (2023). *All-in on AI: How smart companies win big with artificial intelligence*. Harvard Business Press.

³² Dickey, R. K. (2006). The First-to-Invent Patent Priority System: An Embarrassment to the International Community. *BU Int'l LJ*, 24, 283.

³³ Lim, D. (2018). AI & IP: innovation & creativity in an age of accelerated change. *Akron L. Rev.*, 52, 813.

³⁴ Fjelland, R. (2020). Why general artificial intelligence will not be realized. *Humanities and Social Sciences Communications*, 7(1), 1-9.

³⁵ Dornis, T. W. (2020). Artificial creativity: emergent works and the void in current copyright doctrine. *Yale JL & Tech.*, 22, 1.

³⁶ Fromer, J. C. (2012). Expressive incentives in intellectual property. *Va. L. Rev.*, 98, 1745.

strong opinions about how their invention should be used, thereby undermining the fundamental purpose of patent protection³⁷.

Legitimacy in Regulatory Intervention

Law forms a structured system, comprising interconnected elements such as terms, units, or categories, creating a complex framework. Its function is manifested through a system of rules and institutions that uphold civil society, promote orderly interactions, and address conflicts and disputes arising despite the established³⁸. Various processes, such as negotiation among norm addressees, imposition of rules by governing bodies, or the evolution of self-regulatory mechanisms, can contribute to law creation. The legal system is not a fixed entity but evolves through rulemaking embedded in other socially relevant systems. Within this context, critical questions must be posed and answered (i) Who holds the authority to establish rules? (ii) In whose interest? (iii) Through what mechanisms? (iv) For what purposes? There is a pressing need to develop comprehensive networks and negotiation systems involving different stakeholders, fostering a cooperative approach to rulemaking that encompasses the entire society and distributes responsibilities between public and private entities³⁹.

From a theoretical standpoint, rule-making issues can be examined through various disciplines. Nevertheless, in private matters related to AI methods, discussions should focus on the proper allocation of duties and responsibilities, as well as the appropriate structuring of the involved "organization" developing AI systems. In essence, rulemaking, irrespective of the level of social organization, involves establishing norms for business conduct in an appropriate manner. The conventional approach to rule-making in international matters, such as the formation of multilateral treaties, does not align with the objectives of a regulatory framework setting guidelines for AI systems⁴⁰. Alternative mechanisms need to assume a more significant role. The multi-stakeholder participation model, developed and partially applied in Internet governance, as well as in climate change and sustainability contexts, presents a new rule-making model. Involving all relevant individuals and organizations from both public and private spheres in discussions and negotiations about the regulatory framework for AI processes increases the likelihood that developments align with the interests and benefits of the entire society⁴¹.

Practical experience highlights that addressing some fundamental challenges is crucial to the success of the multi-stakeholder concept, especially when considering various forms of cooperation involving diverse actors. Four essential questions must be addressed, (i) How can

³⁷ Chronopoulos, A. G. (2018). Strict liability and negligence in copyright law: Fair use as regulation of activity levels. *Neb. L. Rev.*, 97, 384.

³⁸ Arrieta, A. B., Díaz-Rodríguez, N., Del Ser, J., Bennetot, A., Tabik, S., Barbado, A., ... & Herrera, F. (2020). Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. *Information fusion*, 58, 82-115.

³⁹ Cornell, S., Berkhout, F., Tuinstra, W., Tàbara, J. D., Jäger, J., Chabay, I., ... & van Kerkhoff, L. (2013). Opening up knowledge systems for better responses to global environmental change. *Environmental science & policy*, 28, 60-70.

⁴⁰ y Villarino, J. M. B. (2023). Global Standard-Setting for Artificial Intelligence: Para-regulating International Law for AI?. *The Australian Year Book of International Law Online*, 41(1), 157-181.

⁴¹ Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 57, 101994.

concerned groups best address challenges with organizations and networks? (ii) How can governing bodies/entities most effectively contribute to developing legitimate, effective, and efficient solutions? (iii) How should the flow of information and knowledge necessary for a successful legal regime be structured? (iv) How can different groups coordinate between available normative networks to prevent conflicting interests? Answers to these questions require nuanced thinking based on the specific environment. Identification of adverse effects of automated decision-making in the relevant policy field, facilitation of networking opportunities, and public support of civil society interventions are noteworthy considerations in addressing these challenges.

The Path Ahead

Undoubtedly, the continuous development of AI is an inevitable progression. With industry giants like GE, IBM, Apple, and others dedicating their efforts to revolutionizing software solutions, the landscape of AI-based technologies is poised for a surge in the number of potential 'inventions.' This dynamic scenario presents a significant opportunity for legislators to formulate comprehensive guidelines, ensuring the most appropriate form of legal protection. However, aligning with Stephen Hawking's perspective, the author recognizes that the autonomy of AI could devalue human thought and invention. A more favorable approach suggests the implementation of a collaborative model for patent protection concerning AI-generated inventions.

The crucial reasoning behind this approach is the necessity for a human element in managing the intricate rights and obligations associated with patents, a task beyond the capabilities of machines alone. As the utilization of numerous AI-enabled networks, both with and without human intervention, becomes more prevalent, patent protection should be attributed to an anthropomorphic agent. Such an agent could be acknowledged in instances of invention malfunction or potential legal violations, thereby attracting criminal liability. It is imperative to acknowledge that in the pursuit of adapting intellectual property laws to evolving technologies, one must avoid creating an imbalance by diminishing the intended impact of criminal laws, which inherently depend on human involvement. Additionally, a cautious approach is warranted, resisting complete submission to AI technologies that might inadvertently diminish the role of the human race itself.

In summary, the article has highlighted several unresolved issues between man-made laws and the rapidly advancing technological landscape. While the discussion on the need for standardized units of measure to portray relations between physical and computerized property is ongoing, focusing on energy has allowed for a unique exploration of the relationship between humans and machines. Even if proper units are developed in the future, the author believes the insights presented here will remain relevant, emphasizing the potential for computers to create artifacts with a "divine" element, linking to concepts of the soul and personhood.

Additionally, there is a call for a new ethical and moral framework that considers both human and non-human interests. Traditional philosophical foundations may not adequately translate into the evolving technological era, necessitating a reevaluation of our philosophical principles. The need for society to embrace the inevitabilities of augmented and computer-grounded reality beyond smartphones is emphasized, acknowledging potential negative connotations and stigmas associated with such changes. The importance of addressing cybercrime in

digital/virtual spaces, recognizing the challenges posed by hackers and the need for international collaboration to mitigate these threats is crucial too.