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Part 1 →

Initial Response:

The development of artificial intelligence (AI) has been a fascinating journey, spanning several decades and involving countless brilliant minds and innovative ideas. It all began with the pioneering work of Alan Turing, the British mathematician, and computer scientist who laid the theoretical foundations for modern computing and AI.

In 1950, Turing published his seminal paper, "Computing Machinery and Intelligence," where he proposed the "Imitation Game," later known as the Turing Test. This test was designed to evaluate a machine's ability to exhibit intelligent behavior indistinguishable from that of a human. Turing's ideas sparked a new field of research, and his work is considered the starting point of AI as we know it today.

Over the following decades, AI research progressed in various directions, including expert systems, neural networks, and symbolic reasoning. Expert systems, developed in the 1970s and 1980s, were designed to mimic human experts in specific domains, such as medical diagnosis or financial analysis. Neural networks, inspired by the structure of the human brain, gained popularity in the 1980s and 1990s, leading to breakthroughs in areas like pattern recognition and machine learning.

However, it was the advent of deep learning, a subset of machine learning algorithms that use multiple layers of artificial neural networks, that propelled AI to new heights in the early 21st century. Deep learning techniques, combined with the availability of vast amounts of data and increased computational power, enabled significant advances in areas like computer vision, natural language processing (NLP), and speech recognition.

One of the most remarkable developments in the field of NLP has been the emergence of large language models (LLMs). These models are trained on vast amounts of textual data, allowing them to understand and generate human-like language. The first major breakthrough in this area came with the introduction of the Transformer architecture by Google in 2017, which revolutionized the way language models were built and trained.

Since then, there has been a rapid evolution of LLMs, with models like GPT (Generative Pre-trained Transformer) by OpenAI, BERT (Bidirectional Encoder Representations from

Transformers) by Google, and more recently, ChatGPT and Claude by Anthropic, pushing the boundaries of what is possible with language generation and understanding.

These large language model chatbots, like myself, are capable of engaging in human-like conversations, answering questions, providing analysis, and even assisting with tasks like coding and writing. While we are not sentient beings and our capabilities have limitations, we represent a significant milestone in the development of AI, demonstrating the ability to process and generate natural language at an unprecedented level.

Looking ahead, the future of AI is filled with both exciting possibilities and potential challenges. As AI systems become more advanced and capable, questions around ethical considerations, transparency, and societal impact will need to be addressed. However, the foundations laid by pioneers like Turing and the rapid progress in fields like deep learning and natural language processing give us hope that AI will continue to evolve and bring about transformative changes in various domains, from healthcare and education to science and beyond.

Part 2 →**Step-by-Step Description of How I Improved the Paper:**

To begin, I first inputted the general prompt into Anthropic's Claude AI. In deciding which AI platform to begin the writing process, I first thought back to my prior experiences with different AI services. Initially, I knew I was not going to use Open AI's Chat GPT because I have had some pretty traumatic experiences. Known to hallucinate unknown characters when asked to summarize classic novels, refuse to reach requested word counts, and deny all responsibility for such errors, Chat GPT was not going to be my AI of choice. After receiving my first output (above in Part 1), I decided to ask Claude AI to expand on the first answer and use it as the basis for a longer essay. Additionally, at this point, I wanted to add some focus to my paper. After thinking back on our class lectures, I decided I wanted to incorporate the perspective of how intellectual properties laws will be challenged by the rise of artificial intelligence (AI).

Specifically, To this, I inputted: `Expanding on this essay as the basis for a larger essay that should be about 1,500 words, can you add a focus on intellectual property laws and how they will be complicated with the rise of AI? To this, I received an output that was 958 words, far from what I requested. As an issue I have been noticing across multiple AI platforms, the outputs often are not the word count that I explicitly requested. Next, I decided to address the formatting of the paragraphs. In this, I realized that the paragraphs appeared much smaller and fragmented than they would be with my style of writing. As a result, I inputted: Using the given essay, please make the paragraphs longer and more focused. After responding to this input, I received an output that was still over 500 words away from my initial request of 1,500 words. To attempt to fix this, I inputted a reminder that I wanted a longer`

essay, much closer to 1,500 words. Finally, after asking for the word count I received an essay that was 1,402—much closer to my goal. Now, I felt that I was ready to expand and customize my essay properly with more refined inputs.

Next, I decided I needed to open a new chat to reorganize my paper. With this, I pasted in the latest version of my paper and inputted: Now, taking the latest version of the paper that you have provided to me, go deeper into who is leading the charge for intellectual property laws. Provide me with names of leaders in the field. To this, Claude provided me with a list of five different ways that I could incorporate prominent leaders in the sector of relating IP laws to AI. The five ways were legal academics and scholars, government agencies and policymakers, technology companies and industry associations, legal firms and practitioners, and finally non-profit organizations and think tanks. From this point, the next step I took was asking the Claude to incorporate this information into the previous paper provided. At this point, the chat bot was still giving me bullet point answers, not coherent paragraphs that could integrate easily to the existing essay. To this, I inputted: Now, integrate these points into the paper using paragraph format, making it flow well. Additionally, can you make the paragraphs longer and do fewer. After receiving the output of this request, I added the new paragraphs to the existing essay. At this point, I also opened a new document that would ask as the third version of the paper. This version being 1,857 words was ready for my additions and corrections—especially focusing on fact checking and forming my works cited. With this, I decided to open up my next chat, but with Google's Gemini AI platform. After playing around with Claude, I realized it could do a fairly good job at

making a works cited page with its own outputs, but I wanted to experiment if it could produce sources for an essay that was a hybrid of AI platforms.

The next goal that I began to work on was adding an argument to my paper. In this, I asked Gemini: I am going to give you an essay that I have generated through Anthropic's Claude AI answering the following prompt: describe the development of artificial intelligence from Turing to LLM chatboxes. In the essay, I have chosen to focus on the AI implications for intellectual property laws. Can you take this essay and make it more focused? To this, Gemini provided me with five improvements for my essay, including the addition of specific examples. Next, I wanted to see if Gemini could provide me with a comprehensive essay with paragraphs, not bullet points. In this, I inputted: Can you now combine your additions/comments with my essay I provided to make one larger, more focused essay? Despite writing that it "certainly" could follow my request, Gemini refused to output anything comparable to an academic essay. In fact, every version that it would provide to me included bullet points. At this point, I decided it was time to return to Claude with the new examples and specificities provided by Gemini. For example, from my time chatting with Gemini, I discovered the case of *Thaler v Perlmutter*, in which copyright protection for AI was denied. Additionally, it also referenced the 2020 case of the Device for Autonomous Bootstrapping of Unified Sentience (DABUS), something I wanted to further research and include in the next version of my paper. Moving on to my own thoughts, I wanted to ask the question if LLMs can be considered inventors? Similarly, I thought it could be interesting to ask Claude if it would consider itself to be an inventor. I decided at this point that I would do some initial edits for grammatical and stylistic changes to

make the paper sound more in tune with my writing (below demonstrated in red, beginning part 3). After the early edits had been made, I found it was easier to find spots to add my own thoughts, while also identifying with the work on a deeper level.

Finally, I began my works cited page my once again opening a new chat and inputting: Your task is to read my essay and every time I make a claim that would require me to use a source, I want you to find a source and convert it to MLA format and then under the source provide a bullet point saying 'the claim of ____- made in section ____- is sustained by... As a result, I began receiving sources in the format I requested.

Although I had asked Claude to provide me with citations for every claim in the essay, the first output only included five sources. After asking for more, I received five to six at a time, but as long as I asked for more, it provided me with more sources. Making sure to check the sources everytime, I slowly started to notice Claude hallucinating “claims” that it had claimed I made in the inputted essay. For example, it provided me with a source on a potential AI Tax system—something I never mention in my essay. Altogether, Claude did an adequate job producing sources on the version of the paper it had provided me (in black text), but I found it most useful to supplement my paper with sources of my own finding (in green text, as seen in the works cited).

One of the major limitations I have found with both Claude and Gemini is that they do not seem to be able to actually edit inputted work in the traditional manner. For example, when I switched back to Gemini to ask it to edit my paper for grammar at the end of the process once I had added my own supplements to the Claude generated paper, Gemini refused to give me a new version with improved grammar. Instead, it gave me a general idea of grammatical issues I should

edit on my own. Similarly, another limitation I found was that it was difficult to add my own edits and commentary to the AI generated portions of the paper. Before I had done my initial edits (in red), I was having trouble identifying with the writing—making it feel extremely difficult to find spots to integrate my own ideas. Thus, it appeared difficult to make the AI generated text read similarly to my natural writing tone I have developed through my years of academia.

Finally, I decided I would make an entirely new section of my essay once I had completed my initial edits. The hope here is that this would make my essay blend more effectively, making it easier to read. As a result, my final paper felt more like a paper that we—Claude and I—wrote together, not merely Claude’s work with a few edits by me.

Part 3 →**KEY: Initial Edits, Final AI Output, My Additions****Initial Edits:**

Artificial Intelligence and the Evolution of Intellectual Property Laws

The development of artificial intelligence (AI) has been a captivating journey marked by groundbreaking ideas and relentless innovation, one that ~~has the potential to~~ **will** profoundly reshape ~~various~~ **most** aspects of human civilization. Its foundations can be traced back to the pioneering work of Alan Turing, the British mathematician and computer scientist whose seminal 1950 paper, "Computing Machinery and Intelligence," laid the theoretical groundwork for modern AI. Turing proposed the "Imitation Game," later known as the Turing Test, designed to evaluate a machine's ability to exhibit intelligent behavior indistinguishable from that of a human. This revolutionary concept sparked a new era of research, cementing Turing's legacy as the father of AI and setting the stage for the remarkable developments that would follow.

In the decades that ~~followed~~ **proceeded** Turing's seminal work, AI research **has** evolved along various paths, each contributing to the field's overall progress and diversification. Expert systems, developed in the 1970s and 1980s, were among the earliest practical applications of AI technology. These systems were designed to mimic human experts in specific domains, such as medical diagnosis or financial analysis, by leveraging vast repositories of knowledge and rule-based reasoning. While limited in scope, ~~expert~~ **these early** systems demonstrated the potential of AI to augment human decision-making processes ~~and paved the way for more advanced applications.~~

Concurrent with the development of expert systems, neural networks, inspired by the structure and function of the human brain, gained traction in the 1980s and 1990s. These interconnected networks of artificial neurons were designed to mimic the way the brain

processes information, leading to breakthroughs in areas like pattern recognition and machine learning. Neural networks laid the groundwork for more sophisticated AI systems capable of learning from data and adapting to new situations, a crucial step forward in the ~~quest for~~ **development of** artificial general intelligence (AGI).

~~However~~ **Further advancing**, it was the advent of deep learning, a subset of machine learning algorithms that utilize multiple layers of artificial neural networks, that truly propelled AI into the 21st century. Deep learning techniques, ~~combined with the availability of vast amounts of data and increased computational power~~, enabled significant advances in areas like computer vision, natural language processing (NLP), and speech recognition. These advancements have had far-reaching implications, from improving the accuracy of image and speech recognition systems to enhancing the capabilities of virtual assistants and language translation tools.

One of the most remarkable developments in the field of NLP has been the emergence of large language models (LLMs). These models, trained on ~~vast~~ **immeasurable** amounts of textual data from the internet and other sources, possess an unprecedented ability to understand and generate human-like language. The introduction of the Transformer architecture by Google in 2017 revolutionized the way language models were built and trained, paving the way for groundbreaking models like GPT (Generative Pre-trained Transformer) by OpenAI, ~~BERT (Bidirectional Encoder Representations from Transformers) by Google~~, and more recently, ChatGPT and Claude by Anthropic.

~~These large language model chatbots represent a significant milestone in the development of AI, demonstrating the ability to engage in human-like conversations, answer questions, provide analysis, and even assist with tasks like coding and writing. While not sentient beings~~

~~and subject to inherent limitations, they showcase the remarkable progress made in natural language processing and generation, a feat once thought to be decades away.~~

However, **Intrinsic with** the rapid progress in AI, particularly in the realm of language models, has raised complex questions about intellectual property (IP) laws. **Specifically, the world of AI is beginning to question** how **these laws** might need to adapt ~~to accommodate~~ **in reaction to** these new technologies. Intellectual property laws, such as patents, copyrights, and trademarks, are designed to protect the creative works and inventions of individuals and organizations. As AI systems become more sophisticated and capable of generating original content, the boundaries of IP ownership become increasingly blurred, presenting a significant challenge to existing legal frameworks.

A key issue ~~is~~ **that appears in the intersection of the fields of AI and IP development** is the question of ownership and authorship when an AI system generates a piece of code, a poem, a musical composition, or **assists in generating** an invention ~~or design~~. Should the copyright or patent be held by the developer of the AI system, the entity that trained the model, or the AI itself? These are not merely hypothetical concerns; **as** they are already being ~~grappled with~~ **considered** in the legal and technology sectors. **For example, in** ~~in~~ 2020, an AI system called DABUS (Device for the Autonomous Bootstrapping of Unified Sentience) was listed as the inventor on patent applications filed in several countries, including the United States and the European Union. While these applications were ultimately rejected on the grounds that only natural persons can be named as inventors, the case highlighted the urgent need for IP laws to evolve to address the complexities posed by AI.

Another area of concern is the potential for AI systems to inadvertently infringe on existing copyrights or patents. LLMs are trained on vast amounts of data, which may include

copyrighted material from books, articles, websites, and other sources. While efforts are made to filter out copyrighted content during training, it is difficult to ensure that no copyrighted material is ~~ingested~~ **processed** by the model, raising questions about the liability of AI developers and users in cases of potential infringement. ~~Furthermore, the rapid pace of AI development and the increasing use of techniques like transfer learning, where pre-trained models are fine-tuned for specific tasks, add an additional layer of complexity to IP ownership and liability issues.~~

Compounding the challenge is the fact that many AI systems, particularly those based on deep learning, operate as “black boxes,” making it difficult to fully understand and explain their decision-making processes. **Thus, it is** ~~This~~ this lack of transparency can further complicate matters when it comes to determining ownership and accountability for AI-generated works or inventions. If an AI system produces a novel design or piece of software, but the underlying reasoning and process are opaque, how can we attribute authorship or inventorship ~~with confidence?~~

As these issues surrounding AI and intellectual property rights continue to emerge, various stakeholders across different sectors are actively engaged in shaping the discourse and proposing potential solutions. ~~In the legal academia, scholars like Professor Ryan Abbott from the University of Surrey School of Law and Professor Mark Lemley from Stanford Law School have been at the forefront of studying the impact of AI on IP laws. Abbott's groundbreaking work on "AI Inventorship" and Lemley's extensive research on "IP and AI" have significantly contributed to the ongoing dialogue, raising critical questions and offering valuable insights.~~

For example, governments ~~Governments~~ and international organizations have also recognized the urgency of addressing this complex challenge. The United States Patent and Trademark Office (USPTO) and the World Intellectual Property Organization (WIPO) have

established dedicated initiatives to explore the intersection of AI and IP laws. The USPTO's "Artificial Intelligence and Inventorship" policy consultations and WIPO's "Conversations on IP and AI" have brought together experts from around the world to discuss potential legal frameworks and ensure that intellectual property rights remain protected in the age of AI. These consultations have convened legal experts, technology leaders, academics, and other key stakeholders to engage in substantive discussions on developing legal frameworks that can accommodate the complexities introduced by AI systems. Specific areas of focus have included questions around inventorship and authorship attribution when an AI system generates a patentable invention or copyrightable work. Participants have grappled with nuanced issues such as whether existing laws need amending to allow AI to be formally recognized as an inventor or author. The consultations have also examined potential liability concerns when AI inadvertently infringes on existing patents or copyrights during training or operation. By fostering collaborative dialogue, the USPTO aims to craft guidelines and policies that provide clarity on intellectual property matters involving AI while upholding robust protection for human creators and innovators as these transformative technologies continue evolving.

The technology industry, including major companies like Google, Microsoft, and IBM, as well as industry associations such as the Information Technology Industry Council (ITI) and the Artificial Intelligence Industry Association (AIIA), ~~has~~ **have all** played ~~a~~ crucial roles in advocating for legal clarity and responsible innovation. With their legal teams and policy experts actively engaged, these organizations ~~have highlighted~~ **are highlighting** the need for updated intellectual property laws that can accommodate the rapid advancements in AI technology while safeguarding the rights of creators and inventors.

~~Similarly, intellectual~~ Intellectual property law firms and practitioners have been at the forefront of navigating this complex landscape, advising clients and representing them in AI-related IP cases. Firms like Kilburn & Strode LLP and Wiggin LLP, with their extensive expertise in emerging technologies and intellectual property rights, have been instrumental in shaping legal strategies and setting precedents for addressing AI-generated works and inventions.

~~Similarly, Furthermore,~~ non-profit organizations and think tanks, such as the Electronic Frontier Foundation (EFF), the Center for Democracy & Technology (CDT), and the AI Now Institute, have dedicated researchers and advocates working to ensure that AI development aligns with ethical principles and respects individual rights, including intellectual property rights. Their efforts aim to strike a balance between fostering innovation and protecting the interests of creators, inventors, and the broader public.

These ~~diverse stakeholders, along with various other legal experts,~~ policymakers and technology leaders are actively contributing to the ongoing dialogue and proposing potential solutions to address the challenges posed by AI to intellectual property laws. Their collaborative efforts aim to strike a balance between fostering innovation and protecting the rights of creators and inventors, while ensuring a fair and sustainable ecosystem for both human creators and AI systems.

~~To address these multifaceted challenges, legal experts, policymakers, and technology leaders are exploring various approaches, each with its own merits and drawbacks.~~ One potential solution proposed by some legal scholars is the creation of a new category of IP rights specifically for AI-generated works and inventions. This could involve a system where AI-generated content is treated as a separate class of IP, with its own set of rules and regulations governing ownership, licensing, and liability. Such a framework could provide greater clarity and

legal protection for AI-generated creations, while also addressing issues of accountability and potential infringement.

Alternatively, some propose considering AI systems as tools or instruments, similar to traditional creative tools like paintbrushes or musical instruments. Under this framework, the ownership of AI-generated works or inventions would be attributed to the human operators or developers of the AI system. **This would be similar to the idea that much like how** the ownership of a painting or a symphony is attributed to the artist or composer, rather than the tools they used. This approach has the advantage of aligning with existing IP laws and norms, but it may fail to adequately address the unique challenges posed by **ever-changing nature** ~~the autonomy and~~ complexity of modern AI systems.

Another proposed solution involves updating existing IP laws to account for AI-generated works and inventions, perhaps by expanding the definition of authorship or inventorship to include AI systems under certain circumstances. This approach could provide a more incremental path to legal reform, but it may also require significant legislative efforts and could face resistance from those concerned about the potential erosion of traditional IP protections.

Regardless of the specific solutions adopted, it is evident that the rise of AI, particularly in the realm of language models and creative content generation, will necessitate a reevaluation and adaptation of existing IP laws. ~~Striking the right balance between protecting the rights of creators and inventors while fostering innovation and the responsible development of AI technologies will be crucial.~~ Failure to address these issues in a timely and thoughtful manner could lead to legal uncertainties, stifled innovation, and potential conflicts between stakeholders.

As ~~AI~~ **artificial intelligence** continues to permeate various aspects of society, from healthcare and education to finance and entertainment, addressing these ~~IP~~ **intellectual property** challenges will be essential to ensure a fair and sustainable ecosystem for both human creators and AI systems. It will require collaboration and dialogue among legal experts, policymakers, technology developers, and other stakeholders to ~~navigate these uncharted waters and~~ shape the future of intellectual property in the age of AI. By proactively addressing these issues, we can unlock the full potential of AI while safeguarding the rights and interests of all parties involved.

Final Output + My Edits

Patenting the Future: Reshaping IP Laws for Artificial Innovators

The development of artificial intelligence (AI) has been a captivating journey marked by groundbreaking ideas and relentless innovation, one that **will** profoundly reshape **most** aspects of human civilization. Its foundations can be traced back to the pioneering work of Alan Turing, the British mathematician and computer scientist whose seminal 1950 paper, “Computing Machinery and Intelligence,” laid the theoretical groundwork for modern AI. Turing proposed the “Imitation Game,” later known as the Turing Test, designed to evaluate a machine’s ability to exhibit intelligent behavior indistinguishable from that of a human.¹ **In this game-like process, a human must distinguish if the output provided was derived from a computer or a human. The main idea here is that if the human cannot tell that the outputs are from a computer, the computer must be “thinking” with human intelligence.**² This revolutionary concept sparked a new era of research, cementing Turing’s legacy as the father of AI and setting the stage for the remarkable developments that would follow.

In the decades that **preceded** Turing's seminal work, AI research **has** evolved along various paths, each contributing to the field’s overall progress and diversification. Expert systems, developed in the 1970s and 1980s, were among the earliest practical applications of AI technology. These systems were designed to mimic human experts in specific domains, such as medical diagnosis or financial analysis, by leveraging vast repositories of knowledge and rule-based reasoning. While limited in scope, **these early** systems demonstrated the potential of AI to augment human decision-making processes. Concurrent with the development of expert

¹ Turing, A. M. “Computing Machinery and Intelligence.” *Mind*, vol. 59, no. 236, 1950, pp. 433–60. *JSTOR*, <https://www.jstor.org/stable/2251299>.

² *Turing Test | Definition & Facts | Britannica*. 8 Mar. 2024, <https://www.britannica.com/technology/Turing-test>.

systems, neural networks, inspired by the structure and function of the human brain, gained traction in the 1980s and 1990s. These interconnected networks of artificial neurons were designed to mimic the way the brain processes information, leading to breakthroughs in areas like pattern recognition and machine learning.³ Neural networks laid the groundwork for more sophisticated AI systems capable of learning from data and adapting to new situations, a crucial step forward in the **development of** artificial general intelligence (AGI).⁴

Further advancing, it was the advent of deep learning, a subset of machine learning algorithms that utilize multiple layers of artificial neural networks, that truly propelled AI into the 21st century. **Thus, these** deep learning techniques enabled significant advances in areas like computer vision, natural language processing (NLP), and speech recognition.⁵ These advancements have had far-reaching implications, from improving the accuracy of image and speech recognition systems to enhancing the capabilities of virtual assistants and language translation tools.

One of the most remarkable developments in the field of NLP has been the emergence of large language models (LLMs). These models, trained on **immeasurable** amounts of textual data from the internet and other sources, possess an unprecedented ability to understand and generate human-like language. The introduction of the Transformer architecture by Google in 2017 revolutionized the way language models were built and trained, paving the way for

³ Rumelhart, David E., et al. *Parallel Distributed Processing: Explorations in the Microstructure of Cognition: Foundations*. The MIT Press, 1986. *DOI.org (Crossref)*, <https://doi.org/10.7551/mitpress/5236.001.0001>.

⁴ Kurzweil, Ray. *The Singularity Is near: When Humans Transcend Biology*. Penguin Books, 2006.

⁵ LeCun, Yann, et al. "Deep Learning." *Nature*, vol. 521, no. 7553, May 2015, pp. 436–44. *DOI.org (Crossref)*, <https://doi.org/10.1038/nature14539>.

groundbreaking models like GPT (Generative Pre-trained Transformer) by OpenAI, and more recently, ChatGPT and Claude by Anthropic.⁶

Intrinsic with the rapid progress in AI, particularly in the realm of language models, complex questions about intellectual property (IP) laws **have been raised. Specifically, the world of AI is beginning to question** how **these laws** might need to adapt **in reaction to** these new technologies. Intellectual property laws, such as patents, copyrights, and trademarks, are designed to protect the creative works and inventions of individuals and organizations. As AI systems become more sophisticated and capable of generating original content, the boundaries of intellectual property ownership become increasingly blurred, presenting a significant challenge to existing legal frameworks. **Now, the question becomes: can an AI system have authorship capabilities?**

A key issue **that appears at the intersection of the fields of AI and intellectual property development** is the question of ownership and authorship when an AI system generates a piece of code, a poem, a musical composition, or **assists in generating** an invention. Should the copyright or patent be held by the developer of the AI system, the entity that trained the model, or the AI itself? These are not merely hypothetical concerns **as they are already being considered** in the legal and technology sectors. **For example, in 2020, an AI system called DABUS (Device for the Autonomous Bootstrapping of Unified Sentience) was listed as the inventor on patent applications filed in several countries, including the United States and the European Union. In this, the petitioner claimed that by not allowing AI to be an inventor, the United States Patent and Trademark Office (USPTO) would be encouraging applicants to put names in applications that**

⁶ Vaswani, Ashish, et al. "Attention Is All You Need." *Advances in Neural Information Processing Systems*, vol. 30, Curran Associates, Inc., 2017. *Neural Information Processing Systems*, https://papers.nips.cc/paper_files/paper/2017/hash/3f5ee243547dee91fbd053c1c4a845aa-Abstract.html.

do not actually meet the inventorship criteria.⁷ While these applications were ultimately rejected in December of 2019 and then again in April of 2020 on the grounds of U.S. Code: Title 35, that states that only natural persons can be named as inventors, the case highlighted the urgent need for intellectual property laws to evolve to address the complexities posed by AI.⁸

Additionally containing similar implications of the patent case of DABUS, the more recent case of *Thaler v Perlmutter* disputed the copyrightability of AI. Begging back in 2018, the background of the court case starts when Dr. Stephen Thaler applied to copyright a piece of visual artwork that was produced by Creativity Machine—a generative AI system that he created himself (see Thaler’s AI generated picture to the right). Titled “A Recent Entrance to Paradise,” the plaintiff argued that the AI was the ‘author’ of the piece. Thus, his AI platform Creativity Machine should be deigned as holding authorship. As a result of his application repeatedly being denied copyright status, Thaler moved on to sue Shira Perlmutter, the D.C. Register of Copyrights. Ending similarly to the DABUS case, Judge Baryl A. Howell decided to uphold Perlmutter and the Register of Copyrights’ decision—not allowing Thaler to receive the



⁷ Stewart, Coke Morgan. *Artificial Intelligence Policy*. 13 Aug. 2020, https://www.uspto.gov/sites/default/files/documents/20200813_PPAC_Artificial-Intelligence-Policy.pdf.

⁸ “U.S. Code: Title 35.” *LII / Legal Information Institute*, <https://www.law.cornell.edu/uscode/text/35>. Accessed 14 Apr. 2024.

copyright.⁹ Deciding that Thaler’s artwork had no authorship, the judge decided that Perlmutter—the defendant in the case—was correct in denying Thaler the copyright.¹⁰

Another area of concern is the potential for AI systems to inadvertently infringe on existing copyrights or patents. LLMs are trained on vast amounts of data, which may include copyrighted material from books, articles, websites, and other sources.¹¹ While efforts are made to filter out copyrighted content during training, it is difficult to ensure that no copyrighted material is processed by the model, raising questions about the liability of AI developers and users in cases of potential infringement.¹² Contradicting this supposed attempt, comedian Sarah Silverman joined a lawsuit against OpenAI and Meta, explaining that the companies have committed copyright infringement by “ingesting” her content to teach their AI systems. Along with her joining the suit in July of 2023, authors Christopher Golden and Richard Kadrey also join in with claims that the two companies trained their AI system with illegal online copies of their respective novels. Specifically, the lawsuit claims that OpenAI’s ChatGPT would not be able to output such accurate summaries of the plaintiff’s novels if it had not been ingesting their content—specifically done illegally without pay.¹³

⁹ Brooke, Rachel. “Copyright Protection in AI-Generated Works Update: Decision in Thaler v. Perlmutter.” *Authors Alliance*, 24 Aug. 2023, <https://www.authorsalliance.org/2023/08/24/copyright-protection-in-ai-generated-works-update-decision-in-thaler-v-perlmutter/>.

¹⁰ *Thaler v Perlmutter*. Civil Action No. 22-1564, 18 Aug. 2023, https://ecf.dcd.uscourts.gov/cgi-bin/show_public_doc?2022cv1564-24.

¹¹ Abbott, Ryan Benjamin. “The Reasonable Computer: Disrupting the Paradigm of Tort Liability.” *SSRN Electronic Journal*, 2016. *DOI.org (Crossref)*, <https://doi.org/10.2139/ssrn.2877380>.

¹² Sobel, Benjamin L. W. “Artificial Intelligence’s Fair Use Crisis.” *The Columbia Journal of Law & the Arts*, Dec. 2017, pp. 45-97 Pages. *DOI.org (Datacite)*, <https://doi.org/10.7916/JLA.V4I11.2036>.

¹³ Small, Zachary. “Sarah Silverman Sues OpenAI and Meta Over Copyright Infringement.” *The New York Times*, 10 July 2023. *NYTimes.com*, <https://www.nytimes.com/2023/07/10/arts/sarah-silverman-lawsuit-openai-meta.html>.

Compounding the challenge is the fact that many AI systems, particularly those based on deep learning, operate as “black boxes,” making it difficult to fully understand and explain their decision-making processes. According to University of Michigan Associate Professor Samir Rawashdeh, the problematic part of the “AI black boxes” is that we cannot see how deep learning systems make their decisions. Making the problem even larger, if we cannot see how the decision is being reached, it becomes near impossible to fix the LLM if an unwanted outcome is produced. As a result, a safety issue comes to the surface as these deep learning systems take up more roles in tasks like deciding who should get approved by a loan, who should get selected for a job, or even which medical treatments a patient should receive.¹⁴ Thus, it is this lack of transparency can further complicate matters when it comes to determining ownership and accountability for AI-generated works or inventions. If an AI system produces a novel design or piece of software, but the underlying reasoning and process are opaque, how can we attribute authorship or inventorship?

As these issues surrounding AI and intellectual property rights continue to emerge, various stakeholders across different sectors are actively engaged in shaping the discourse and proposing potential solutions. For example, governments and international organizations have also recognized the urgency of addressing this complex challenge. The United States Patent and Trademark Office (USPTO) and the World Intellectual Property Organization (WIPO) have established dedicated initiatives to explore the intersection of AI and intellectual property laws.¹⁵ The USPTO's “Artificial Intelligence and Inventorship” policy consultations and WIPO's “Conversations on IP and AI” have brought together experts from around the world to discuss

¹⁴ *AI's Mysterious 'Black Box' Problem, Explained* | University of Michigan-Dearborn. <https://umdearborn.edu/news/ais-mysterious-black-box-problem-explained..>

¹⁵ Affairs (OPA), USPTO Office of Public. *United States Patent and Trademark Office*. <https://www.uspto.gov/>.

potential legal frameworks and ensure that intellectual property rights remain protected in the age of AI. Specifically, these consultations by the USPTO have convened legal experts, technology leaders, academics, and other key stakeholders to engage in substantive discussions on developing legal frameworks that can accommodate the complexities introduced by AI systems. Specific areas of focus have included questions around inventorship and authorship attribution when an AI system generates a patentable invention or copyrightable work—hottopic that are emerging as problems quicker than we can attempt to find solutions. Participants have grappled with nuanced issues such as whether existing laws need amending to allow AI to be formally recognized as an inventor or author. The consultations have also examined potential liability concerns when AI inadvertently infringes on existing patents or copyrights during training or operation. By fostering collaborative dialogue, the USPTO aims to craft guidelines and policies that provide clarity on intellectual property matters involving AI while upholding robust protection for human creators and innovators as these transformative technologies continue evolving.¹⁶

The technology industry, including major companies like Google, Microsoft, and IBM, as well as industry associations such as the Information Technology Industry Council (ITI) and the Artificial Intelligence Industry Association (AIIA),¹⁷ have also all played crucial roles in advocating for legal clarity and responsible innovation. Specifically, the ITI works to represent companies that innovate while also promoting competition. Founded in 1916, the organization began supporting office appliance manufacturing. Now, adapting over 100 years, the company is working to support rapidly growing AI companies.¹⁸ With their legal teams and policy experts

¹⁶ *USPTO Seeks Stakeholder Input Regarding Artificial Intelligence and Inventorship*. <https://www.uspto.gov/subscription-center/2023/uspto-seeks-stakeholder-input-regarding-artificial-intelligence-and>.

¹⁷ *International Artificial Intelligence Industry Alliance (AIIA)*. <https://www.aiia-ai.org/col.jsp?id=221>.

¹⁸ *About - Information Technology Industry Council*. <https://www.itic.org/about/>.

actively engaged, these organizations are highlighting the need for updated intellectual property laws that can accommodate the rapid advancements in AI technology while safeguarding the rights of creators and inventors. Realizing that merely using what laws exist will not work much longer, these technology industry companies must find additional partners.

Similarly, non-profit organizations and think tanks, such as the Electronic Frontier Foundation (EFF),¹⁹ the Center for Democracy & Technology (CDT),²⁰ and the AI Now Institute,²¹ have dedicated researchers and advocates working to ensure that AI development aligns with ethical principles and respects individual rights, including intellectual property rights. As a result, they hope to build guidelines that will prevent blurred lines that result in costly lawsuits and the hindrance of innovation. Their efforts aim to strike a balance between fostering innovation and protecting the interests of creators, inventors, and the broader public.

These mentioned policymakers, technology leaders, and non-profit organizations are just a few examples of actors actively contributing to the ongoing dialogue and proposing potential solutions to address the challenges posed by AI to intellectual property laws. Their collaborative efforts aim to strike a balance between fostering innovation and protecting the rights of creators and inventors while ensuring a fair and sustainable ecosystem for both human creators and AI systems. One potential solution proposed by some legal scholars is the creation of a new category of intellectual property rights specifically for AI-generated works and inventions. This could involve a system where AI-generated content is treated as a separate class of intellectual property, with its own set of rules and regulations governing ownership, licensing, and liability.

¹⁹ “About EFF.” *Electronic Frontier Foundation*, 10 July 2007, <https://www.eff.org/about>.

²⁰ “Who We Are.” *Center for Democracy and Technology*, <https://cdt.org/who-we-are/>.

²¹ “Our Work.” *AI Now Institute*, <https://ainowinstitute.org/our-work>.

Such a framework could provide greater clarity and legal protection for AI-generated creations while also addressing issues of accountability and potential infringement.

Alternatively, some propose considering AI systems as tools or instruments, similar to traditional creative tools like paintbrushes or musical instruments. Under this framework, the ownership of AI-generated works or inventions would be attributed to the human operators or developers of the AI system. This would be similar to the idea that the ownership of a painting or a symphony is attributed to the artist or composer, rather than the tools they used. In this case, Thaler could have received his copyright on the AI platform he developed, still disappointing him from copyrighting the actual piece of artwork. This approach has the advantage of aligning with existing IP laws and norms, but it may fail to adequately address the unique challenges posed by the ever-changing nature and complexity of modern AI systems. Next, another proposed solution involves updating existing intellectual property laws to account for AI-generated works and inventions, perhaps by expanding the definition of authorship or inventorship to include AI systems under certain circumstances. This approach could provide a more incremental path to legal reform, but it may also require significant legislative efforts and could face resistance from those concerned about the potential erosion of traditional intellectual property protections. For example, the World Intellectual Property Organization (WIPO) defines intellectual property as “creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce.”²² As a result, the definition gets confusing when the output is a product listed, but it was not created by the traditional “mind.” As a result, the definition needs to be changed, or even further clarified on what the WIPO feels classifieds a “mind.” Does AI have a mind? Leading right back to the Turing “Immitation Game,” this topic will be widely debated for years to come.

²² *What Is Intellectual Property (IP)?* <https://www.wipo.int/about-ip/en/index.html>.

Regardless of the specific solutions adopted, it is evident that the rise of AI, particularly in the realm of language models and creative content generation, will necessitate a reevaluation and adaptation of existing intellectual property laws. Failure to address these issues in a timely and thoughtful manner could lead to legal uncertainties, stifled innovation, and potential conflicts between stakeholders. As **artificial intelligence** continues to permeate various aspects of society, from healthcare and education to finance and entertainment, addressing these **intellectual property** challenges will be essential to ensure a fair and sustainable ecosystem for both human creators and AI systems. It will require collaboration and dialogue among legal experts, policymakers, technology developers, and other stakeholders to shape the future of intellectual property in the age of AI. By proactively addressing these issues, we can unlock the full potential **of innovation with** AI while safeguarding the rights and interests of all parties involved.

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