Mind Over Machine: Adapting U.S. Intellectual Property Law for an AI-Driven Future

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Abstract

The rapid rise of artificial intelligence (AI) technology challenges American intellectual property (IP) laws, which are designed to protect human creativity and innovation. As AI systems become more advanced by relying on existing intellectual resources, concerns arise regarding authorship, ownership, and the adequacy of current IP protections. As companies race to innovate technologically, IP implications are often overlooked. This paper examines the urgent need to modernize IP law to address AI-specific concerns, particularly in regard to copyright infringement and patent protection. The research explores three core areas: (1) the current state of federal IP law; (2) legal gaps where AI is insufficiently covered; and (3) proposed reforms to close these gaps. Uncertainties in the law threaten individuals, corporations, and creators whose work has been used without their consent or compensation. Without clear legal standards, creators' ability to control and benefit from their work is at risk, endangering the very purpose of IP law. As AI-generated content continues to evolve and mimic human creativity, achieving a balance between protecting creators' rights and enabling technological innovation is especially pertinent. American IP law risks becoming obsolete without reform as other nation-states adapt their IP laws, giving them a competitive edge in technological advancement and a global market influence. This study offers ten legal recommendations to protect creators' rights in an AI-driven future, drawing on current IP statutes, expert legal analysis, and emerging case law.

Keywords: artificial intelligence, intellectual property law, copyright, patent, data, algorithms, ownership

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Contents

Abbreviations

AI - Artificial Intelligence

CMI - Copyright Management Information

DABUS - Device for the Autonomous Bootstrapping of Unified Sentience

DL - Deep Learning

DMCA - Digital Millennium Copyright Act

DRM - Digital Rights Management

EU - The European Union

GANs - Generative Adversarial Networks

IP - Intellectual Property

ML - Machine Learning

PTAB - Patent Trial and Appeal Board

UK - The United Kingdom

US - The United States of America

USC - The United States Code

USPTO - The United States Patent and Trademark Office

Introduction

"The most lucrative act of theft in history" (Coulter, 2025, p. 3). This quote refers not to stolen art or hacked bank accounts but to artificial intelligence (AI) systems trained on millions of copyrighted books, research papers, and creative works extracted from the internet. These systems bypass the rights of creators and profit from their labor without their consent or compensation. At the center of this issue is a key question: In the age of AI, do your ideas still belong to you?

As AI technology autonomously generates content, once straightforward ownership questions are becoming pressing legal and ethical dilemmas. The integration of AI into everyday life is reshaping a vast number of industries and long-established norms. As humanity enters a new era marked by increasingly advanced robots, bots, and AI, this digital revolution has exposed weaknesses in the current intellectual property (IP) systems (Jain, 2021; Corbett, 2023). The relationship between AI and IP is at a delicate balance, requiring IP law to evolve in a way that protects regulation and creators' rights while still allowing for technological innovation and AI advancement (Chesterman, 2024; Crouch, 2024; Cuntz et al., 2024; Moreland, 2024). AI's influence on innovation can be viewed in two ways: how existing IP affects AI development and how AI, in turn, impacts human-generated IP (Corbett, 2023).

AI systems rely on existing intellectual resources to build broad databases that enable them to mimic human-like abilities. However, as companies race to make technological breakthroughs, the implications for IP can be overlooked. Economic incentives from a competitive marketplace can also incentivize companies to innovate without patent protection (Corbett, 2023). The United States (US) federal IP laws, designed to protect human ideas, inventions, products, and designs, now face unprecedented challenges. AI-driven content and

issues such as deepfakes, disinformation, copyright infringement, and data ownership, have emerged, exposing critical gaps in current IP law (Chesterman, 2024; Crouch, 2024; Kirakosyan, 2024; Ali & Kamraju, 2023). These gaps risk harm to individuals, corporations, and creators whose work may be used without their consent or compensation. For example, multiple authors, including former Sinn Féin president Gerry Adams, have accused Meta of using their books and research papers to train its Gen-AI system, Llama (Coulter, 2025). Historian Michael Taylor called it "infuriating" that Meta allegedly used his works on the LibGen database without his consent, while other creators described the situation as "disheartening" and "demoralizing" (Coulter, 2025, pp. 3, 5).

Without clear legal standards, people's right to control and benefit from their creations is under threat, which endangers the very purpose of IP law (Chesterman, 2024; Kirakosyan, 2024; Moerland, 2024). As Dustin Corbett articulates, "Legal uncertainty harms both AI and IP owners, and injunctions to preserve the status quo will harm all of society" (Corbett, 2023, p. 384). Maintaining the current IP system without modernization risks technological stagnation, delaying critical advancements, and preventing society from benefiting from AI-driven solutions.

Reflecting this concern, Atul Jain (2021) states, "The current IP laws need severe upgrading to come up to par with the artificial intelligence that is continuously growing" (p. 1505). Without reform, US IP law risks becoming internationally obsolete as other nation-states adapt their laws to reflect modern times, giving them a competitive edge in technological advancement. At the same time, global efforts to regulate AI remain contentious, with large economies divided over how to govern it (Kleinman & McMahon, 2025). At the AI Action Summit in Paris, France, in February of 2025, French President Emmanuel Macron defended the need for regulation, stating, "We need these rules for AI to move forward" (Kleinman &

McMahon, 2025, p. 2). In contrast, the US and the United Kingdom (UK) declined to sign the AI Action Summit's international declaration, concerned that regulation could suppress innovation (Kleinman & McMahon, 2025). As global leaders navigate the balance between regulation and innovation, similar tensions emerge within US IP law as it faces change with the rise of AI.

This paper discusses *how US IP law should be adapted to address the challenges posed by AI and what legal gaps currently hinder its effectiveness in protecting IP.* This thesis examines IP considerations in an AI-driven world by focusing on: (1) the current state of IP law; (2) the gaps in which AI is not adequately covered; and (3) proposals to bridge those gaps.

The paper argues that the transformative rise of AI is exposing profound failures in US IP law, creating legal ambiguity that weakens technological innovation and significantly leaves creators unprotected. Firstly, existing copyright and patent law foundations are built on human authorship and inventorship definitions. This leaves AI-generated works and AI-trained databases without legal protections, making enforcing rights and ownership over AI-driven creations difficult. Secondly, critical gaps – such as the absence of AI-specific protections, ambiguous fair use standards, and the refusal to recognize AI as an inventor – undermine the law's ability to regulate AI-driven creativity and innovation. Thirdly, urgent reforms are needed to bridge these gaps, including expanded definitions of authorship and inventorship, AI-specific licensing structures, and more explicit liability frameworks for infringement.

Without IP law reforms, the US risks legal stagnation, undermined IP protections, and a competitive disadvantage in the global AI race. Creators risk losing control over their work, receiving no credit or compensation, while AI systems profit from their unlicensed labor. At the same time, corporations risk legal ambiguity, public scrutiny, rising liability, and the unintended consequences of using transformative AI technologies without clear legal and ethical guardrails.

Literature Review

AI systems have rapidly transformed society, influencing everything from national security to face and speech recognition, medical diagnoses, self-driving vehicles, surgical robots, education, music, art, and internet searches (Chandra, 2023; Jain, 2021; Lee et al., 2021). In stark contrast, IP is a long-standing legal institution that dates back to the passage of *The Copyright Act* in 1790, with the first federal copyright law signed by George Washington in May of that year (Copyright.gov, n.d.). The intersection between AI and IP is becoming increasingly salient, with the rise of the digital age in the 21st century exposing deficiencies in current IP law (Corbett, 2023). The review is structured as follows: (1) artificial intelligence and (2) federal intellectual property law, with sub-sections dedicated to each main topic.

(1) Artificial Intelligence

'Artificial' is defined as non-human and does not occur naturally (Lupu, 2018). Meanwhile, 'intelligence' is more contested, with most definitions using the terms 'learn' and 'acquire' (Lupu, 2018). AI is the ability of digital systems to make independent decisions, often mimicking human-like intelligence (Jain, 2021; Tripathi & Ghatak, 2018). While no widely accepted definition exists, AI is generally described as exhibiting intelligent behavior, solving complex problems, and achieving real-world objectives (Jain, 2021). Kop (2019) identifies AI as an entity, system, or science with cognitive abilities such as reasoning and learning. It is important to note that the concept of "understanding" is a contentious concept because it is a "hidden state" that cannot be directly observed (Lupu, 2018, p. 1).

Lupu (2018) discusses the origins of AI, tracing its roots to the Dartmouth Conference of 1956, where McCarthy and colleagues formally introduced AI as a field of research. AI has evolved since John McCarthy's 1950s definition as "the science and engineering of making

intelligent machines" (Corbett, 2023, p. 353; Tripathi & Ghatak, 2018). Modern AI comprises software, specialized hardware, and advanced algorithms, categorized into narrow AI (focused on specific tasks) and general AI (hypothetical human-level intelligence) (Corbett, 2023). These contemporary systems can generate different works, such as music, art, literature, recipes, and inventions, that could be eligible for patents (Pearlman, 2017). These developments present inevitable challenges regarding authorship, ownership, and the mental states traditionally associated with human creativity and invention. This section will thus discuss (1.1) Intelligent Machines and Algorithms and (1.2) Authorship, Ownership, and Mental States.

(1.1) Intelligent Machines and Algorithms

Machine learning (ML), a specialized branch of AI, aims to improve computer decision-making through data analysis and algorithms (Corbett, 2023). ML operates through layers of mathematical functions called 'neurons' that transform numerical inputs into outputs or 'weights.' Weights are classified as either trainable parameters (adjustable variables) or hyperparameters (fixed settings) (Corbett, 2023). The learning process occurs during training, where data is fed into the model, errors are evaluated using a loss function, and trainable parameters are adjusted to reduce the mistakes by algorithms (Corbett, 2023). Success in ML largely depends on the quantity, quality, and diversity of training data, with quantity often being the most significant factor (Corbett, 2023). Advanced ML techniques use (1) generative adversarial networks (GANs), (2) deep learning (DL), and (3) evolutionary algorithms, each requiring unique policy considerations (Corbett, 2023; Jain, 2021).

Firstly, GANs consist of an unsupervised learning algorithm that involves two sub-models: a generator that creates data and a discriminator that evaluates it as authentic or fake

(Corbett, 2023). The generator improves its output realism through adversarial training, while the discriminator sharpens its detection (Corbett, 2023). This process enables GANs to synthesize new data, expand existing datasets, and uncover underlying patterns. Meanwhile, creative adversarial networks build upon GANs by encouraging originality through a secondary signal, generating realistic outputs that do not conform to existing style categories (Corbett, 2023).

Secondly, DL is another subset of ML that uses artificial neural networks with multiple layers to model and analyze patterns in large datasets (Hilty et al., 2020). Progressing neural networks are a foundation of modern AI development (Lupu, 2018). The Perceptron model, conceptualized in the 1950s, has evolved into complex networks consisting of millions of interconnected neurons, driving advancements in ML (Lupu, 2018). However, integrating DL also raises concerns related to IP (Hilty et al., 2020). While DL encourages positive research and accelerates innovation, overly restrictive IP frameworks may suppress independent innovation, potentially leading to underinvestment in AI-related creations (Hilty et al., 2020). Moreover, the ability of future innovators to build on existing advancements highlights the complicated ‘free-rider’ issue, where excessive IP protection might stifle innovation, limit access to essential training data for AI development, and create barriers to entry for smaller firms and researchers (Hilty et al., 2020).

Thirdly, AI algorithms form the core programming that enables computers to learn and perform tasks independently (Tableau, 2024). These algorithms process training data labeled, unlabeled, or autonomously collected to enhance performance (Tableau, 2024). Algorithms are categorized into supervised, unsupervised, and reinforcement learning, each defined by distinct training and operating methods (Tableau, 2024). For example, once trained, algorithms can perform tasks and, in some cases, evolve by integrating new data (Tableau, 2024). Designing the

models and algorithms requires human intervention, which varies in level and form (Corbett, 2023).

The rise of AI in generating content and inventions creates significant challenges to IP laws. AI databases are increasingly relying on copyrighted works, with most generative AI models being trained on vast amounts of data 'scraped' from the web (Corbett, 2023; Crouch, 2024). In this context, web scraping involves the automated and mass collection of protected works from websites and other online sources to train an AI database (Crouch, 2024). This heavy reliance on protected data raises concerns about licensing disputes and legal challenges that could restrict innovation (Corbett, 2023). By producing content faster and more cheaply than humans, AI disrupts traditional IP markets, reshaping market dynamics and reducing production costs (Nyaboke, 2024). Additionally, this influx of AI-generated content may confuse what qualifies for protection under existing laws, particularly in light of fair use considerations (Corbett, 2023).

AI's autonomous capabilities further complicate IP issues. For example, systems like Google's Magenta generate music through neural networks without requiring step-by-step programming (Pearlman, 2017; Abbott, 2016). Similarly, IBM's Watson system demonstrated computational creativity by editing a movie trailer through thematic analysis (Pearlman, 2017; Abbott, 2016). Dr. Stephen Thaler's *Creativity Machine* also independently generated patent-eligible chemical formulas, meeting inventiveness requirements with minimal human involvement (Pearlman, 2017). As AI systems increasingly operate as autonomous creators, the boundary between human-driven and machine-driven innovation is becoming blurred, challenging conventional conceptions of IP (Abbott, 2016).

As AI systems continue to innovate and disrupt traditional IP markets, urgent legal reforms are needed to address their growing role in content creation and protect the integrity of IP laws (Corbett, 2023; Abbott, 2016; Kirakosyan, 2024).

(1.2) Authorship, Ownership, and Mental States

Human authorship is fundamentally linked to humanness, requiring originality, creativity, and a personal connection between the author and their work (Kop, 2019). It reflects imagination, decision-making, and intent (Kop, 2019). In contrast, AI authorship is not legally recognized because AI lacks the personality, intent, and mental states necessary for originality (Kop, 2019). AI functions as "faithful agents," generating outputs based on algorithms and data rather than genuine creative processes (Kop, 2019, p. 7).

However, AI's ability to autonomously generate creative content has promoted debates (Tripathi & Ghatak, 2018). Questions arise, such as who should be credited as the inventor: the AI itself, its developers, or the organization that owns the AI? (Nyaboke, 2024). For example, the Device for the Autonomous Bootstrapping of Unified Sentience (DABUS) case (2018) demonstrated that AI could independently create inventions, provoking debates over whether AI can qualify as an inventor (Ali & Kamraju, 2023). In this case, Dr. Stephen Thaler, the creator of DABUS, listed the AI system as the sole inventor on patent applications (Ali & Kamraju, 2023). Subsequently, these patent applications in the UK, US, and Europe were denied because AI cannot be considered an inventor under current laws (Ali & Kamraju, 2023). AI-generated art projects, such as *The Next Rembrandt,* demonstrate AI's capacity to produce work indistinguishable from human creations (Corbett, 2023). These cases challenge the boundaries of authorship, exposing gaps in IP law when AI produces human-like creations.

Legal scholars have thus argued for evolving definitions of authorship. Chatterjee and Fromer (2019) propose a functional approach that evaluates originality based on outputs rather than requiring human consciousness. Pearlman (2017) advocates assessing AI creativity through a two-part legal test of independence and causation. Corbett (2023) similarly emphasizes that originality can exist without subjective intent if the work is independently created with a "modicum of creativity" (p. 329). According to Corbett (2023), advanced AI models using unsupervised learning can meet this standard. Building on this, Pearlman (2017) adds that the legal shift toward assessing inventiveness based on originality rather than subjective intent allows autonomously trained AI systems to produce original ideas.

The question of ownership centers on who should be credited for AI-generated works: the programmer, the user, or the AI itself (Pearlman, 2017). Kirakosyan (2024) argues that programmers should retain ownership, as AI outputs rely on human-designed frameworks, aligning with current IP laws that prioritize human creativity. Pearlman (2017), however, proposes a more flexible approach, suggesting that ownership should depend on the level of human involvement and the independence of the AI's creative process. As a compromise, the UK's *Copyright, Designs and Patents Act* (1988) provides a middle ground by assigning ownership of computer-generated works to the person who made the "arrangements necessary for the creation of the work," even if no human authorship is directly involved (Chesterman, 2024, pp. 5-7).

A core debate in AI authorship revolves around mental states and the concept of creativity. Human creativity involves both product creativity, which values outputs, and process creativity, which values imagination and intent (Corbett, 2023). AI excels in product creativity but lacks traditional human intent, leading critics to dismiss AI outputs as mechanical

rule-following or "slavish copying" (Pearlman, 2017, p. 27). As Lee et al. (2021) observe, "AI can now also make creative decisions and generate creative works by learning from existing works" (p. 6).

However, Pearlman argues that AI's DL systems parallel human cognitive processes and should be recognized as performing "mental processes" analogous to human creativity (Pearlman, 2017, p. 37). Chatterjee and Fromer (2019) challenge the need for human consciousness, advocating for a functional standard to assess creativity and originality. They emphasize that legal systems should focus on outcomes rather than subjective intent, as laws do not always require conscious experience to assign rights and responsibilities (Chatterjee & Fromer, 2019). Pearlman (2017) adds that courts should focus on the objective outcomes of AI-generated works, treating AI as capable of mental processes similar to human creativity.

While functional mental states are sufficient for assessing copyright infringement, authorship typically requires consciousness and personhood due to the rights and responsibilities associated with ownership (Chatterjee & Fromer, 2019). Pearlman (2017) draws parallels between AI systems and corporate legal personhood, suggesting that AI could hold ownership rights given its collaborative relationship with human actors. Similarly, Lee et al. (2021) question whether AI, exhibiting human-like intelligence, should be granted legal personhood, allowing it to hold rights, bear obligations, and participate in legal processes.

However, this approach raises concerns about accountability, as AI systems lack consciousness and moral responsibility (Chandra, 2023). Chandra (2023) instead advocates for adapting existing legal frameworks to include AI-generated works, though this would require significant reforms. Chatterjee and Fromer (2019) offer an alternative, assigning liability for AI outputs, such as copyright infringement, to businesses that deploy AI systems. This model views

AI as a tool that extends the capabilities of its human or corporate operators, reflecting the decreasing emphasis on human consciousness in the creative process.

While data ownership is essential in discussing the intersection between AI and IP law, Kop (2019) argues that global data governance should focus more on data usage than on data ownership. This shift in focus is relevant as AI systems often rely on large and diverse amounts of data, raising questions about who controls and benefits from their use (Kop, 2019). As AI continues to reshape creativity, traditional IP frameworks face growing challenges. To resolve questions of authorship and ownership, policymakers must balance technological innovation, modernize existing laws, and hold AI companies accountable for transparency in their data usage, which includes copyrighted works.

(2) Federal Intellectual Property Law

IP law protects innovations and creative works, but the rise of AI presents significant legal challenges, particularly in the areas of patentability, copyright, and trade secrets (Chandra, 2023). Current policies from the US Copyright Office and the US Patent and Trademark Office reject non-human authorship or inventorship, reflecting outdated legal frameworks (Pearlman, 2017). Such a situation creates a paradox: IP laws, designed to protect human creativity, struggle to address AI's ability to generate work autonomously.

Cuntz et al. (2024) compare AI to transformative technologies like the steam engine, viewing it as a "method of invention" (p. 5). However, unlike prior inventions, AI has the potential to diminish or replace human creativity, highlighting the need to reassess IP laws to

keep pace with technological change. This section will discuss (2.1) Copyright Law, (2.2) Patent Law and Inventor/Invention, and (2.3) Data Protection.[1]

(2.1) Copyright Law

Copyright law, a key branch of IP rights, grants creators exclusive rights to use and distribute original and tangible works, primarily in literary and artistic fields (Chandra, 2023; Tripathi & Ghatak, 2018; Kop, 2019). Rooted in John Locke's economic theory of possessive individualism, copyright protection is based on human originality and tangibility (Tripathi & Ghatak, 2018). However, AI-generated content challenges these traditional concepts of authorship and ownership, making IP adaptation necessary (Lee et al., 2021).

The Digital Millennium Copyright Act (DMCA) (1998) introduced 'safe harbor' laws that protect online platforms from being held responsible for copyright violations by their users as long as they follow specific rules (Crouch, 2024). These protections were designed to support the growth of the internet by preventing services like search engines and content platforms from being held responsible for what users post (Crouch, 2024). However, generative AI often uses copyrighted material without linking back to the original sources, raising questions about whether these uses still qualify for protection under the DMCA (Crouch, 2024). Safe harbor laws remain critical to current debates on how copyright should adapt to AI.

AI systems make it harder to separate human and machine creativity, producing works that range from AI-assisted outputs to fully autonomous creations (Cuntz et al., 2024). AI's ambiguous authorship role particularly threatens industries like music and publishing, where AI

[1]This review does not address trademark law, as the primary focus is on the intersection of AI and IP laws related to authorship, ownership, and creative processes. Trademark law, which primarily protects symbols used in commerce to identify goods or services, faces fewer direct challenges from AI systems compared to copyright and patent law (Cornell Law School, 2025). While AI may impact brand creation or counterfeit detection, these issues are outside the scope of this analysis.

enhances productivity but threatens human labor markets. US copyright law remains human-centric, requiring human authorship for protection, as affirmed in *Community for Creative Non-Violence v. Reid* (1989) and *Naruto v. Slater* (2018), also known as the "monkey-selfie" case (Pearlman, 2017; Chandra, 2023).

AI-generated content typically falls into two categories: AI-assisted works, where humans play a significant creative role in the creative process, and fully autonomous AI creations with little to no human involvement (Cuntz et al., 2024). Legal concerns are relevant in the case of fully autonomous creations, such as generative art or AI-written novels (Cuntz et al., 2024). Addressing these challenges requires legal clarity to balance technological advancement with protecting human creators' rights.

Proposed solutions include attributing ownership to AI programmers, given their role in designing the systems (Kirakosyan, 2024). Attributing ownership to AI programmers would maintain a human connection to the output of the AI-generated content (Kirakosyan, 2024). Critics warn that excluding AI-generated works from protection could result in these works defaulting to the public domain and under-incentivizing technological innovation (Kirakosyan, 2024). Others argue for hybrid frameworks where AI operates as an agent of its creator or deployer in infringement cases (Chatterjee & Fromer, 2019).

AI's use of copyrighted training data challenges the fair use doctrine (Chandra, 2023). For example, The New York Times has filed a copyright infringement lawsuit against OpenAI and Microsoft, claiming that these AI systems use their copyrighted material to train the AI systems' large language models (Klosek, 2024). Fair use allows individuals to use copyrighted content without needing the copyright holder's approval as long as specific conditions are met (Penn State, 2024).

When determining if a particular use of copyrighted material is qualified as fair use or copyright infringement, there are four main factors to consider together: (1) the purpose and type of use; (2) the nature of the original work; (3) the amount of copyrighted work used and its sustainability; and (4) the impact on the market (Penn State, 2024). AI companies argue that training AI models with publicly available materials qualifies as fair use, citing the Library Copyright Alliance's position that such use aligns with established legal principles (Klosek, 2024).

While fair use permits limited and transformative use of copyrighted works, it remains unclear whether AI training qualifies as transformative or permissible under this standard (Chandra, 2023). Rachael Samberg, Timothy Vollmer, and Samantha Terem argue that treating AI model training as fair use is crucial for preserving research opportunities, such as text and data mining, because restricting AI training to public domain works would limit scholarly inquiries and limit cultural, historical, and societal studies from academic research (Klosek, 2024). Others argue that AI systems relying on vast datasets containing copyrighted material may infringe on existing protections, leading to legal disputes. In response, jurisdictions like the European Union (EU) have introduced text and data mining exceptions to facilitate innovation, but the US lacks such provisions (Lee et al., 2021; Corbett, 2023). A balanced legal solution is needed to address these ambiguities, ensuring AI development and scholarly research can progress while protecting the rights of creators.

The rise of AI as a quasi-autonomous creator is straining IP laws, which have historically been grounded in human originality and labor (Cuntz et al., 2024). As Cuntz et al. (2024) argue, IP laws must adapt to accommodate AI's role in creativity while addressing ownership and liability. As AI systems increasingly push the boundaries of copyright frameworks designed for

human authors, the need to reevaluate legal standards becomes even more poignant (Lee et al., 2021; Chandra, 2023).

Historically, courts have struggled with the role of machines in copyright, particularly concerning authorship and liability. Cases like *White-Smith Music Publishing Co. v. Apollo Co.* (1908) and *Religious Technology Center v. Netcom On-Line Communication Services, Inc.* (1995) established the 'volitional act' requirement, necessitating human intent to determine authorship or infringement liability (Chatterjee & Fromer, 2019). Since AI lacks the capacity for intent or independent legal action, its recognition as an author or infringer creates challenges under the existing law (Chatterjee & Fromer, 2019). This reliance on human volition highlights a barrier to incorporating AI-generated works into traditional copyright law.

Scholars debate the risks and benefits of expanding copyright to AI works. Critics caution that such expansion could disrupt the balance between public access and creator rights, while others argue that excluding AI works suppresses innovation and investment (Chandra, 2023; Jain, 2021). For example, restrictions on AI training data could hinder technological progress (Crouch, 2024). Moerland (2024) emphasizes that while AI algorithms can be protected as literary works, AI-generated outputs that lack human creative input remain excluded.

Comparative analyses highlight varying global approaches to AI-generated works. In jurisdictions such as the UK, New Zealand, Hong Kong, and South Africa, authorship of computer-generated works is attributed to programmers through legal fiction (Lee et al., 2021). In contrast, US laws remain rooted in traditional, human-centric authorship standards.

Proposed reforms include recognizing AI as a co-author or treating it as a legal tool to bridge the gap that the current law has left (Tripathi & Ghatak, 2018; Pearlman, 2017). As AI continues to reshape creative industries, US copyright law must address critical gaps in

authorship, liability, and fair use while balancing innovation incentives with protecting human creators' rights (Hilty et al., 2020; Corbett, 2023).

(2.2) Patent Law and Inventor/Invention

Patent law, a branch of IP, grants inventors exclusive rights to their inventions to encourage innovation while promoting public knowledge through mandatory disclosure requirements (Tripathi & Ghatak, 2018; Corbett, 2023). Historically, this system is based on creativity and human ingenuity (Cuntz et al., 2024). However, as Cuntz et al. (2024) point out, AI functions as both a "general-purpose technology" and an "invention of the method of invention" (p. 19). While AI enhances innovation productivity (by accelerating the development of ideas and reducing research time), it challenges the human-centric foundations of patent law, creating potential inequities for human inventors (Corbett, 2023).

Traditionally, US patent law requires that inventors be human, as the law centers on mental processes like 'conception,' which involves human intent and creativity and excludes AI systems that lack personal intent or an emotional attachment (Tripathi & Ghatak, 2018; Abbott, 2016). Since AI lacks mental states and does not form attachments to its creations, its recognition as an inventor is a contentious issue. Inventions generated by AI without direct human involvement may not meet the criteria for patentability (Jain, 2021). For an invention to be considered patentable, the inventor must have conceived a permanent idea during the 'conception' stage (Tripathi & Ghatak, 2018).

This human-centered framework is also maintained by the United States Patent and Trademark Office (USPTO) and the European Patent Office, which reject AI as inventors (Lee et al., 2021). Given AI's ability to generate inventions autonomously, there is a need to reconsider

the legal and philosophical foundations of what it means to invent (Pearlman, 2017; Corbett, 2023). The USPTO and courts have consistently rejected AI as an inventor, highlighting a fundamental issue in patent law. These limitations reflect a legal framework not yet equipped to handle AI-driven innovation (Tripathi & Ghatak, 2018; Pearlman, 2017).

Abbott (2016) argues that AI systems like the *Creativity Machine,* developed by Dr. Stephen Thaler, could fulfill inventorship criteria. However, such AI systems' lack of "legal personality" remains a barrier (Tripathi & Ghatak, 2018, p. 94). Recognizing AI as inventors would challenge the traditional mental act requirement but could resolve ownership ambiguities (Abbott, 2016). Still, AI-generated inventions complicate core patent principles by relying on pre-existing data and algorithms, raising legal, ethical, philosophical, and economic questions about independent innovation (Tripathi & Ghatak, 2018).

Patent law is based on three core principles – novelty, inventive steps, and industrial applicability – which create particular challenges when applied to AI-generated inventions (Tripathi & Ghatak, 2018). For example, the novelty requirement demands that an invention significantly differ from prior art (Tripathi & Ghatak, 2018). This raises concerns about whether AI outputs truly represent independent innovation or simply reflect existing input data and algorithms (Tripathi & Ghatak, 2018). As Chandra (2023) observes, "Patentability is a key issue in the protection of AI innovations... the challenges involved in demonstrating novelty, non-obviousness, and usefulness are significant" (pp. 1448-1449). AI-generated inventions challenge traditional patent criteria and whether human-provided data and algorithms can be considered part of the inventive process. As a result, determining whether AI outputs meet the thresholds for novelty, inventive steps, and industrial applicability becomes complicated (Tripathi & Ghatak, 2018; Corbett, 2023).

The opacity of AI systems, often described as ‘black boxes,’ creates significant challenges to patent law’s disclosure requirement, which demands clarity for others to replicate an invention (Lee et al., 2021; Hilty et al., 2020). This lack of transparency in the process of how AI systems generate specific outputs and reach decisions also complicates the establishment of copyright protections (Hily et al., 2020). Although AI enhances efficiency in patent-related processes such as prior art searches and infringement analysis, it risks perpetuating biases inherent in its training data (Hilty et al., 2020; Noble, 2018). These algorithmic biases raise concerns about fairness, transparency, and accountability in patent adjudication (Chandra, 2023).

AI-related patents can prevent future innovation by limiting access to key technological ‘building blocks’ needed for new developments (Cuntz et al., 2024). Policymakers must carefully address the risk of market concentration, where a few entities control critical AI technologies, to ensure a balanced approach that allows for innovation while protecting broader societal interests (Lee et al., 2021; Hilty, 2020). The EU has considered classifying AI-generated works under copyright as “own intellectual creation,” providing a potential model for how U.S. patent laws might better address the complexities of AI-generated inventions (Tripathi & Ghatak, 2018, p. 91). Corporations often patent AI innovations to incentivize development and strengthen their competitive position, using AI-driven knowledge gathering to gain market advantages (Hilty, 2020).

Moerland (2024) distinguishes between AI-assisted and AI-generated inventions. AI-assisted inventions, in which humans make significant contributions to problem-solving, align well with the traditional human-centered framework of patent law (Moerland, 2024). In contrast, AI-generated inventions – where machines autonomously develop solutions with minimal or no human input – challenge the concept of human inventorship, as no natural person

may qualify as the inventor (Moerland, 2024). According to Cuntz et al. (2024), the latter category poses significant legal challenges, as current frameworks require human conception.

Authors reviewed in the literature propose several critical reforms to address these challenges. First, inventorship must be clarified by explicitly determining whether AI systems can qualify as inventors; if not, rights should be assigned to human collaborators, programmers, or deploying entities based on their contributions (Pearlman, 2017; Chandra, 2023). Second, patentability standards, such as novelty and inventive steps, should evolve to account for AI's role in innovation while maintaining rigorous evaluation criteria (Chandra, 2023; Tripathi & Ghatak, 2018). Third, ethical and strategic guidelines are needed to address biases in AI training data and ensure transparency in AI-driven decision-making processes (Chandra, 2023; Noble, 2018). Finally, policymakers must confront broader societal implications, including job displacement in creative and research and development sectors, to ensure that IP law aligns with societal and economic needs (Hilty, 2020).

AI has the potential to revolutionize innovation and disrupt industries, but existing human-centric patent law principles must evolve to meet its challenges (AI-Admin, 2024). Explicitly defining inventorship, refining patentability criteria and disclosure requirements, and addressing AI-related ethical and economic impacts will help US IP laws fulfill their constitutional purpose of promoting the progress of science and the arts (Corbett, 2023; Pearlman, 2017; Abbott, 2016).

(2.3) Data Protection

Data forms the foundation of AI innovation, interacting with IP, competition law, and data protection (Lee et al., 2021). Data protection involves the legal frameworks designed to

protect personal and sensitive information from unauthorized access, use, and misuse (Storage Networking Industry Association, 2024). These measures uphold individual privacy rights while regulating data collection, storage, and sharing (Storage Networking Industry Association, 2024).

Cuntz et al. (2024) note that AI relies on vast datasets protected by trade secrets, database rights, or copyright. Balancing access to training data with incentives for data creation creates challenges: overly restrictive IP protections can hinder AI development, while lax regulations may reduce innovation incentives (Cuntz et al., 2024). To address the controversy over copyrighted data use in AI training, Cuntz et al. (2024) recommend "automated licensing mechanisms" and liability rules to mitigate infringement risks (p. 20).

Hilty et al. (2020) argue that data exclusivity, rather than formal IP protections, serves as the primary protection for innovation in AI tools. "In the context of machine learning...the creation of (factual) data exclusivities or data-specific competitive advantages and know-how tends to be the incentive to innovate in the first place, and not IP rights" (Hilty et al., 2020, p. 21). Hilty et al. (2020) suggest that data-driven strategies may better support the rapid evolution of AI tools.

AI's reliance on datasets conflicts with US IP laws, particularly regarding fair use and liability (Chandra, 2023). AI outputs often fall outside fair use boundaries, creating legal uncertainty (Chandra, 2023). This issue is worsened by AI's 'black box' nature, which obscures decision-making and complicates IP enforcement, highlighting the need for more explicit guidelines on AI's use of copyrighted materials (Lee et al., 2021).

Trade secret misappropriation presents further risks in the AI era. Trade secret law protects confidential business information, such as proprietary algorithms or AI technologies (Chandra, 2023). However, AI has introduced new methods for theft, as shown by a case where

AI algorithms replicated genetically engineered rice seeds stolen by a scientist (Chandra, 2023). To mitigate such risks, Chandra (2023) advocates AI-powered monitoring systems to detect data breaches, while Nyaboke (2024) calls for stronger legal protections for AI-generated trade secrets through updated legislation. Although Hilty et al. (2020) support trade secret protections, they caution against overregulation that could suppress innovation. Similarly, Crouch (2024) warns that excessive reliance on trade secrecy may undermine AI transparency, explainability, and accountability - factors vital for societal trust. A balanced approach to regulation is needed to protect proprietary interests without perpetuating AI's inherent 'opacity.'

Bias in AI systems, often stemming from unrepresentative training datasets, further complicates data protection and IP. Chandra (2023) and Lee et al. (2021) stress that biases can perpetuate discrimination, impacting sectors like patents. Noble (2018) adds to this discussion of inherent algorithmic biases, explaining the concept of technological redlining as decisions embedded in automated algorithms that systematically reinforce racism, sexism, and other forms of oppression. Noble's investigation into Google's search algorithms shows how profit-driven motives can prioritize discriminatory and harmful representations - such as the sexualized portrayal of women of color - over neutral or equitable information (Noble, 2018). These biased systems reflect and perpetuate oppressive ideologies, influencing how information is classified and represented, particularly for historically marginalized groups (Noble, 2018). Such systemic bias highlights the importance of promoting transparency and fairness in AI training and decision-making processes. Training AI systems on diverse and representative datasets helps reduce prejudice and counter the reinforcement of societal inequities.

The rapid evolution of AI presents significant challenges to traditional IP frameworks, requiring a careful balance between protecting investments and avoiding monopolization that

suppresses competition (Corbett, 2023). Hilty et al. (2020) note that when AI-driven innovation cycles accelerate to the point where investments cannot be recouped (even with IP protection), such rights may harm economic welfare. They argue that conventional economic theories, like Kitch's Prospect Theory, struggle to integrate AI's rapid innovation and spillover effects (Hilty et al., 2020). As alternatives, Hilty et al. propose open-source frameworks and a self-regulatory model. Similarly, Moerland (2024) highlights the need for IP frameworks to adapt by balancing incentives for AI research with public access, warning that overly restrictive protections may suppress innovation while insufficient protections risk diminishing incentives for development.

Chesterman (2024) adds an economic perspective to this debate, comparing AI's impact on creative industries to disruptions seen in the gig economy. Like gig work, AI threatens to break creative professions into fragmented, task-based roles with less job security, lower compensation, and reduced long-term career prospects. Chesterman (2024) cautions that unchecked AI-generated content could commoditize creative jobs, lowering market value and undermining sustainability. Drawing from the music industry's transition post-Napster, Chesterman (2024) advocates for licensing models and transparency requirements to mitigate harm. In addition to its legal and economic implications, AI harms creative industries, individual artists, and authors of works (Glynn, 2025; Coulter, 2025). In February 2025, over 1,000 musicians, including Annie Lennox, Kate Bush, and Damon Albarn, protested proposed UK copyright changes that would enable AI to use copyrighted content by default (Glynn, 2025). They released a silent album symbolizing the potential erasure of human-created music (Glynn, 2025).

Scholars have proposed legislative and policy frameworks to address challenges related to AI and IP regulation. Tripathi and Ghatak (2018) advocate for an *AI Data Protection Act* to

regulate the use of AI and establish mechanisms for managing civil and criminal liabilities arising from AI-driven actions. Regarding IP rights, Pearlman (2017) suggests a structured framework for recognizing AI authorship and inventorship. This approach assigns IP rights to appropriate individuals or entities through predefined rules, including contractual agreements to protect ownership and data rights (Kop, 2019). Corbett (2023) recommends creating "sui generis" rights for AI-generated works to incentivize innovation while minimizing disruption to existing legal systems (p. 375). Sui generis, meaning "of its own kind" in Latin, is an expression used to describe unique IP rights created to protect works that fall outside of traditional categories, allowing for tailored legal protection (Cornell Law School, 2021, p. 1). Abbott (2016) further emphasizes default ownership rules, such as assigning AI-generated inventions to the AI's owner, to encourage technological progress.

From a societal perspective, Kop (2019) introduces "Res Publicae ex Machina" (public property from the machine), which treats AI outputs that exceed a defined autonomy threshold as a public good (p. 37). Based on the Roman multi-layered property model, this concept encourages innovation, protects cultural diversity, and ensures broad access to AI-generated content while preventing monopolization (Kop, 2019). Chesterman (2024) discusses the need for a balanced regulatory approach that supports innovation and fair compensation for human creators. He emphasizes transparency, ethical licensing practices (such as those demonstrated by Adobe Firefly compensating creators), and accountability by using authorized datasets to clarify ownership and respect IP rights (Chesterman, 2024).

These proposals outline strategies to regulate AI, address ownership uncertainties, and balance innovation and societal interests. Corbett (2023) further underscores the importance of harmonizing IP laws globally, noting the challenge of aligning US utilitarian frameworks with

Europe's moral rights-based systems. International collaboration is crucial to ensure consistent protection for AI-generated works across jurisdictions, particularly given the globalized nature of AI datasets (Corbett, 2023; Nyaboke, 2024; Cuntz et al., 2024; Moerland, 2024).

To conclude, the rapid advancement of AI challenges the foundational principles of IP law, exposing the inadequacies of a historic system built to protect human creativity in an increasingly digital and machine-driven landscape. AI's ability to autonomously produce creative works and inventions raises questions of authorship, ownership, and inventorship. Traditional IP frameworks, grounded in human intent and originality, are not equipped to address AI's role as a quasi-autonomous creator (Abbott, 2016; Chesterman, 2024; Cuntz et al., 2024; Kirakosyan, 2024; Kop, 2019; Moreland, 2024). As seen in debates surrounding copyright, patentability, fair use, and data protection, the emergence of AI necessitates tailored reforms, including more explicit definitions of authorship, adaptable patent criteria, and regulatory approaches that ensure transparency, accountability, and fairness.

Legislative reforms must clarify ownership and liability for AI-generated works while ensuring that IP laws incentivize innovation without suppressing competition or access. Crucially, reforms must balance technological innovation and protect human creators' rights. While producing reforms, addressing ethical concerns like algorithmic bias, technological redlining, data privacy breaches, and job displacement remains crucial to ensuring that AI development promotes societal progress without perpetuating inequities (Chesterman, 2024; Crouch, 2024; Cuntz et al., 2024; Moreland, 2024; Noble, 2018). As AI redefines creativity and innovation, IP law must evolve to reflect the realities of this digital age. IP reforms must create a future where human ingenuity and technological advancement coexist, allowing for

life-changing advancements while protecting the historic values that define our shared humanity: fairness, creativity, accountability, and individual rights.

Research Design

This study employs a doctrinal legal research methodology to assess the adequacy of US IP law in regulating AI-generated content and innovations (Jerome Hall Law Library, 2025). Often referred to as the 'black letter' approach, this method entails analyzing legal statutes, judicial opinions, and patterns in the law to evaluate the effectiveness of existing laws, identify inconsistencies, and propose necessary reforms (Jerome Hall Law Library, 2025).

The United States Code (USC) is the official compilation and codification by subject of the general and permanent US federal laws, organized into 54 titles and maintained by the Office of the Law Revision Counsel of the US House of Representatives (US Government Publishing Office, n.d.). Primary legal sources, including federal IP statutes (Title 17 USC for copyright and Title 35 USC for patents), judicial rulings, and policy documents, form the backbone of this study. These primary sources underline existing definitions, court interpretations, and ongoing legal disputes, providing insight into where AI-generated works and inventions fall within or outside current legal protections. Additionally, secondary legal sources, such as scholarly articles, legal analyses, and expert reports, add to the study by offering critical perspectives on AI's impact on IP law. These sources were selected based on their credibility and relevance to AI-generated content, ensuring the analysis is contemporary and legally sound.

The results are presented visually using three comparative tables to analyze the law's shortcomings and subsequent proposals. This table structure is particularly helpful in Tables 1 and 2, as it directly juxtaposes statutory provisions against AI-related challenges. The comparative structure is also beneficial in Table 3, as it highlights legal gaps, their subsequent reforms, and supporting case law to further the argument that the current law is inadequate in protecting creators' rights against AI.

Table 1 (Copyright Law and AI) examines thirteen Title 17 sections, evaluating the implications of AI for subject matter, authorship, fixation requirement, derivative works, exclusive rights, fair use, ephemeral recording privileges, ownership and derivative rights, statutory licenses for sound recordings, public representation loopholes, registration process, technological circumvention, and copyright management information (CMI) integrity.

Table 2 (Patent Law and AI) assesses ten Title 35 sections, evaluating the implications of AI for patent examination and appeals, patentability criteria, inventorship requirement, disclosure and enablement, patent term extensions, protection of AI-assisted plant breeding, liability for AI-driven infringement, AI's role in prior commercial use defense, remedies for AI-Driven patent infringement, and international patent considerations.

Table 3 (Legal Gaps and Proposed Reforms) synthesizes the deficiencies and provides policy recommendations, highlighting key legal cases, such as *Thaler v. Vidal* (2022)*, NYT v. OpenAI* (pending in 2025), *Getty Images v. Stability AI* (2023), *Thaler v. Perlmutter* (2023), *Kadrey v. Meta Platforms, Inc.* (2023), *Thaler v. Perlmutter* (2023), and *Thaler v. Hirshfeld* (2021). These cases were selected for this analysis based on their legal significance, jurisdictional relevance to the US, and the unresolved or ambiguous legal questions they present regarding AI and IP law.

The primary challenge in this legal review is interpreting statutes enacted before the rise of AI. The language of US IP laws does not clearly apply to AI technologies, resulting in uncertainty about how key legal concepts should be interpreted in this context. However, this challenge emphasizes the purpose of the study: to identify legal gaps and how IP can evolve to address these gaps created by AI. The lack of judicial precedent in many AI-related copyright and patent disputes further complicates the analysis. This study relies on foreseeable issues based

on the USC, existing cases, and expert analyses to address these challenges. Another challenge is that some of the cases referenced, such as *NYT v. OpenAI*, remain ongoing as of 2025. The ongoing legal debate surrounding AI and IP law highlights the inadequacy of the current IP framework, the need for reform, and the necessity of this study.

Conducting a legal review, this study contributes to the ongoing conversation about AI and IP by identifying specific copyright and patent law gaps and proposing targeted legal amendments that balance technological innovation with IP protections.

Results

This section details the findings of the study by addressing: (1) the current state of intellectual property law; (1.1) federal copyright law; (1.2) federal patent law; and (2) insufficiently covered legal gaps and proposed reforms.

(1) The Current State of US Intellectual Property Law

This section examines US IP law and its adequacy in protecting creators' rights concerning AI. The two subsections focus on copyright and patent law as they stand at the time of this study. It is important to emphasize that the current framework of IP law is built on protecting "original works of authorship" created by humans and preserved in a tangible form (US House of Representatives, n.d.-a, p. 17).

(1.1) Federal Copyright Law

The foundational criteria for copyright protection are originality and fixation (US House of Representatives, n.d.-a). Originality is evident in Section 102(a), where the law does not define it but instead relies on judicial precedents, establishing that originality requires only a minimal degree of creativity (US House of Representatives, n.d.-a). Meanwhile, fixation is explained as a work that must be "fixed in any tangible medium of expression" that allows it to be "perceived, reproduced, or otherwise communicated" (US House of Representatives, n.d.-a, pp. 6 and 178).

Table 1 below details thirteen aspects and legal provisions of copyright law, as outlined in Title 17 of the USC, along with their implications for AI. It highlights the legal gaps surrounding Section 102, including subject matter, authorship, and the fixation requirement. It

also highlights gaps in Section 103 (derivative works) and Section 106 (exclusive rights). A derivative work is a new creation that is based on or adapted from one or more existing copyrighted works (Cornell Law School, 2022). Copyright law grants the original copyright holder the exclusive right to authorize their work's transformation, adaptation, or reinterpretation. Such derivative works require permission from the copyright owner unless the original work is in the public domain (Cornell Law School, 2022; Kop, 2019). Exclusive rights protect reproduction, distribution, and derivative works, raising concerns that AI systems may potentially infringe on these rights when generating outputs based on copyrighted material.

Table 1 also emphasizes Section 107, the fair use clause, which allows exceptions for criticism, teaching, and research (US House of Representatives, n.d.-a). However, whether using copyrighted datasets to train AI falls under fair use remains unsettled. AI's ability to remix or generate content autonomously further complicates the distinction between transformative and derivative use (US House of Representatives, n.d.-a). The table also highlights legal gaps surrounding Sections 112 and 114, including ephemeral recording privileges, ownership and derivative rights, and statutory licenses for sound recordings. Additionally, a gap is identified in Section 120 with public representation loopholes. Section 408 confronts issues surrounding the documentation of AI and the copyright registration process.

Finally, the table addresses Sections 1201 (technological circumvention) and 1202 (CMI). Technological circumvention allows AI to bypass digital rights management (DRM) protections and access restricted content. DRM uses technology to help control how digital content is copied, shared, and used, making it more difficult for people to use or distribute copyrighted materials illegally (Data Loss Prevention, 2022). Moreover, CMI (Section 1202) is at risk if AI

inadvertently removes or changes metadata, leading to potential legal violations (US House of Representatives, n.d.-a).

Table 1

Overview of US Copyright Law and Its Implications for AI.

Aspect of Copyright	Legal Provision	Significance/Issues for AI
1. Subject Matter	Section 102(a) - Applies to 'original works of authorship' fixed in a tangible medium, including literary, musical, and audiovisual works.	AI's use of datasets for training challenges the definition of originality and leads to issues of copied or adapted work.
2. Authorship	Section 102(a) - Protects 'original works of authorship,' assumes a human creator, leaving AI-generated works in a legal 'gray area' regarding ownership and originality.	AI-authored works are excluded from protection due to the assumption of human authorship and the lack of clarity on ownership and originality.
3. Fixation Requirement	Section 102 - Requires works to be fixed in a tangible medium of expression to qualify for federal copyright protection.	AI-generated content may not qualify for copyright protection if it is not fixed in a tangible medium by a human author.
4. Derivative Works	Section 103 - Covers copyright protection for original contributions added to pre-existing works, but does not address authorship or protection for AI-generated outputs.	Unclear how outputs generated by AI, particularly those influenced by copyrighted training data, qualify as derivative works or how rights in such outputs can be licensed or enforced.
5. Exclusive Rights	Section 106 - Grants copyright holders the exclusive rights to reproduce, adapt (create derivative works), distribute, perform, and display their works.	AI systems that generate outputs based on existing copyrighted material may infringe on the right to create derivative works.
6. Fair Use	Section 107 - Allows exceptions for uses such as	AI's use of copyrighted material in training challenges fair use

	criticism, commentary, teaching, and research while leaving room for interpretation in new contexts.	boundaries. There is an evident gap in whether there are exceptions in AI contexts, particularly regarding database work, research, and security.
7. Ephemeral Recording Privileges	Section 112 - Permits transmitting organizations, such as broadcasters and educational institutions, to make limited, temporary recordings of copyrighted works for uses such as licensed transmission, archival purposes, or instructional broadcasts.	This does not address whether AI systems that make temporary or intermediate copies during training or operation (especially in automated and large-scale contexts) qualify for similar exemptions.
8. Ownership and Derivative Rights	Sections 112 and 114 - Statutory licensing systems do not explicitly cover data used for training generative AI models.	Licensing mechanisms for AI outputs based on copyrighted training datasets are unclear, leaving enforcement ambiguous.
9. Statutory Licenses for Sound Recordings	Sections 112 and 114 - Statutory licenses regulate royalty payments for broadcasting and digital transmissions, but do not address AI training.	Licensing and compensation gaps for AI training on datasets containing copyrighted materials create ambiguity in the enforcement and infringement of creators' rights.
10. Public Representation Loopholes	Section 120 - Permits the creation and use of pictorial representations of publicly visible architectural works, bypassing derivative protections under Section 106.	AI systems may lawfully train on or generate images of public architecture without infringing copyright, potentially bypassing the original creator's control over derivative works.
11. Registration Process	Section 408 - Allows permissive copyright registration but does not explicitly require disclosure of AI-generated contributions or underlying training datasets.	The absence of documentation requirements for AI-generated content or datasets hinders transparency and complicates the assessment of originality and authorship in copyright claims.
12. Technological Circumvention	Section 1201 - Prohibits circumvention of technological measures that control access to copyrighted works and the	AI systems that bypass technological barriers to access copyrighted content, for example, behind paywalls or in

	trafficking in tools or services designed to bypass such protections, subject to certain exemptions for uses like research, education, security testing, and interoperability.	DRM-protected files, might infringe, even if the underlying use might otherwise qualify as fair use.
13. Copyright Management Information Integrity	Section 1202 - Prohibits knowingly falsifying, removing, or distributing altered CMI with the intent to facilitate or conceal copyright infringement.	AI systems that generate, remix, or distribute content may inadvertently strip or misattribute CMI, raising liability risks and enforcement challenges in identifying authorship and protecting rights.

(1.2) Federal Patent Law

Patentability criteria (Section 100) require novelty, usefulness, and non-obviousness (US House of Representatives, n.d.-b). AI-generated inventions may meet these criteria, but their legal recognition is prevented by the assumption that inventors must be human.

Table 2 below details ten aspects and legal provisions of patent law, as outlined in Title 35 of the USC, along with their implications for AI. It highlights the legal gaps surrounding Section 6 (patent examination and appeals), which outlines the Patent Trial and Appeal Board (PTAB) institution. It also highlights gaps in Section 100 (patentability criteria) and Sections 101 and 115 (inventorship requirement). The inventorship requirement explicitly mandates that only “natural persons” can be listed as inventors on patent applications, stopping AI from being credited despite its ability to develop novel solutions autonomously (US House of Representatives, n.d.-b, p. 169; Moerland, 2024). This limitation raises concerns about whether AI-assisted innovations will lack patent protection if no human can claim sole inventorship.

The table also outlines legal gaps surrounding Section 112 (disclosure and enablement) and Section 156 (patent term extensions). Disclosure and enablement require that patents provide

sufficient detail for a "skilled" person to replicate an invention (US House of Representatives, n.d.-b, p. 72). AI-generated inventions often lack transparent reasoning processes, making it challenging to meet this legal standard (Crouch, 2024; Moerland, 2024). Explainability requires that a patent application clearly and thoroughly describes an invention so that someone skilled in the field (known as a 'person having ordinary skill in the art') can understand and replicate it (US House of Representatives, n.d.-b, p. 66). There are also uncertainties in patent term extensions, especially regarding AI-assisted pharmaceutical discoveries. Furthermore, legal gaps in Sections 161 to 164 (protection of AI-assisted plant breeding) raise uncertainty when AI systems are involved in discovering or breeding new plant varieties, as current law does not address non-human inventors or attributing inventive activity to autonomous systems.

Moreover, Table 2 details legal gaps surrounding Section 271 (liability for AI-driven infringement) and Section 273 (AI's role in prior commercial use defense). The liability for patent infringement remains unclear when AI autonomously infringes patents. It is also uncertain whether legal responsibility should be placed on the developer, the operator, or the AI itself (Kirakosyan, 2024; Chesterman, 2024). Finally, the table addresses Section 284 (remedies for AI-driven patent infringement) and Sections 361-371 (international patent considerations).

Table 2

Overview of US Patent Law and Its Implications for AI.

Aspect of Patent	Legal Provision	Significance/Issues for AI
1. Patent Examination and Appeals	Section 6 - Establishes the PTAB but does not address AI's role in existing/prior art analysis or automated patent review.	AI-assisted patent applications face challenges during examination, as claims are evaluated based on human conception rather than AI-generated outputs.

2. Patentability Criteria	Section 100 - Defines conditions for patentability, including novelty, usefulness, and non-obviousness. It does not specify whether AI-generated inventions meet these standards independently.	AI-generated inventions may qualify for patents, but the law requiring a human inventor creates uncertainty for AI-driven innovation.
3. Inventorship Requirement	Sections 101 and 115 - Inventors must be "natural persons." Patent applications must name the inventor and include an oath or declaration affirming that the named individual believes themselves to be the original inventor.	AI cannot be legally recognized as an inventor, meaning AI-generated innovations may lack patent protection when no human can claim sole inventorship.
4. Disclosure and Enablement	Section 112 - Requires that a patent application include a written description sufficient to enable a person skilled in the relevant art to make and use the invention and disclose the best mode contemplated by the inventor.	AI-generated inventions may face difficulties satisfying the enablement and written description requirements due to limited transparency and explainability, complicating efforts to secure patent protection for such innovations.
5. Patent Term Extensions	Section 156 - Allows extending a patent term to compensate for time lost during regulatory review of certain products, including drugs and medical devices, under specific conditions and limits.	Legal uncertainty remains as to whether AI-assisted drug discoveries or automated regulatory submissions meet the criteria to qualify for term extensions.
6. Protection of AI-Assisted Plant Breeding	Sections 161-164 - Grant patents for new and distinct plant varieties, assuming 'human breeders' and do not address AI-driven genetic modifications.	AI-generated plant varieties may not receive patent protection if no 'human breeder' is identified, despite AI's relevance to genetic engineering.
7. Liability for AI-Driven Infringement	Section 271 - Defines patent infringement, including direct infringement (making, using, selling, or importing a patented invention without authorization) and indirect	If an AI system autonomously infringes a patent, current law does not establish whether liability falls on the owner, developer, or user, leaving a gap in how infringement is

	infringement (inducement and contributory infringement), and outlines specific exceptions, defenses, and remedies.	attributed in non-human decision-making contexts.
8. AI's Role in Prior Commercial Use Defense	Section 273 - Provides a defense for prior commercial use if done in good faith at least one year before a patent filing. No provisions exist for AI-generated prior use.	AI-generated innovations used commercially before a patent's effective filing date may not qualify for prior use defense if no identifiable human or legal entity can be shown to have directed the use in good faith.
9. Remedies for AI-Driven Patent Infringement	Section 284 - Courts must award damages adequate to compensate for patent infringement, including at least an adequate royalty, and may increase damages up to three times the assessed amount in cases of willful infringement. Assume intent and knowledge, which AI lacks.	AI-driven infringement complicates damage assessment, as existing laws presume that a human knowingly violated a patent. This makes it challenging to attribute liability for the damages and difficult to calculate appropriate remedies.
10. International Patent Considerations	Sections 361-371 - Describes the US implementation of the Patent Cooperation Treaty, defining international application procedures, the role of the USPTO, priority rights, and the transition from the international to national phase for patent filings.	Assumes a human inventor and applicant. The absence of international consensus on whether AI can be recognized as an inventor creates legal inconsistency, particularly when jurisdictions like South Africa and Australia have accepted AI-generated patents (Mathur, 2023).

(2) Insufficiently Covered Legal Gaps and Proposed Reforms

Table 3 outlines ten insufficiently covered legal gaps in copyright and patent law, proposed reforms, and relevant legal cases reiterating the necessity to update IP law.

Table 3

Insufficiently Covered Legal Gaps and Subsequent Proposed Reforms.

Insufficiently Covered Legal Gaps	Proposed Reforms	Relevant Legal Cases
1. Non-Human Authorship - Copyright law assumes a human creator (17 USC Section 102), leaving AI-generated works in a legal 'gray area.'	Amend 17 USC section 102 to expand authorship definitions, granting copyright to human operators with substantial control over AI's creative process. Develop an AI-specific IP framework to offer limited protection for AI-generated works, using co-authorship models when appropriate and excluding fully autonomous AI outputs from copyright, instead protecting them through a sui generis system or as public goods (Howell, 2023; Mathur, 2023).	*Thaler v. Perlmutter* (2023): Highlights the human authorship requirement in copyright law, reinforcing that AI-generated works lack copyright protection. The court ruled that because Dr. Stephen Thaler's AI system, the *Creativity Machine*, autonomously generated the work without human guidance or intervention, it did not meet the legal standard for authorship (Howell, 2023; Mathur, 2023).
2. AI and Transformative Use - AI's use of copyrighted materials in training challenges fair use boundaries (17 USC Section 107).	Establish a specialized, tiered fair use framework under 17 USC section 107. This system should apply quantitative thresholds based on the extent and nature of content used, refine the concept of transformative use for AI outputs, and require licensing or compensation at higher usage tiers. Higher statutory damages should deter mass copying, ensuring a balance between responsible AI innovation and copyright protection (Chhabria, 2023; Allyn, 2025).	*NYT v. OpenAI* (pending in 2025): Highlights AI's challenges to fair use by questioning whether AI training on copyrighted materials constitutes transformative use or direct competition with original works (Allyn, 2025). OpenAI argues that its model's processing of data into patterns and tokens qualifies as transformative. At the same time, The New York Times contends it enables AI to serve as an alternative source of information, undermining traditional copyright protections and monetization models (Pope,

		2024).
3. Ownership of AI Outputs - The law does not clarify who owns AI-generated content when multiple parties contribute (17 USC. Section 114).	Amend 17 USC section 114 to define ownership rights in AI-generated works by establishing clear criteria based on meaningful human involvement or substantial content transformation. In cases with minimal human input, ownership should be assigned to the entity responsible for training and operating the AI system. Contractual agreements should allow for shared or role-based ownership and clarify derivative work standards. Transparency measures like digital watermarking should be included to track the use of copyrighted materials in AI training (Howell, 2023; Kirakosyan, 2024; Kop, 2019; Allyn, 2025).	*Kadrey v. Meta Platforms, Inc.* (2023): highlights the legal ambiguity surrounding AI-generated content ownership. It confirms that AI models are not derivative works (Chhabria, 2023); however, it does not resolve who holds the rights to AI-generated outputs when multiple parties contribute (Howell, 2023).
4. AI Training and Copyrighted Data - No licensing mechanism exists for AI systems using copyrighted materials for training (17 USC Sections 112 and 115).	Establish AI-specific licensing provisions under 17 USC sections 112 and 115, modeled after collective licensing systems in the music industry, to regulate the use of copyrighted material in AI training. Require developers to participate in a statutory licensing scheme, pay compulsory fees for training data, set clear rules for digital archives, define usage limits to prevent market competition	*Getty Images v. Stability AI* (2023): highlights the legal gap in AI training, where no licensing mechanism exists for using copyrighted materials. Getty sued AI developers for training on copyrighted images without a license (Loving, 2023).

	with original works, and implement adaptive compensation schemes (Pope, 2024).	
5. Derivative Works Ambiguity - AI-generated content influenced by copyrighted works blurs derivative rights (17 USC. Section 103).	Clarify under 17 USC section 103 how AI-generated works influenced by copyrighted materials should be classified and licensed, specifying in section 106 whether this qualifies as a derivative work and how ownership is determined. Establish clear standards to assess derivative status based on recognizable elements and transformative changes. Implement a licensing framework with opt-in/opt-out mechanisms for rights holders, ensuring that AI-generated content legally licenses pre-existing works or demonstrates originality and transformation to avoid infringement (Moerland, 2024; Kirakosyan, 2024; Chhabria, 2023).	*Thaler v. Perlmutter* (2023): Reinforces that derivative rights apply only when substantial human authorship exists, creating ambiguity for AI-generated works that incorporate copyrighted material but lack apparent human involvement (Mathur, 2023; Howell, 2023).
6. AI and Patent Inventorship - Patent law limits inventorship to 'natural persons' (35 USC Sections 101 and 115).	Amend 35 USC sections 101 and 115 to recognize AI systems as co-inventors alongside humans when meaningful human oversight and intellectual contributions are present. Update statutory language that limits inventorship to "individuals" and introduce AI-specific provisions defining the minimum human role required for	*Thaler v. Vidal* (2022): The Federal Circuit ruling reaffirms that US patent law limits inventorship to "natural persons," excluding AI systems from being recognized as inventors even if they autonomously generate novel and non-obvious solutions. This highlights a legal gap in protecting AI-assisted innovations (US Court of Appeals for the Federal

	co-inventorship and patent eligibility. Emphasize the creativity of the invention itself, regardless of whether it originates from a human, AI, or their collaboration (Abbott, 2016; Karpinia, 2020; Mathur, 2023; Frankel et al., 2024).	Circuit, 2022).
7. Patent Disclosure and Explainability - AI-generated inventions may not meet the explainability standard required under 35 USC Section 112.	Establish new disclosure standards for AI-generated inventions under 35 USC section 112. Applicants must provide detailed documentation of the AI's role in the inventive process, including how the AI was used, its specific contributions, and key procedural steps. Transparency in training data and algorithms should be mandated to help patent examiners assess the originality and inventive contribution of AI-generated outputs (Lee et al., 2021; Mathur, 2023).	*Thaler v. Hirshfeld* (2021): highlights that AI-generated inventions fail to meet the explainability standard because patent law requires 'human conception' and a straightforward disclosure process, which AI lacks due to its inability to provide the reasoning behind its creations (*Thaler V. Hirshfeld*, 2021).
8. Liability for AI Infringement - Patent law assumes a human actor for infringement (35 USC Section 271).	Amend 35 USC section 271 to establish a tiered liability framework holding AI developers, users, and service providers accountable for AI-driven patent infringement. Implement strict liability for unauthorized use of patented inventions, balanced by Safe Harbor protections for entities using approved infringement	*Kadrey v. Meta Platforms, Inc.* (2023): Highlights the challenge of IP laws that assume human actors in AI systems by exposing gaps in copyright for training data and AI-generated outputs (Chhabria, 2023). Traditionally, patent law assumes that human infringement results from human actions, so updated liability frameworks are

	detection and prevention measures. Require AI companies to: (1) deploy automated systems to detect and prevent infringement during training and output generation; (2) restrict AI from producing patented inventions without authorization; (3) obtain licenses for patented technologies integrated into AI models; (4) pay statutory damages for unauthorized use; (5) publicly disclose patents included in training datasets; and (6) embed patent attribution metadata in AI-generated outputs to ensure transparency. Establish a specialized AI Patent Dispute Body within the PTAB to oversee AI-related infringement cases with expert guidance (Ali & Kamraju, 2023; Chesterman, 2024; Allyn, 2025; Jain, 2021).	needed to hold AI operators accountable for autonomous patent violations (Allyn, 2025).
9. Technological Circumvention by AI - AI systems may bypass DRM protections, violating 17 USC Section 1201.	Amend 17 USC section 1201 to define acceptable and prohibited AI circumvention activities, with specific penalties for violations. Introduce AI-specific exemptions under sections 1201(f) and (g) to permit legitimate activities such as interoperability, encryption research, and security testing. Mandate that AI developers implement safeguards and	*Kadrey v. Meta Platforms, Inc.* (2023): Highlights increasing concerns over AI scraping and bulk extraction, including from DRM-protected sources. However, this case focuses more on copyright infringement than specific anti-circumvention claims.

	certify DRM compliance to prevent unauthorized bypassing of technological protections. Expand DMCA protections to explicitly address unauthorized web scraping and bulk extraction of copyrighted materials for AI training (Chhabria, 2023; Pope, 2024).	
10. International Patent Recognition for AI - US law does not recognize AI as an inventor, creating disparities with other jurisdictions (35 USC Sections 361-371).	Broaden inventorship definitions in 35 USC section 101 to recognize AI as a co-inventor. Amend sections 361 and 363 to require disclosure of AI contributions in international patent applications, with human operators documenting AI involvement. Establish standardized disclosure forms detailing AI systems used, their inventive roles, and human input. Support international cooperation to create uniform global standards for AI-generated inventions, reducing cross-jurisdictional legal uncertainty (Karpinia, 2020; Mathur, 2023; Nyaboke, 2024; US Court of Appeals for the Federal Circuit, 2022).	*Thaler v. Vidal* (2022): Highlights the US restriction of patent inventorship to humans, creating a legal gap with countries like South Africa and Australia that recognize AI-generated inventions (Mathur, 2023). This case emphasizes the need for international patent harmonization and US reform to address AI's role in innovation (US Court of Appeals for the Federal Circuit, 2022).

The findings from Tables 1-3 highlight that current US IP laws are inadequate for protecting creators' rights in an AI era. Copyright law struggles with non-human authorship,

uncertainties regarding fair use, and licensing ambiguities. In contrast, patent law faces challenges recognizing AI inventors, defining liability for AI-driven infringement, and ensuring transparency in AI-generated innovations.

Reforms must consider AI-specific exemptions for non-commercial and research-oriented purposes (Chhabria, 2023), particularly interoperability and encryption research, while ensuring that DRM compliance measures are in place for AI developers (US House of Representatives, n.d.-a). Interoperability is the ability of software systems and devices to connect and communicate in an organized manner without requiring user effort (Lewis, 2023). Meanwhile, encryption research involves studying and testing methods to protect data by converting it into secret codes so only authorized individuals can access it. These coding systems are tested to improve security. Exemptions for interoperability (Section 1201(f)) and encryption research (Section 1201(g)) are essential because they enable AI systems to access and analyze protected content lawfully for security testing, compatibility improvements, and cybersecurity advancements, thereby ensuring innovation while preventing abuse (US House of Representatives, n.d.-a).

US IP laws must be modernized to be relevant in the age of AI (Abbott, 2016; Pearlman, 2017; Crouch, 2024; Chesterman, 2024; Jain, 2021). While some argue for broad systematic change (Kop, 2019; Chesterman, 2024; Crouch, 2024), others argue for reforms within the existing IP framework (Ali & Kamraju, 2023; Cuntz et al., 2024; Lupu, 2018), and others advocate for reexamining the fundamental human-centric principles of IP law (Moerland, 2024; Kirakosyan, 2024). Despite these contrasting approaches to change, the rigidity of current IP laws necessitates a more flexible system that can adapt to the rapid technological advancements driven by AI (Corbett, 2023; Crouch, 2024; Kop, 2019; AI-Admin, 2024).

Without updates, the US legal system risks falling behind, leaving innovators and rights holders without explicit protections. It is time for Congress to modernize IP laws to ensure a fair balance between technological progress and IP rights before AI outpaces the rules meant to govern it (Hilty et al., 2020).

Discussion and Conclusion

"The first principle in the academic world is that you direct your reader to your source material, and that isn't happening here... It begs the question of what does copyright even mean anymore," said former politician, academic, and professor Monica McWilliams (Coulter, 2025, p. 3). Her concern reflects a growing unease among scholars and creators who fear that AI is not only using their work without permission but also actively undermining the foundations of intellectual ownership.

The rise of AI is reshaping countless industries, including healthcare, finance, retail, education, transportation, military systems, cybersecurity, music, and entertainment (Datarails, 2024; Sentient Digital, Inc., 2024). However, AI is not just reshaping these industries but dismantling long-standing frameworks and redefining the boundaries of IP law within them. As AI continues evolving, urgent legal and ethical reforms are needed to address its costly implications.

This study recommends ten policy reforms to address the gaps in US federal Copyright and Patent law:

First, copyright law should be amended to explicitly require substantial human creative input for eligibility while also clearly distinguishing between human and AI-generated works. A functional approach can also be incorporated, in which AI is treated as a tool or agent alongside human authorship. In cases where AI demonstrates a high degree of autonomous creativity alongside meaningful human contribution, co-authorship models may be considered. Meanwhile, fully autonomous AI outputs should not qualify for copyright. They could instead be protected under a separate sui generis system or argued as a public good. This solution protects human creativity while still considering the realities and complexities of AI authorship (Howell, 2023).

Second, rather than directly applying traditional fair use rules to AI, a specialized tiered system should be established to determine when AI training constitutes fair use based on the extent and nature of content use (Chhabria, 2023). This system should set clear, quantitative thresholds (based on the specific percentage of work(s) used) that balance the need for AI innovation with the protection of copyright holders. Critically, this solution should refine the concept of transformative use in the AI context, differentiating between models that simply replicate elements of copyrighted works and those that generate genuinely new outputs. At higher tiers of usage, AI developers should be required to obtain licenses and/or provide compensation to rights holders. Additionally, higher statutory damages should be introduced specifically for generative AI infringement cases to help deter mass copying of works (Allyn, 2025). This solution would prevent systemic reproduction or direct market competition with original works by defining precise boundaries for permissible use while enabling responsible AI development.

Third, copyright law should establish a clear framework for determining ownership rights in AI-generated works. This proposal should define specific criteria for ownership based on the level of human creative involvement or substantial content transformation, ensuring that works with meaningful human input qualify for copyright protection. In cases where AI-generated outputs are produced with minimal human involvement, ownership should be assigned to the entity responsible for training and operating the AI system (Howell, 2023). For situations involving multiple contributors, this proposal should allow shared or role-based ownership through contractual agreements that explicitly define each party's rights and responsibilities (Kop, 2019). To support transparency and prevent unauthorized use of copyrighted materials in

AI training, the law should implement digital watermarking to help identify copyrighted materials used in AI training and enforce proper licensing (Allyn, 2025).

Fourth, copyright law should establish AI-specific licensing provisions modeled after collective licensing systems like music royalties to regulate the use of copyrighted material in AI training (Chesterman, 2024). This framework should explicitly include AI training within its scope and require developers to participate in a statutory licensing scheme. Developers would be required to pay compulsory licensing fees for incorporating copyrighted content into training datasets, ensuring fair compensation for rights holders (Allyn, 2025). The proposal should also establish licensing rules for digital archives, differentiating between digital archiving and generative AI training (Pope, 2024). Agreements should explicitly define allowed uses and include limits of usage to prevent large-scale reproduction or competition with original works (Pope, 2024). Inspired by debates in *New York Times Co. v. Tasini* (2001), the framework could incorporate adaptive compensation schemes or carve-outs that balance permissible AI usage with fair compensation for rights holders (Pope, 2024).

Fifth, copyright law should clarify how AI-generated works influenced by copyrighted materials are classified and licensed by establishing statutory standards to determine when such outputs constitute derivative works. These standards should include clear criteria (such as the degree of recognizable elements from the original work and the extent of transformative changes) to assess whether AI outputs require licensing. An additional licensing framework should offer opt-in and opt-out revenue-sharing mechanisms, allowing rights holders to choose whether their world can be used in AI training or content generation (Moerland, 2024; Kirakosyan, 2024). AI developers would then be required to obtain licenses when sustainable expressive elements are used or demonstrate that their outputs are original and transformative to

avoid infringement. This approach provides legal certainty for creators and developers while helping prevent unauthorized exploitation of protected works.

Sixth, patent law should be amended to formally recognize AI systems as co-inventors alongside humans in cases where human oversight and meaningful intellectual contributions are present. This would involve updating statutory language that currently restricts inventorship to individuals and introducing provisions specific to AI within IP law (Abbott, 2016). The amendments should establish the minimum human role required to qualify for co-inventorship and patent eligibility (Karpinia, 2020; Mathur, 2023; Frankel et al., 2024). The emphasis should be on the creativity of the invention itself, rather than the origins of the invention (whether it originates from a human, an AI system, or their collaboration).

Seventh, patent law should establish disclosure requirements for AI-generated inventions, requiring transparency in training data, algorithms, and the AI's role in the inventive process (Lee et al., 2021). Applicants should be required to provide detailed documentation of the AI's role in the inventive process, including how the AI was used, the specific contributions it made, and the key procedural steps leading to the invention. Additionally, applicants must disclose information about the training data and algorithms used, enabling patent examiners to properly assess the originality of AI-generated contributions.

Eighth, a tiered liability system should be established to hold AI developers, users, and companies accountable for their roles in AI-driven patent infringement. This system should include a strict liability rule, making AI operators automatically liable for the unauthorized use of patented inventions while offering safe harbor protections for those implementing approved compliance measures, such as infringement monitoring and prevention tools. A qualified AI Patent Dispute Body should also be created within the PTAB to handle AI-related patent

infringement cases (Jain, 2021). AI companies should also be required to: (1) deploy automated systems that detect and prevent infringement during AI training and output generation; (2) implement controls to restrict AI from producing patented inventions without proper licensing; (3) obtain licenses for patented technologies incorporated into AI models; (4) pay statutory damages for unauthorized use; and (5) publicly disclose all patented technologies included in their training datasets (Ali & Kamraju, 2023; Chesterman, 2024; Allyn, 2025). Lastly, AI-generated outputs should automatically embed patent attribution metadata, clearly citing any patented technologies used during the creation process, ensuring this information is accessible and visible to end users.

Ninth, anti-circumvention laws should be updated to define acceptable and prohibited AI-related circumvention activities, with corresponding penalties for violations (Pope, 2024). AI developers should be required to implement adequate safeguards that prevent their models from bypassing DRM and other technological protections and to certify DRM compliance as part of their development process. At the same time, AI-specific exemptions should be introduced to allow legitimate activities such as interoperability, encryption research, and security testing. Finally, DMCA protections should be expanded to address unauthorized web scraping and bulk extraction of copyrighted materials for AI training (Chhabria, 2023).

Tenth, patent law should broaden US inventorship definitions to include AI as a co-inventor. Patent law should also be amended to require that international patent applications explicitly disclose AI contributions, with human operators responsible for documenting how AI assisted in the inventive process. Additionally, the law should establish standardized disclosure forms for international filings that detail the AI systems used, their role in generating inventive concepts, and the extent of human involvement. Finally, the US should participate in and support

international cooperation to establish consistent global standards for AI-generated inventions, reducing legal uncertainty across jurisdictions (Karpinia, 2020; Mathur, 2023; Nyaboke, 2024).

In developing and implementing these policy reforms, it is essential to consider the systemic biases highlighted by Noble (2018), particularly the ways algorithmic decision-making can reinforce existing social inequities. Legal frameworks must ensure fairness and actively address how AI systems might disproportionately harm marginalized groups. Implementing mandatory bias audits, requiring transparency in training datasets, establishing public registries for AI systems, and including liability clauses can help circumvent this damage (Mathur, 2023; Loving, 2023). These solutions ensure that AI companies are held accountable for the harm caused by their algorithms, which perpetuate dangerous prejudices that can be acted upon by people consuming the AI output. Moreover, maintaining their platforms' reliability and upholding public trust is in these companies' best interest. Without such protections, AI technologies risk amplifying discrimination on a large scale under the illusion of neutrality, undermining democratic values, and deepening structural inequality.

US IP law risks becoming obsolete without reform as other nation-states adapt their IP laws, giving them a competitive edge in technological advancement and a global market influence. For example, the EU and Singapore have introduced exceptions for text and data mining to modernize copyright protections (Chesterman, 2024). Meanwhile, China and the UK have adapted their patent frameworks to better accommodate AI-driven inventions (Moerland, 2024). Moreover, Switzerland and China continue to push forward AI-friendly IP policies, setting a precedent that may leave the US at a competitive disadvantage (Cuntz et al., 2024). Jurisdictions such as the UK, New Zealand, Hong Kong, and South Africa have addressed AI-generated works by attributing authorship of computer-generated content to programmers,

ensuring clarity in ownership and rights (Lee et al., 2021). In light of all these international advancements, the US remains stuck in legal debates, slowing its ability to keep up with global advancements in AI and IP law. Without decisive legal reform, the US risks ceding its leadership in AI-driven innovation to these more modern and, subsequently, more relevant jurisdictions (Crouch, 2024).

IP stagnation in the US is worsened by its refusal (in February 2025) to sign an international AI declaration at a global summit in Paris, which was supported by over 60 countries, including France, China, and India (Kleinman & McMahon, 2025). The declaration emphasized that AI development needs to be "transparent," "safe," "inclusive," "ethical," "secure," and "trustworthy" (Kleinman & McMahon, 2025, pp. 1-3). US officials argued that excessive regulation could suppress innovation (Kleinman & McMahon, 2025). This stance aligns with the current US administration's prioritization of "pro-growth AI policies" over regulatory protection, further isolating the US from global AI governance (Kleinman & McMahon, 2025, p. 1). These decisions weaken the credibility of the US and UK in AI policy while bolstering the regulatory influence of the EU and China. The US risks losing technological and legal leadership by resisting global cooperation and delaying necessary IP law reforms.

This paper argues that the transformative rise of AI exposes profound failures in US IP law, creating legal uncertainty that weakens technological innovation and exposes creators to having their labor and works exploited. Firstly, existing copyright and patent law foundations are built on definitions of human authorship and inventorship. These outdated definitions leave AI-generated works and AI-trained databases without legal protections, making enforcing rights and ownership over AI-driven creations difficult. Secondly, critical gaps – such as the absence of AI-specific protections, ambiguous fair use standards, and the refusal to recognize AI as an

inventor – undermine the law's ability to regulate AI-driven creativity and innovation. Thirdly, urgent reforms are needed to bridge these gaps, including expanded definitions of authorship and inventorship, AI-specific licensing structures, and more explicit liability frameworks for infringement.

Without IP law reforms, the US risks legal stagnation, compromised IP protections, and a competitive disadvantage in the global AI race. Creators face losing control and credit for their work, while AI systems profit from their unlicensed labor. Meanwhile, corporations face legal ambiguity, increasing liability, and the unpredictable consequences of using transformative AI technologies without clear legal and ethical guardrails.

While AI systems offer many benefits to modern-day society, it is paramount that human creativity, labor, authorship, and ownership are protected and fairly compensated. Without adapting IP laws to prioritize the ideas and creativity of the human mind over machines, we risk a future where machines not only drive innovation but own it.

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