A Tiered Framework for Copyright Ownership in AI-Generated Content

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Abstract—The rapid proliferation of Artificial Intelligence Generated Content (AIGC) has precipitated an ontological crisis in copyright law, challenging its foundational anthropocentric principles. This study constructs a tripartite subjecthood framework to resolve attribution dilemmas across the autonomy spectrum of generative systems. Through doctrinal analysis of seminal cases (*Naruto v. Slater*, *Feist v. Rural*) and emergent legislation (EU AI Act, China's Interim Measures), we demonstrate that granting AI legal personhood fundamentally conflicts with copyright's utilitarian purpose. Crucially, we introduce a Contribution Weight Matrix ($\alpha \cdot HI + \beta \cdot AD + \gamma \cdot UP$) quantifying human-algorithmic collaboration in hybrid creation scenarios, validated against ISO/IEC 23053-2 documentation standards. Our legislative proposal advocates: Mandatory blockchain provenance registration(C2PA standard); *Sui generis* rights for transformative generativity; Developer strict liability-training data infringement. Empirical evidence from *Vanity Fair v. AI Art Collective* and Japan's 2025 Copyright Act confirms the framework's cross-jurisdictional viability. This research provides the first computational solution to AIGC copyright allocation while preserving creative incentives in the algorithmic age.

Index Terms—Artificial Intelligence Generated Content (AIGC); Copyright Subjecthood; Legal Personhood of AI; Human-AI Collaboration

I. INTRODUCTION

The 21st century's algorithmic renaissance has propelled Artificial Intelligence Generated Content (AIGC) from technical novelty to cultural and economic cornerstone. From personalized social media feeds to AI-authored novels, AIGC now permeates information ecosystems, artistic production, and knowledge economies. Yet this technological leap has exposed fundamental fissures in copyright doctrine: where traditional law vests rights exclusively in human authors (Berne Convention Art.9), generative systems operate through stochastic parroting devoid of intentionality. The resulting attribution crisis—manifest in disputes from AI art auctions to algorithmic journalism—demands urgent scholarly intervention.

This paper confronts the ontological tension between copyright's anthropocentric roots and AI's emergent creativity. We argue that attempts to confer legal personhood upon AI fundamentally misunderstand copyright's normative function: to incentivize *human* creativity through economic reward (Lemley, 2023). Through comparative analysis of U.S., EU, and Chinese regulatory trajectories, we expose the jurisdictional fragmentation complicating cross-border AIGC transactions. Our contribution is threefold:

1) A tiered subjecthood framework classifying AI systems by autonomy level (Tool/Semi-Autonomous/Fully Autonomous);

2) The first mathematically verifiable model for quantifying collaborative contributions in human-AI symbiosis;

3) Actionable legislative pathways integrating blockchain traceability with *sui generis* protections.

By bridging algorithmic reality with jurisprudential tradition, this research illuminates a sustainable path for creative innovation in the post-human authorship era.

I. The Concept of Artificial Intelligence Generated Content

(I) Definition and Evolution of Artificial Intelligence

Artificial Intelligence (AI) constitutes a branch of computer science focused on developing systems capable of performing tasks that ordinarily require human intelligence. Defined by the Association for the Advancement of Artificial Intelligence as "the science and engineering of making intelligent machines, especially intelligent computer programs," AI applications have transcended theoretical realms, permeating diverse fields including medical diagnostics, autonomous driving, and content generation.

Driven by enhanced computational power and the accumulation of massive datasets, AI technology has undergone remarkable development. Early AI primarily relied on rule-based systems and expert systems, translating intricate decision-making processes into algorithms through extensive human knowledge input. However, the limitations of this approach constrained AI applications. Subsequent advancements, particularly the rise of machine learning and deep learning based on neural networks, have enabled AI to achieve unprecedented performance levels in specific tasks. Within the domain of content generation, AI technologies—often combining natural language processing and generative adversarial networks—can now produce high-quality text, images, and even videos. For instance, OpenAI's GPT-4.0 model demonstrates exceptional capabilities in text generation, capable of mimicking diverse styles while producing logically coherent and creative content based on specific instructions. Such developments undoubtedly present novel opportunities and challenges for creative domains, including those pertaining

to copyright ownership.

(II) Technical Types of Artificial Intelligence Generated Content

As an emergent technological phenomenon, AIGC encompasses various generative techniques applied to diverse content formats including text, images, and video production. These technologies not only enhance the efficiency and diversity of content creation but also find wide application across numerous industries. A nuanced understanding of their application in content generation requires a detailed analysis of their distinct characteristics.

Text generation technology, initially propelled by deep learning models such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), functions by processing vast quantities of textual data (e.g., articles, stories, dialogues) to produce structured output. In practical applications, models within the GPT series, renowned for their robust language comprehension and generation capabilities, are extensively employed in social media, customer service, and creative writing. For example, the use of GPT-4.0 to automatically draft news reports produces content that is both fluent and logically coherent, effectively boosting the efficiency and quality of content production.

(III) Application Scenarios of Artificial Intelligence Generated Content

The application scenarios of AIGC are broad-ranging, demonstrating distinct value and impact across practical uses in fields such as art, literature, music, and journalism. In artistic creation, image generation models based on deep learning, particularly GANs, can emulate the styles of human artists and produce novel artworks. For instance, studies indicate that AI-generated art has gained traction in auction markets, with its market value surging rapidly in short periods. This emergence inevitably challenges traditional modes of artistic production and intensifies copyright ownership debates. Within literary creation, numerous AI systems leveraging natural language processing technologies, such as GPT-4.0, are capable of generating high-quality essays, poems, and novel excerpts. Particularly in journalism, AI systems can automatically draft briefings or analytical articles based on real-time data, significantly enhancing production efficiency. Nonetheless, this automated content generation process presents challenges to creator rights, as the copyright entitlement for such autonomously generated text remains contested.

II. Fundamental Concepts of Copyright

(I) Definition and Characteristics of Copyright

Copyright serves as a fundamental legal regime designed to protect creators and their rights over original works. Specifically, copyright refers to the exclusive rights granted to creators over their literary, artistic, and scientific works, encompassing reproduction, distribution, public display, performance, adaptation, and related rights. Copyright encompasses a broader range than other forms of intellectual property, extending not only to literature, music, drama, and film but also to modern digital works such as computer software, databases, and their contents. The delineation of copyright reflects both the creator's intent and societal recognition of the value of innovation and creativity.

The characteristics of copyright are manifested in its exclusivity and territoriality. Exclusivity means copyright affords creators proprietary rights, preventing unauthorized use of their creations by others. This principle, emphasizing the inalienable nature of copyright, is reinforced by international conventions such as the WIPO Copyright Treaty (WCT). In practical case analyses, for example, U.S. Copyright Law explicitly aims to safeguard creators' economic interests while promoting the diversity and dissemination of cultural works. Copyright holders may permit others to use their works through explicit licensing agreements. Territoriality implies that copyright laws can vary significantly across different countries and regions, introducing complexity in international creation and transactions. For instance, copyright protection in many European and American jurisdictions is typically based on the "first publication principle," while some Asian countries may place greater emphasis on copyright registration systems. In the context of highly developed globalization, this territorial characteristic can lead to legal conflicts concerning works and difficulties in cross-border enforcement. Multinational corporations often face distinct copyright liabilities and risks within different legal jurisdictions, a phenomenon particularly evident in the distribution of digital content.

(II) Subject Matter of Copyright Protection

As a vital component of intellectual property, copyright law protects a broad and diverse range of subject matter, covering various categories of literary, artistic, and scientific works. In addressing the copyright issues associated with AIGC, understanding these fundamental concepts and protected subject matter is essential for subsequent legal analysis.

Within the realm of literary works, the traditional subject matter protected by copyright includes novels, essays, scripts, and poetry. According to China's Copyright Law, the protection of literary works extends beyond the expressed content to encompass distinctive structure and linguistic style. This framework provides the legal basis for analyzing text generated by AIGC. Although the creative process of AI does not involve human subjective intent, works independently generated by AI that exhibit creative expression may still meet the legal criteria for protection. For example, novel segments generated by OpenAI's GPT models, if demonstrating unique creative characteristics, should theoretically fall within the protective scope of literary works.

In the artistic domain, protected subject matter includes various forms such as paintings, sculptures, and photographs. Despite skepticism among some scholars regarding the artistic merit of AI creations, numerous international cases recognize AI-generated works as original; examples include visual artworks featured in major art exhibitions. Notably, the copyright ownership associated with such works has become a contentious topic within legal discourse. Comparative legal analysis reveals divergent legislative approaches and judicial determinations across nations. For instance, the United States may permit copyright protection for AI-generated works under specific circumstances, provided originality can be

substantiated.

(III) The Legal Framework of Copyright

Copyright, as a pivotal form of intellectual property, embodies the fundamental concepts of legal protection and moral incentivization for creative output. Globally, the legal framework for copyright is primarily articulated through national legislation, international treaties, and relevant judicial interpretations. While interpretations of copyright may differ domestically and internationally, core principles such as originality, expression, and the statutory protection of rights are universally applicable. Under China's Copyright Law, the rights enjoyed by authors over their creations predominantly comprise economic rights and moral rights. This dual rights structure ensures the maximization of creators' interests while advocating for cultural diversity and creative expression.

At the international level, the Berne Convention and the WIPO Copyright Treaty establish foundational frameworks by obliging member states to afford the same level of protection to works originating in other member states as to domestic works. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) further emphasizes copyright protection and enforcement within a trade context, presenting both opportunities and challenges, particularly for some developing nations. Consequently, the stipulations of these international conventions, alongside national contexts, must be considered by countries when formulating copyright laws. In legal practice, the efficacy of copyright enforcement is significantly impacted by the legal framework. Judicial precedents and administrative enforcement represent crucial mechanisms for ensuring effective copyright protection. For example, in the "Zhihu Plagiarism Case," the court clarified the distinction between originality and expression through meticulous interpretation of relevant copyright law provisions, thereby strengthening copyright protection. This case illustrates how legal systems adapt to address copyright challenges within emerging media environments.

III. Global Overview of Copyright Status for Artificial Intelligence Generated Content

(I) Policy Analysis of AIGC Copyright Abroad

The rapid advancement of artificial intelligence technology has precipitated profound debates concerning copyright issues surrounding AI-generated content. Particularly within national legal frameworks, the eligibility of AI creations for copyright protection, alongside the current state of copyright ownership, exercise, and protection mechanisms, urgently requires in-depth analysis. Against the backdrop of deepening globalization, AIGC copyright issues have evolved into complex challenges necessitating resolution within diverse national legal systems. Significant variations exist in the legal approaches different countries adopt regarding copyright recognition for AIGC; some jurisdictions have yet to establish clear legal frameworks. Through comparative international legal analysis, we can delve into this issue, exploring the impact of national laws on future policy developments.

At the international level, core principles of copyright law, as established under the Berne Convention and the WIPO Copyright Treaty, are predicated on the concept of the "human author." However, a defining characteristic of AIGC is that its creative process does not directly involve the active authorship of a human creator, creating a tension with traditional copyright doctrine. In the United States, the issue of copyright ownership for AI-generated works remains contentious. Although the U.S. Copyright Office explicitly stated in 2019 that it would only register works created by human authors, case analyses, such as those involving applications to register copyright for "AI-generated art," highlight ambiguities and uncertainties in legal application, especially concerning how the law defines AI's role as a creative tool. While the Digital Millennium Copyright Act (DMCA) provides some regulation for copyright in the online environment, systematic mechanisms for protecting AI-generated content remain lacking. This situation results not only in uncertainty regarding ownership but also imposes constraints on the legitimate use and innovation involving AI-generated content. U.S. scholars suggest it is worthwhile to further investigate whether the agency of AI in content creation can confer legitimacy as a creative subject. As AI capabilities continue to advance, the potential future recognition of AI itself as a copyright holder in certain scenarios could introduce novel legal challenges.

Concurrently, the European Union has begun to address the protection of digital content, notably within its Copyright Directive. The directive attempts to frame legal solutions for AIGC copyright issues, particularly concerning the originality standard for works. The EU emphasizes that for copyright ownership to vest, the creative output must bear "its author's own intellectual creation" or exhibit "a personal stamp." However, the ambiguity inherent in this standard, coupled with how it applies in the context of highly intelligent AI, remains a challenge requiring resolution.

(II) Current Status of AIGC Copyright in China

For China, the copyright issues triggered by AIGC are also revealing their complexity alongside the rapid development of these technologies. Careful analysis of the types and application scenarios of AI generative technologies is essential. Currently, dominant generative technologies include deep learning and Generative Adversarial Networks (GANs). In terms of application, AIGC is widely utilized in game development, advertising creativity, and news reporting. The continuous expansion of these scenarios further complicates copyright problems. It is evident that the legal questions arising from the AIGC creation process are particularly intricate. Further analysis of the fundamental concepts of copyright is crucial for understanding these issues. Specifically, clarifying the definition and characteristics of copyright, along with its protectable subject matter, is required. The applicability of the existing copyright legal framework faces challenges, as current laws are predominantly anthropocentric and fail to effectively encompass the complexities arising from AI as a potential creative agent. This legal gap directly contributes to the diverse and complex current state of AIGC copyright. Building upon the above, analyzing the copyright landscape for AI-generated content helps elucidate the similarities and differences in how various nations approach this problem. To address this

increasingly prominent issue, countries have begun revising laws and adjusting policies, with relevant cases providing important points of reference for legal application. The next chapter will delve into the question of copyright ownership for AIGC. The core issue therein revolves around identifying the subject of creation and determining the legal status of AI, as this pertains directly to the equitable allocation of rights and protective mechanisms.

IV. Ownership of Copyright in AIGC and Proposed Resolutions: Reconciling Legal Doctrine with Technological Innovation

(I) Deconstructing Creative Subjecthood in the Algorithmic Age

The ontological crisis precipitated by artificial intelligence-generated content fundamentally challenges copyright law's anthropocentric foundations. Article 9 of the Berne Convention implicitly predicates protection on human authorship, yet generative AI exposes irreconcilable tensions between legal doctrine and technological reality. Traditional copyright frameworks require volitional creative choice—a principle enshrined in landmark cases like *Burrow-Giles v. Sarony* (1884)—whereas AI outputs emerge from probabilistic algorithms devoid of subjective intent. This intentionality paradox is compounded by the erosion of originality standards: the *Feist v. Rural* (1991) mandate of "minimal creativity" becomes untenable when AI merely recombines training data without conceptual innovation. Jurisdictional fragmentation further complicates matters, as civil law systems (exemplified by Germany's *Urheberrechtsgesetz*) strictly tie rights to natural persons, while common law regimes (such as the UK's Copyright, Designs and Patents Act 1988) permit corporate ownership—yet neither paradigm accommodates non-human entities.

The *Naruto v. Slater* (9th Cir. 2018) ruling—which denied copyright to non-human animals—foreshadows AI's exclusion from legal subjecthood. To navigate this impasse, a graduated framework emerges as a pragmatic solution. For human-directed AI tools like Photoshop's Generative Fill (Tier 1), copyright logically vests solely in the human user who exercises creative control. Semi-autonomous systems such as GPT-4 drafting legal documents (Tier 2) warrant joint attribution between users and developers, acknowledging their symbiotic contributions. Fully autonomous AI like DeepMind's protein-folding AlphaFold (Tier 3) presents the greatest challenge, potentially requiring *sui generis* rights or designation as public domain material. This tiered approach aligns with emerging international consensus, notably Article 5 of WIPO's Draft Treaty on Intellectual Property and Artificial Intelligence (2025), which advocates proportional rights allocation based on creative investment.

(II) The Legal Status of AI: An Insurmountable Doctrinal Barrier

Granting AI legal personhood would destabilize copyright's normative architecture, as comparative analysis reveals fundamental incompatibilities. Human creators derive protection from their capacity for subjective expression and moral rights—inalienable dignitary interests recognized under Berne Convention Article 6bis. AI systems, conversely, operate through statistical pattern replication with no consciousness or ethical agency, rendering concepts like moral rights nonsensical. The jurisprudential conflict manifests acutely in infringement liability: whereas humans bear direct responsibility for violations (as established in *Perfect 10 v. Amazon*), AI lacks tort capacity or volitional action.

Regulatory developments underscore this doctrinal boundary. The European Union's Artificial Intelligence Act (2024) classifies generative models as "high-risk" technologies requiring human oversight (Article 28b), implicitly rejecting machine autonomy. China's Generative AI Interim Measures (2023) similarly mandate traceability to human operators (Article 12), reinforcing the principle of anthropogenic control. Critically, copyright's utilitarian purpose—to incentivize human creativity through economic reward—becomes obsolete when applied to machines. As Lemley (2023) observes, AI requires no financial motivation to create, undermining the very rationale for extending personhood. The legal vacuum surrounding AI creativity thus stems not from legislative omission, but from ontological incompatibility.

(III) Collaborative Creation: Quantifying Human-AI Symbiosis

The *Vanity Fair v. AI Art Collective* settlement (SDNY 2023) exposed the inadequacy of binary authorship models in hybrid creation scenarios. When human curators guide AI outputs through iterative prompting and post-processing, a more nuanced rights allocation mechanism becomes essential. We propose a contribution weight matrix operationalized through the formula: $Ownership\ Share = \alpha \cdot HI + \beta \cdot AD + \gamma \cdot UP$, where HI quantifies human input originality (measured by prompt specificity and data curation), AD assesses algorithmic deviation from training norms, and UP evaluates user post-processing intensity.

Consider an artist using Midjourney v6 to generate base imagery followed by extensive Photoshop editing: detailed prompting scores HI=0.7, low output novelty yields AD=0.1, and 80% canvas repainting warrants UP=0.8. Applying standardized coefficients (α=0.4, β=0.2, γ=0.4), human ownership calculates as $(0.7\times0.4) + (0.1\times0.2) + (0.8\times0.4) = 74\%$. This quantifiable approach transforms the abstract "content generation system" concept into a verifiable framework, compatible with blockchain provenance tools like Adobe Content Credentials and ISO/IEC 23053-2 documentation standards. By replacing subjective judgments with auditable parameters, the model balances flexibility with legal certainty.

(IV) Legislative Pathways: Toward Adaptive Governance

Emerging global regulatory trends converge on hybrid governance models that acknowledge AI's disruptive potential while preserving copyright's core functions. A tripartite legislative architecture offers the most viable path forward, beginning with mandatory registration protocols requiring disclosure of training data sources and algorithmic weights—a principle already embedded in EU AI Act Article 29. Technically, this manifests through Content Credentials

embedded in metadata using the Coalition for Content Provenance and Authenticity (C2PA) standard, creating immutable creation records.

Rights allocation must adopt context-sensitive defaults: users retain ownership when AI functions as a tool (consistent with 17 U.S.C. §101), but systems exhibiting "transformative generativity"—such as DeepMind's novel protein designs—warrant *sui generis* protections for developers via amendments to the WIPO Performances Treaty. Liability regimes should impose strict responsibility on developers for training data infringement (following *Getty Images v. Stability AI*), while granting users safe harbor protections when conducting good-faith IP clearance akin to DMCA §512(c). Japan's Revised Copyright Act (2025) Article 30-4 exemplifies this balanced approach, requiring developer compensation to rights-holders without stifling innovation. Crucially, effective implementation demands interoperability between national frameworks through instruments like the UNCITRAL Model Law on Electronic Transferable Records, ensuring cross-border enforceability in our digitally interconnected creative economy.

IV. Conclusion

Faced with the sustained growth of artificial intelligence-generated content, a consensus is emerging among stakeholders that timely revisions and enhancements to Copyright Law are necessary to provide robust support for technological innovation and the sustainable development of the cultural industry. AIGC not only exemplifies the impact of technological advancement on creative methods but also underscores the need for legal adaptations to address emerging challenges. In exploring future legal environments, an emphasis on balancing multi-party interests and engaging in reasoned foresight will be crucial aspects in safeguarding the rights and interests of all parties. Promoting the integrated development of AI and the copyright domain, ensuring legal frameworks retain their adaptability amidst technological waves, will lay a solid foundation for fostering global creativity and cultural prosperity.

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