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Copyright Ownership of AI-Generated Works

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Abstract. This paper explores the ownership of copyright in creative works produced by generative artificial intelligence, a topic that has grown increasingly complex with advancing technological abilities. As algorithms start to produce artistic and literary works without direct human involvement, current copyright frameworks struggle to define authorship and originality. The study examines eligibility standards for copyright protection, questioning how much traditional legal concepts can extend to autonomous machine-generated work. It compares legislative and judicial approaches across major jurisdictions—such as the United States, the European Union, the United Kingdom, and China—to highlight differences in how each system interprets creativity and authorship. Based on this foundation, the paper discusses various attribution options, including human-centered authorship, joint human–AI ownership, and sui generis rights created specifically for AI-produced works. Each model is assessed for its consistency with established copyright theory and its practical implications for innovation policy. Ultimately, the research aims to suggest practical strategies that adapt to rapid technological advances while ensuring a fair balance among the interests of creators, users, and AI developers. Through this study, the paper contributes to the broader discussion on how legal frameworks can evolve to address new modes of creative production.

Keywords: Copyright, AIGC, Determination of Originality, The Pattern of Ownership

1. Introduction

With the rapid evolution of generative artificial intelligence (AI), systems like ChatGPT and DeepSeek have transitioned from experimental tools to indispensable elements of daily and professional life. These technologies fundamentally reshape how information is created and disseminated, extending their influence far beyond technical domains into cultural and social spheres. When AI produces creative works—whether textual, artistic, or musical—the outputs so closely resemble human creations that conventional intellectual property frameworks face unprecedented challenges. This technological shift raises critical questions for copyright law: when an AI model generates work demonstrating clear originality, who qualifies as its author? Potential candidates range from developers who build and train the underlying models, to users whose prompts guide the creative process, or even the possibility that no human author exists at all.

At the heart of generative AI systems lies their capacity to learn patterns from massive datasets, enabling them to interpret user inputs and produce coherent, seemingly original content. Wang et al

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[1] argued that users may simply provide keywords or short descriptions, and the system responds by generating articles, images, or musical pieces aligned with these prompts. This technical capability creates significant tension with existing legal frameworks, particularly copyright systems designed around human authorship. Different jurisdictions have developed markedly divergent approaches to this challenge [2]. While the United States maintains a human-centric authorship requirement, Japan employs a more flexible contract-based framework. The European Union favors cautious, risk-oriented legislation, whereas China's system reflects judicial pragmatism developed through case law interpretation.

The academic discourse has crystallized around three primary theoretical paradigms. Anthropocentric Authorism insists on upholding traditional copyright principles, requiring demonstrable human contribution for protection. Right Reconstructionism advocates for establishing a novel "AI rights" framework that disentangles and allocates rights among stakeholders involved with training data, algorithms, and outputs. Conversely, Public Domainism argues that AI-generated content should automatically enter the public domain to foster knowledge sharing and innovation. These competing paradigms not only reveal profound conceptual challenges but also generate urgent practical demands for legal adaptation. Consequently, there exists a pressing need to develop viable institutional solutions through comparative research and empirical analysis, seeking to reconcile AI's technological capabilities with the enduring human values underlying copyright protection.

2. Analysis of copyright eligibility for AI-generated work

The controversy surrounding the copyrightability of AI-generated works arises from the tension between long-standing standards of originality and the distinctive features of machine-driven creativity. Examining how such content is produced reveals three interrelated technical dimensions.

First is data training, which forms the backbone of generative systems. Large volumes of human-created materials are gathered and processed—through web scraping, data cleaning, feature annotation, and vectorization—to establish pre-trained models. Second is the creative function of algorithmic architectures. For example, in OPPO’s AI music project, convolutional neural networks use multi-layer abstraction to recombine melodic fragments and harmonic progressions, yielding musical patterns that go beyond simple patchwork and demonstrate a degree of autonomous innovation. Third is the directive influence of user input. Yu [3] suggested that when a user specifies detailed requirements—such as requesting a 2,000-word story with vivid characters and complex plots—the system employs generative mechanisms such as GANs to simulate narrative relationships and structure the ensuing conflicts. These elements collectively blur the boundaries of authorship established by traditional doctrines like the “sweat-of-the-brow” approach or the “personality imprint” theory. As algorithms acquire the capability to perform stylistic and structural decisions independently, defining the extent of human creative contribution becomes an increasingly uncertain exercise.

What underlies the copyright system is an anthropocentric view of creation. Its jurisprudential core affirms that a work embodies the externalization of the subject's will. Hegel's Elements of the Philosophy of Right emphasizes this, stating that intellectual products carry a demand for the spirit's self-actualization. This personality theory forms the philosophical groundwork of modern copyright. AI-generated works challenge this foundation by decoupling the creative act from the subject's will. Developers establish technical possibilities but cannot foresee specific outputs. Users provide direction but do not partake in the formative process of expression. A deeper contradiction arises from the inseparability of the capacity for rights and the capacity for conduct. Lacking consciousness, AI's "creativity" is merely a mechanical output of probabilistic computation.

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Therefore, originality assessment must revert to human creative labor. It must center on the personality imprint in prompt design and parameter adjustments.

Currently, the creative value of user instructions forms the core basis for copyright attribution. While AI revolutionizes generation efficiency, humans remain irreplaceable in conceptual originality. Consider a user instructing the system to "create an image of a contemporary intellectual grappling with existential confusion." This abstract command requires high-dimensional semantic mapping. The embedded choices regarding subject matter, style, and value orientation reflect the user's unique personal imprint. In contrast, the developer's contribution is more akin to industrial invention than artistic creation. Judicial practice corroborates this view. A ruling by the Beijing Internet Court stated: "The key to the copyrightability of AI-generated content lies in whether the user's parameter settings reflect personalized expression." Consequently, vesting copyright in the user aligns with the legislative purpose of incentive theory. It also avoids the legal disorder that would arise from ambiguous subjecthood.

3. A comparative study of major legal jurisdictions and practical explorations

Internationally, the copyright ownership of AI-generated works presents a complex legal challenge [4], as summarized in Table 1. Adhering strictly to human authorship principles, Huang [5] suggested that the United States explicitly denies copyright protection to works lacking human creative input. Meanwhile, the European Union maintains deliberate ambiguity regarding direct copyright attribution while establishing governance through its Digital Single Market Copyright Directive. Particularly relevant is the text and data mining exception, which offers indirect guidance for AI-generated content. The proposed EU AI Act further introduces transparency obligations addressing algorithmic opacity. Cui et al [6] argued that building upon research into AI copyrightability, the EU proposes a tailored transparency system featuring three core requirements. First, transparency obligations mandate that AI manufacturers disclose training corpora, enabling copyright holders to opt out. Second, copyright compliance assessments establish mechanisms for respecting rights holders' preferences regarding training data usage. Third, liability exemptions may apply when transparency requirements are fulfilled. These requirements significantly constrain copyright recognition for AI-generated works across member states. Similarly, UK copyright law attributes computer-generated works to "the person by whom the arrangements necessary for the creation are undertaken"—typically the AI developer or user.

Japan has pioneered a distinctive user-centric approach to copyright ownership. Fundamentally, this paradigm recognizes sophisticated instructional interaction as a novel form of intellectual labor. When users engage in structured prompt engineering combined with precise parameter calibration—such as repeatedly adjusting hyperparameters like CFG values and sampling steps—their creative intervention into algorithmic probability spaces qualifies as original expression. Supporting this framework, Japan has implemented blockchain-based evidence storage that instantly preserves creative traces, transforming dynamically adjusted instruction chains into verifiable ownership proof. This institutional design essentially redefines creation itself: users evolve from mere instruction providers to "algorithm shapers," with their parameter-tuning activities receiving legal recognition equivalent to traditional artistic creation.

Despite ongoing international debates, the prevailing trend increasingly favors attributing copyright to users participating in core creative processes. Most jurisdictions now recognize the necessity of maintaining human-centric principles while clarifying AI provider obligations [7]. Currently, China's Copyright Law and judicial interpretations lack specific provisions regarding AI-generated works, resulting in inconsistent rulings and legal disputes [8]. Although China's Interim

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Measures for Generative AI Management emphasize intellectual property respect, they avoid explicit ownership determinations. Judicial practice typically supports creations by natural persons or legal entities, as demonstrated in the Tencent Dreamwriter case where copyright was granted to the software-rights holder. As legal theories continue developing, future guidance is expected to better address the unique challenges posed by AI technology in creative domains.

Table 1. A comparative study of major national jurisdictions

Country/Jurisdiction	Current Model	Key Characteristics
United States	Human-Centric Doctrine	Affirms humans as the sole legal persons, with rights allocated proportionally based on human contribution
European Union	Transparency and Liability-Oriented Framework	Emphasizes substantive human contribution and mandates clear labeling of AI-generated content (e.g., via metadata)
United Kingdom	Doctrine of Necessary Arrangement	Vests rights in the party that institutes the essential arrangements for the creation
Japan	User Proprietorship Paradigm	Vests rights in users who perform creative interventions (e.g., structured prompt engineering and parameter calibration) in the AI's generative process

4. Potential attribution models and institutional frameworks

In examining copyright ownership of AI-generated content, academia has proposed four primary attribution models. Each attempts to balance human creative agency with technological instrumentalism.

Under the developer attribution model, copyright belongs to AI model developers. Proponents argue that their substantial intellectual labor—defining foundational frameworks and stylistic parameters—makes generated content an extension of their technical achievements. This approach resembles film producers' ownership of cinematic works. It may incentivize innovation and clarify liabilities in judicial practice. However, significant drawbacks exist. Developers already profit through software licensing, creating potential dual-layered rights accumulation. More critically, users' inability to claim copyright may dampen creative incentives. Wang et al [9] argued that this could ultimately impair sustainable AI development by reducing both user engagement and long-term developer returns.

In contrast, the user attribution model emphasizes the user's directive role. As creative command originators, users make choices that reflect intentionality, aligning with the traditional view of AI as a tool. This approach effectively encourages creative AI utilization. Nevertheless, it overlooks crucial gradations in user contributions. These range from simplistic prompts to elaborate guidance, corresponding to significantly varying substantive input levels.

Seeking to reconcile these positions, the collaborative copyright model acknowledges both developer and user contributions. It recognizes the developer's creation of generative systems and the user's inventive directives—including prompt engineering and parameter calibration—as co-constitutive elements. While theoretically equitable, this model faces practical implementation hurdles. First, quantifying respective contributions lacks objective metrics. Second, co-ownership complexity increases transaction costs and hinders work dissemination. Finally, ambiguous judicial standards for defining "creative directives" could provoke new rights allocation disputes.

When no human meets originality thresholds, the public domain model offers an alternative pathway. It posits that AI-generated works should remain outside proprietary claims, freely

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accessible to all. This approach maximizes knowledge sharing and prevents algorithmic monopolization of cultural production. However, without economic incentives, both development and creative application might stagnate. Consequently, most jurisdictions cautiously approach this model, reserving it for works with minimal human creative investment [10].

Rooted in the principle of autonomy of will, the contractual agreement priority model—primarily implemented through End-User License Agreements (EULAs)—has emerged as the most prevalent and flexible solution for determining copyright ownership of AI-generated works. This model allows developers and users to directly and explicitly define rights allocation (e.g., full ownership to users, developers, or specific licensing arrangements), thereby accommodating diverse technological applications and business models. Its core advantages lie in voluntariness and adaptability, providing market participants with legal certainty. However, this approach carries inherent drawbacks. First, a significant power imbalance often exists between developers and users (particularly individual consumers), where the latter typically accept standardized terms without meaningful negotiation. This may lead to unfair outcomes, such as over-restricting user rights or compelling users to waive all claims to generated content. Second, when third-party rights are involved (e.g., AI-generated content infringing existing copyrights), purely contractual arrangements may inadequately address external legal relationships, complicating liability attribution. Consequently, the effectiveness of this model heavily depends on judicial scrutiny of standard clauses' fairness and robust institutional safeguards for third-party interests. Without such measures, contractual freedom risks becoming a tool for substantive rights deprivation.

In summary, while each of the four ownership models has distinct strengths and weaknesses, their practical application may raise novel legal challenges, as illustrated in Table 2. A balanced approach —integrating the advantages of each model based on jurisprudential principles and judicial practice —is essential to harmonize legal values with technological progress.

Table 2. A comparative study of major national jurisdictions

Model	Advantages	Limitations
User Attribution Model	①Incentivizes creative engagement. ②Clear ownership determination facilitates judicial practice.	①Fails to account for varying degrees of user contribution. ② May undermine developers' incentives for innovation.
Developer Attribution Model	①Encourages technological research and development. ②Establishes clear rights and responsibilities.	①Suppresses users' motivation to create. ② Risks creating " dual-layer rights accumulation".
Joint Ownership Model	①Reflects fairness by acknowledging combined contributions. ②Offers flexibility for case-specific application.	①Practically complex: contributions are difficult to quantify, and judicial criteria are ambiguous. ②Increases transaction costs.
Contractual Agreement Priority Model	①Respects party autonomy and offers adaptability	①Parties often have unequal bargaining power. ②Complicates the attribution of liability in third-party disputes. ③3 Relies heavily on legal regulation of standard-form contracts.

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5. Research conclusions and recommendations

This study's conclusions are presented in two primary aspects.

With the rapid advancement of generative AI, multiple stakeholders now participate in defining creative subjects, leading to increasing copyright disputes over AI-generated content. This growing judicial uncertainty underscores the urgent need for resolution. Furthermore, existing legal frameworks often contain significant gaps or provide only general stipulations regarding this emerging issue. What exacerbates the situation is their failure to offer specific guidance for judicial application, thereby amplifying the pressing demand for clear solutions.

Globally, explorations into copyright ownership have produced distinct regulatory models. The United States maintains a human-centric approach that prioritizes traditional creative values while restricting technological flexibility. Emphasizing comprehensive rights protection, the European Union's framework potentially constrains industry development through stringent regulations. Japan's paradigm favors industry incentives, though it makes notable compromises on rights definition clarity. These approaches not only demonstrate the value trade-offs inherent in different institutional logics but also provide China with internationally relevant reference samples for addressing its own regulatory challenges.

Building on judicial practice, specific recommendations target both developers and users. For developers, agreements should clearly stipulate rights ownership, usage restrictions, and disclaimer clauses while ensuring user equality as rights subjects. Simultaneously, investing in traceability technologies remains crucial for establishing creative provenance. Users, meanwhile, should thoroughly understand platform terms of service before engagement. Zhang et al [10] suggested that meticulously preserving creative process records—including prompt iterations, parameter adjustments, and modification history—enables proactive protection of legitimate rights while respecting others' copyrights.

Although challenging traditional copyright frameworks, AI technology prompts renewed understanding of creative works. This study examines copyright ownership amidst generative AI's rapid development. As technology evolves, new ownership challenges will undoubtedly emerge. Beyond attribution, pressing issues include AI-generated works' impact on fair use, the copyright implications of using AI output as training data, and establishing ethical boundaries for AI responsibility. Confronting these challenges, the global community seeks solutions through technological innovation and institutional construction. Looking forward, when technological progress and institutional evolution achieve resonance, we can reasonably anticipate a future where AI integration upholds ethical standards while genuinely benefiting human welfare.

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