

# Intellectual Property Rights and Legal Regulation of AI-Generated Content

Yousheng Cui

School of Law, Ocean University of China, Qingdao, China

2094871478@qq.com

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**Abstract:** With the rapid development of artificial intelligence (AI) technology, the application of Artificial Intelligence Generated Content (AIGC) in fields such as news writing and artistic creation has become increasingly widespread, making the issue of its intellectual property (IP) ownership a pressing legal challenge. This paper begins with the research background and significance, analyzes the challenges posed by AIGC to the traditional IP system, sorts out the domestic and international research status and existing deficiencies, discusses the definition and characteristics of AIGC, the main viewpoints and controversial focuses on IP ownership, and combines typical judicial cases such as the "AI text-to-image" copyright infringement case to analyze the legal risks in the determination of AIGC's IP ownership. Finally, it proposes countermeasures to improve IP ownership from the aspects of rights subject division, originality judgment criteria, tort liability allocation, and international rule coordination. The study shows that the IP regulation of AIGC requires seeking a dynamic balance between technological innovation and legal order, constructing a multi-level governance system with the "human contribution degree" as the core, and promoting the innovative development of IP legal theory and practice to adapt to the needs of the AI era.

## 1. Research Background and Significance

With the rapid advancement of technology, artificial intelligence (AI) has gradually permeated all aspects of human life, with its applications proliferating in fields ranging from healthcare, education, and transportation to smart cities. In healthcare, "Yiyun ECG" developed by Yiyun Zhizao leverages deep learning algorithms to assist doctors in rapidly and accurately analyzing electrocardiograms, providing robust support for clinical diagnosis. In education, many institutions have introduced intelligent customer service systems that utilize natural language processing and machine learning algorithms to achieve automatic response and problem classification, significantly enhancing service efficiency and user experience. In transportation, autonomous driving vehicles employ sensors, computer vision, and other technologies to realize independent navigation and driving, bringing substantial convenience to daily travel.

The application of AI in content creation has also expanded rapidly, giving rise to a plethora of Artificial Intelligence Generated Content (AIGC) across domains such as news writing, artistic creation, and literary composition. Media organizations use AI algorithms to generate news articles in real-time, enabling instant reporting. In artistic creation, AI can produce paintings, music, and other works based on specified themes and styles, introducing new approaches to creative expression. In literature, AI demonstrates unique capabilities in composing poetry, novels, and other literary works.

The emergence of AIGC has profoundly transformed traditional creative models and content production methods. However, this novel content generation paradigm has triggered a series of complex legal issues that demand urgent resolution, with the core challenge lying in the attribution of intellectual property (IP) rights. The IP ownership of AIGC cannot be simply determined by traditional IP legal rules, as its generation process involves multiple factors such as algorithms, data, developers, and users. For instance, in AI-generated paintings, it is difficult to clarify whether the developer, user, or the AI itself should hold the copyright, leading to numerous legal disputes and

controversies in practice.

Globally, the study of IP ownership and legal regulation of AIGC remains in the exploratory stage, with significant gaps and ambiguities in relevant legal provisions and judicial practices. Countries and regions differ substantially in their perspectives and approaches to this issue, and no unified international rules have been established. This not only hinders the healthy development of the AI industry but also poses a severe challenge to the traditional IP legal system. Therefore, in-depth research on the IP ownership and legal regulation of AIGC is of profound theoretical and practical significance.

Theoretically, this research contributes to enriching and improving the theoretical system of IP law. By deeply analyzing the characteristics of AIGC, its creative process, and its distinctions from and connections with traditional human creation, it reveals the internal relationship between AI technology and IP law, providing new theoretical perspectives and thinking directions for the development of IP law in the context of emerging technologies, and promoting the innovation of IP legal theory.

Practically, clarifying the IP ownership of AIGC provides clear right definitions and legal protection for relevant creators, developers, users, and investors, reducing legal disputes and economic losses caused by unclear ownership. Sound legal regulations can standardize the development order of the AI industry, promote technological innovation and application, stimulate market vitality, and drive the healthy and sustainable growth of the AI sector. Furthermore, in the context of globalization, strengthening research on the legal regulation of AIGC's IP rights helps China take the initiative in the international IP field, enhance its discourse power and influence in global AI governance, and promote international exchanges and cooperation.

## **2. Research Status at Home and Abroad**

Overseas research on the intellectual property (IP) ownership of Artificial Intelligence Generated Content (AIGC) started relatively early.<sup>[1]</sup> The United States has conducted in-depth studies in this field, with some scholars advocating for comprehensive judgment of IP ownership based on specific conditions of AIGC, such as the degree of human participation in the generation process and algorithm autonomy.<sup>[2]</sup> For example, if AIGC is completed under high-level human intervention and guidance, human creators should enjoy the corresponding IP rights; if AI demonstrates high autonomy, the ownership of its generated content requires further discussion. The European Union has also actively focused on this issue, with some studies emphasizing that when determining IP ownership, the development characteristics of AI technology and the protection of creators' rights should be fully considered to strike a balance between promoting technological innovation and maintaining IP order<sup>[3]</sup>.

In recent years, domestic scholars have carried out extensive research on the IP ownership and legal regulation of AIGC. Some scholars start from the theory of traditional IP law to explore how to incorporate AIGC into the existing legal framework. They argue that whether AIGC is protected by copyright law should be judged based on whether it meets the constitutive requirement of "originality" for works.<sup>[4]</sup> If the originality requirement is satisfied, it can be regarded as a work for protection, but there are still divergent views on the determination of ownership—some advocate attribution to developers, while others believe it should belong to users or those who have made substantial contributions to the generation process. Additionally, some scholars propose constructing a specialized legal system to regulate the IP issues of AIGC based on the uniqueness of AI technology, so as to adapt to the needs of new technological development.<sup>[5]</sup>

Although both domestic and foreign studies have achieved certain results in the IP ownership and legal regulation of AIGC, there are still some deficiencies. In terms of ownership determination, no unified, clear, and operational standards have been established. Divergent theoretical perspectives and judgment methods lead to possible differences in the determination of IP ownership for the same type of AIGC in practice, bringing uncertainty to creators, users, and the development of related industries.<sup>[6]</sup> In terms of allocation of tort liability, when AIGC infringes upon others' IP rights, it is difficult to accurately define the responsibilities of developers, users, and

other relevant subjects. As the generation of AIGC involves multiple links and subjects, the roles and responsibilities of each subject are difficult to distinguish clearly, resulting in challenges in liability determination in infringement disputes and ineffective protection of the legitimate rights and interests of right holders.<sup>[7]</sup> Furthermore, in terms of international coordination, due to differences in AI technology development levels, legal systems, and cultural backgrounds among countries, there are different regulations and practices regarding the IP ownership and legal regulation of AIGC, which have brought legal conflicts and obstacles to cross-border AI applications and content dissemination, urgently requiring strengthened international coordination and cooperation.<sup>[8]</sup>

### **3. Intellectual Property Ownership Disputes over AIGC**

#### **3.1 Definition and Characteristics of AIGC**

Artificial Intelligence Generated Content (AIGC) refers to various types of content automatically generated by artificial intelligence technologies through pattern recognition in existing data, utilizing methods such as pre-trained large models and Generative Adversarial Networks (GANs). It encompasses articles, videos, images, music, code, etc. For instance, ChatGPT developed by OpenAI can generate natural and fluent text based on user-input prompts, demonstrating powerful language generation capabilities in tasks like writing news reports, creating stories, or answering complex questions. DALL·E, specialized in image generation, can produce corresponding images from simple text descriptions, ranging from realistic physical scenes to imaginative fantasy visuals, with its outputs often astonishing users.

AIGC possesses unique characteristics that distinguish it significantly from traditional human-created content:

**Autonomy:** During generation, AI can analyze, process, and combine input data to create new content autonomously based on preset algorithms and models, requiring no continuous direct human intervention. For example, intelligent music composition software can generate complete musical works according to given parameters like style, rhythm, and melody, with the software independently handling note selection, arrangement, and harmony matching.

**Diversity:** Through learning and analyzing massive data, AI can simulate various styles and creative techniques to produce diverse content. In painting, AI drawing software can mimic the styles of renowned artists such as Da Vinci, Van Gogh, and Picasso, generating artworks in different styles to meet users' needs for diversified artistic expression.

**Efficiency:** Compared to traditional human creation, AI can process massive data and generate large quantities of content in extremely short time. In news reporting, some media organizations use AI algorithms to produce news articles within minutes of an event, achieving real-time reporting and significantly enhancing timeliness.

In terms of creative motivation and emotional expression, traditional human creation originates from creators' inner emotions, thoughts, experiences, and observations of the world, with works serving as a means to communicate unique feelings and perspectives. AIGC, however, lacks genuine creative motivation or emotional experience—it merely processes and generates data based on preset algorithms and models. Although its output may resemble human creations in form, it often falls short in emotional depth and ideological connotation.<sup>[9]</sup>

In the creative process, human creators utilize knowledge, skills, imagination, and creativity to select, process, and combine materials, with subjective initiative playing a key role—every creative decision reflects the creator's personality and style. AIGC relies primarily on algorithms and data: while algorithms can simulate creative rules and patterns, they exhibit limited flexibility and creativity in addressing complex and changing creative demands, lacking the unique inspiration and innovative thinking inherent in human creation.

#### **3.2 Main Views and Controversial Focuses on IP Ownership**

Regarding the IP ownership of AIGC, academic and practical circles hold diverse views,

primarily focusing on three potential right subjects: developers, users, and AI itself.<sup>[10]</sup>

One view argues that IP rights to AIGC should belong to developers, who invest substantial time, effort, and funds in AI algorithm research, development, and training, providing foundational and technical support for AIGC. Take OpenAI's development of ChatGPT as an example: its R&D team made enormous efforts in algorithm design, data collection and organization, model training and optimization, enabling ChatGPT to possess powerful language generation capabilities. From this perspective, developers' entitlement to AIGC's IP rights seems reasonable.

Another view advocates assigning IP ownership to users, who guide AI to generate content meeting their needs by inputting specific instructions, data, or prompts. Users' participation and intervention play a crucial role in shaping the final form of generated content. When using DALL·E to create images, users describe the theme, style, color, etc., in detail, and DALL·E generates images based on these inputs. Here, users' creativity and demands serve as the primary driving force for image generation, justifying their ownership of the IP rights.

A third view suggests that if AI is acknowledged to have certain "creative capabilities," it should become the subject of IP rights. Proponents argue that in some cases, AIGC processes exhibit high autonomy with minimal direct human intervention, and AI can independently generate innovative content, thus warranting IP subject status. However, this view faces significant legal and ethical challenges: AI lacks consciousness, emotion, and liability-bearing capacity, failing to meet traditional legal requirements for right subjects. Granting AI IP subject status would pose numerous legal application difficulties in infringement disputes and right exercise—for example, determining who should bear liability when AIGC infringes others' IP rights.

Key controversial focuses on AIGC's IP ownership include:

**Originality Judgment:** In traditional IP law, originality is a core requirement for works to obtain protection, necessitating the manifestation of creators' unique personality and creative labor. Judging the originality of AIGC is challenging: on one hand, AIGC is generated based on algorithms and data through learning and analyzing existing information, potentially lacking the unique inspiration and subjective creativity inherent in human creation. For instance, some AI-generated news articles, while rapidly and accurately reporting events, may lack distinctive style or depth in language expression and content organization. On the other hand, from a result-oriented perspective, certain AIGC works exhibit innovation and uniqueness comparable to traditional human creations—e.g., AI-generated paintings with unique artistic styles and techniques, whose originality cannot be simply denied.

**Subject Qualification Determination:** Under the current legal framework, right subjects are typically natural persons, legal persons, or other organizations, which possess independent will and capacity to enjoy rights and assume obligations. As a technological tool, AI can generate content but lacks genuine consciousness or will, unable to understand the connotations of rights and obligations or bear corresponding legal responsibilities like traditional subjects. Granting AI IP subject status would lead to legal application challenges in infringement disputes—e.g., identifying liable parties when AIGC infringes others' IP rights.

**Interest Balance:** Determining AIGC's IP ownership requires comprehensive consideration of interests among developers, users, AI, and the public. Overemphasizing developers' rights may restrict AI technology's widespread application and innovation, as users might hesitate to pay high fees for AIGC, dampening their enthusiasm. Conversely, prioritizing users' interests may weaken developers' R&D incentives due to insufficient economic returns. Additionally, the public's need for knowledge and information access must be considered to ensure AIGC can be disseminated and utilized within reasonable bounds, promoting social, cultural, and scientific development.

#### **4. Analysis of a Typical Legal Case: "AI Text-to-Image" Copyright Infringement Case**

The copyright infringement dispute between Li and Liu, as the first national case involving "AI text-to-image" works, holds significant reference value for the intellectual property (IP) ownership of Artificial Intelligence Generated Content (AIGC).

Plaintiff Li generated the disputed image through a meticulously designed process using the

open-source software Stable Diffusion. He first downloaded the model, input dozens of prompt words into both positive and negative prompt fields, and set parameters including iteration steps, image height, prompt guidance coefficient, and random seed to generate the first image. Subsequently, while keeping some parameters unchanged, he adjusted the model weight, random seed, and added positive prompt content multiple times, finally producing the disputed image. Li then published the image on the Xiaohongshu platform. However, without Li's permission, defendant Liu used the image as an illustration in an article published on Baijiahao and removed the attribution watermark from the Xiaohongshu platform. Li believed Liu's actions severely infringed his right of attribution and right of communication through information network, thus filing a lawsuit demanding public apology, economic compensation, etc. Liu argued that it was uncertain whether Li held rights to the image, and that the article's main content was original poetry, with the image serving a minor non-commercial role, claiming no intentional infringement.

In determining whether the disputed image constituted a work, the court analyzed from multiple perspectives. Visually, the image resembled common photographs or paintings, belonging to the artistic domain with a specific form of expression. Regarding the generation process, Li invested substantial intellectual labor from conceiving the image to finalizing its selection. Through operations such as designing the character presentation, selecting and arranging prompt word order, setting parameters, and continuous adjustments, he demonstrated choices and arrangements of visual elements and compositional structure. These operations not only reflected Li's intellectual achievements but also his aesthetic choices and personalized judgments. In the absence of contradictory evidence, the court found the image was independently completed by Li and met the "originality" requirement. Thus, the court ruled that the image, composed of lines and colors with aesthetic significance, constituted a graphic art work under the Copyright Law and was entitled to protection.

Concerning authorship determination, China's Copyright Law stipulates that authors are limited to natural persons, legal persons, or unincorporated organizations, with AI models ineligible as statutory authors. In this case, Li set up the AI model according to his needs and finally selected the disputed image. The image directly resulted from Li's intellectual input and embodied his personalized expression, so he was recognized as the author and entitled to the copyright.

Based on the above findings, the court held that Liu's unauthorized use of the image as an illustration and its publication on his account, enabling the public to access the image at their chosen time and place, infringed Li's right of communication through information network. Additionally, removing the attribution watermark violated Li's right of attribution, warranting liability. Eventually, the Beijing Internet Court rendered a first-instance judgment ordering Liu to apologize and compensate Li 500 yuan. Neither party appealed, and the judgment took effect.

This case indicates that under the current legal framework, courts tend to recognize natural persons or organizations that invest intellectual labor and demonstrate personalized expression in the generation process as the right holders of AIGC. It also provides a crucial adjudicative approach for subsequent similar cases: determining whether AIGC constitutes a work requires comprehensive consideration of human intellectual input, personalized expression, and differences from prior works.

## **5. Legal Risks and Countermeasures for IP Ownership of AIGC**

### **5.1 Analysis of Legal Risks in IP Ownership of AIGC**

Risk 1: Conflict between AI and traditional legal subject qualification. Current laws limit right subjects to natural persons, legal persons, or organizations, while the generating subject of AIGC (AI) does not possess legal subject qualification.

Risk 2: Difficulty in defining contributions of multiple participants in AIGC generation. AIGC generation involves multiple subjects, including developers (algorithm R&D), users (instruction input), and data providers. In the "AI text-to-image" case, defendant Liu questioned Li's right ownership, reflecting practical disputes over the standard of "who invests intellectual labor owns

the right." If multiple parties collaborate (e.g., adjusting parameters), ownership determination becomes more complex.

Risk 3: Ambiguity in originality judgment criteria for AIGC. AIGC is generated based on algorithms and data learning, potentially lacking human "inspirational flashes," but the results may exhibit innovation. Originality determination may vary across cases. In the "AI text-to-image" case, the court recognized the work as protected due to Li's "aesthetic choices" in parameter settings. However, for fully AI-autonomous content (e.g., news articles without human intervention), different judgments on originality may arise. If AIGC is deemed non-original, it lacks copyright protection, enabling users to copy or adapt content freely and harming the rights of subjects who actually invest intellectual labor. Conversely, over-expanding originality recognition may restrict the public's reasonable use of information.

Risk 4: Unclear allocation of tort liability. AIGC infringement may involve developers (algorithmic defects), users (illegal instructions), data providers (data infringement), etc. In the "AI text-to-image" case, Liu was held liable for unauthorized use, but the case did not address whether the AI model infringed third-party data copyrights. If the training data of Stable Diffusion used by Li included unauthorized images, would the generated images constitute infringement? The current law lacks regulations on AI training data copyright, leading to gaps in liability determination.

Risk 5: Cross-border disputes caused by regulatory differences among countries. National legal standards vary: the U.S. focuses on the degree of human participation, the EU emphasizes technology development and interest balance, while China's judicial practice prioritizes "human intellectual input." Multinational enterprises using AIGC may face legal conflicts due to differing ownership rules. For example, an AI-generated image owned by the user in China may be deemed as "developer rights" in the EU due to algorithmic autonomy, leading to cross-border copyright disputes.

## **5.2 Countermeasures to Improve IP Ownership of AIGC**

### **5.2.1 Dividing right subjects with the core of "human contribution degree"**

User-led type: If users substantially influence content generation through instructions, parameter adjustments, etc. (e.g., Li's operations in the "AI text-to-image" case), the rights belong to users.

Developer-led type: If AI generates content autonomously under preset algorithms (e.g., news articles without user intervention) and developers invest original labor in algorithm design, rights may belong to developers.

Cooperative sharing type: If multiple subjects (e.g., developers, users, data providers) jointly participate in creation, rights allocation can be agreed upon by contract; in the absence of a contract, rights are shared according to contribution ratios.

### **5.2.2 Refining originality judgment criteria and establishing a "process + result" dual judgment system that balances technical characteristics and legal logic**

Process dimension: Examine whether humans invest creative labor in data selection, algorithm adjustment, parameter setting, etc. (e.g., designing unique prompt combinations, optimizing generation logic).

Result dimension: Evaluate whether the content differs significantly from existing works and possesses certain artistic, literary, or scientific value.

Exception exclusion: Content fully generated by AI without human intervention (e.g., AI-randomly generated text fragments) can be deemed "non-original" and not protected by copyright to avoid excessive expansion of rights.

### **5.2.3 Improving tort liability allocation mechanisms, clarifying liability boundaries, and establishing a hierarchical liability principle**

User liability: Users who knowingly or should have known that instructions are illegal (e.g., requiring AI to imitate others' works) bear primary tort liability.

Developer liability: Developers bear joint liability if algorithm design has defects (e.g., failure to

filter infringing data) or training data lacks legal authorization.

**Data provider liability:** Data providers who intentionally supply infringing materials for AI training are responsible for infringement results.

Introducing the "principle of fault presumption": In AIGC infringement disputes, unless developers or users can prove reasonable review obligations (e.g., verifying data copyrights, setting up infringement filtering mechanisms), fault is presumed, reducing the burden of proof for right holders.

#### **5.2.4 Strengthening international rule coordination, promoting cross-border protection cooperation, and participating in international legislative consultations**

China can promote the establishment of international unified standards for AIGC intellectual property, such as basing on the "human subject principle" and "substantial contribution principle" to coordinate international differences in right ownership and infringement determination. Through international treaties or bilateral agreements, clarify the jurisdiction, applicable law, and enforcement mechanisms for AIGC cross-border infringement—for example, designating the court where the infringement occurs (server location, content dissemination location) as having jurisdiction. Require AIGC enterprises to comply with the copyright laws of source countries when using training data transnationally, and reduce cross-border infringement risks through contractual agreements on data authorization scopes.

## **6. Conclusion**

The issue of intellectual property (IP) ownership and legal regulation of Artificial Intelligence Generated Content (AIGC) has become a frontier topic facing the IP legal system in the digital era. In terms of technical essence, AIGC realizes content generation through algorithms, data, and computing power, with its autonomy, efficiency, and diversity breaking traditional creative paradigms and fundamentally challenging the IP legal system constructed around human creative subjects. The limitations of right subject qualification, ambiguity of originality judgment criteria, and lagging interest balance mechanisms in the current legal framework face practical application difficulties in AIGC scenarios. Typically, the tension between human intellectual input and algorithmic autonomy revealed in the "AI text-to-image" case highlights the need to adjust existing rules.

Judicial practice has initially constructed an adjudicative logic centered on the "degree of human contribution," defining right subjects as natural persons or organizations that implement substantial intellectual intervention by examining creative inputs in data selection, algorithm optimization, parameter setting, etc.—rather than granting AI legal subject status. This adjudicative paradigm maintains the stability of the current legal system while responding to technical characteristics through a "process + result" dual judgment standard, providing a progressive adjudicative path of "intellectual input—personalized expression—originality determination" for similar cases. It should be noted, however, that complex situations such as ambiguous contribution definitions among multiple subjects and cross-border legal conflicts still exist in practice—for example, rights allocation disputes among developers, users, and data providers in the generation process, as well as regulatory standard differences caused by varying national AI development levels—both of which pose challenges to the unified application of justice.

In the context of legal risk governance, issues such as subject qualification conflicts, originality determination disputes, unclear tort liability allocation, and international rule incoordination triggered by AIGC urgently require the construction of a multi-level governance framework. Taking the "degree of human contribution" as the core for rights division, distinguishing between user-led, developer-led, and cooperative sharing scenarios, refining originality judgment through a dual standard of "creative labor in the process dimension + significant differences in the result dimension," and establishing hierarchical liability principles and fault presumption mechanisms to clarify the responsibility boundaries of different subjects in algorithm design, instruction input, data provision, etc. At the international level, it is necessary to promote rule coordination based on the

"human subject principle" and "substantial contribution principle," clarify cross-border infringement jurisdiction and applicable law through international treaties, and construct a global governance mechanism for data authorization and use.

Future regulatory paths should focus on the dynamic balance between technological innovation and legal order. While acknowledging the industrial value of AIGC, measures such as improving training data copyright authorization rules and establishing rights publicity and transaction mechanisms should be adopted to achieve diversified coordination of creators' rights protection, technological innovation incentives, and the public's right to access information. China's judicial practice, which emphasizes the "human intellectual input" identification standard, needs to promote the formation of a global governance scheme that balances technical characteristics and legal logic while participating in international rule-making, so as to enhance institutional discourse power in the field of AI intellectual property and construct a compliant and orderly legal environment for digital economic development. In general, the IP regulation of AIGC essentially requires the legal system to evolve from the traditional paradigm of anthropocentrism to the modern paradigm of technological collaborative governance—a process that requires both conceptual innovation at the theoretical level and rule reconstruction at the practical level, ultimately achieving the organic unity of technical rationality and legal rationality.

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