# Legal Recognition and Protection of Copyright for Artificial Intelligence-Generated Content

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Abstract: With the in-depth application of artificial intelligence (AI) technology in the field of content generation, copyright issues have become a focus of legal and ethical concern. This paper starts from the concept of AI-generated content (AIGC), analyzes the development, application scenarios of AIGC technology, and its challenges to traditional copyright law. The article discusses the basic concepts, protected objects, and legal framework of copyright, and compares the current state of AIGC copyright domestically and internationally. Based on this, the paper focuses on the copyright ownership issues of AIGC, including the identification of the subject of work creation, the legal status of AI as a creative subject, and collaborative creation and inheritance relationships. It also analyzes the copyright infringement issues of AIGC, including the criteria for infringement, liability and compensation, and prevention and relief measures. Finally, the paper puts forward policy recommendations and legislative prospects, aiming to provide theoretical support and practical guidance for the resolution of AIGC copyright issues.

*Keywords:* AI-Generated Content; Copyright Ownership; Legal Protection; Infringement Liability; Policy Recommendations.

### I. Introduction

In today's digital age, AI-generated content (hereinafter referred to as AIGC) has gradually permeated all aspects of social life, becoming an important part of cultural and economic activities. From algorithmic recommendations on social media to automatic writing assistants, AIGC's importance in information dissemination, artistic creation, and knowledge sharing is increasingly evident. However, with the technological progress of AIGC, the ensuing copyright issues have also attracted increasing attention. These issues not only concern the adaptability of the law but also encompass ethics, economy, and society on multiple levels, thus necessitating in-depth discussion. AIGC is generated based on massive data using complex algorithms (e.g., deep learning and natural language processing) to automatically generate text, images, or audio content. This seems to challenge the definition of the creative subject in traditional copyright law: copyright law usually grants copyright to creators, and in the context of AIGC, the creative subject is a machine, which undoubtedly poses a significant legal and moral challenge to existing copyright law. At this juncture, the issue of copyright ownership needs to be clarified—whether rights should be attributed to the developers of algorithms, users, or non-entity AI. This issue is not only a subject of discussion in the legal community but also a focal point of general social concern.

### 1. Concept of AI-Generated Content

### 1.1 Definition and Development of Artificial Intelligence

Artificial intelligence is a branch of computer science aimed at creating systems capable of performing tasks that typically require human intelligence. According to the American Association for Artificial Intelligence, AI is "the science and engineering of making computers behave in ways that, if done by humans, would be called intelligent." With technological advancements, AI applications have extended beyond theoretical levels and permeated various fields, including medical diagnosis, autonomous driving, and content generation.

With the enhancement of computing power and the accumulation of vast amounts of data, AI technology has seen significant development. Early AI primarily relied on rules and expert systems, which transformed complex decision-making processes into algorithms through substantial human knowledge input. However, the limitations of this approach restricted the application of AI. With the rise of machine learning and deep learning, especially applications based on neural networks, AI technology has reached unprecedented levels of performance in specific tasks. In the field of content generation, combining natural language processing with generative adversarial networks and other technologies, AI can now generate high-quality text, images, and even videos. For instance, Open AI's GPT4.0 model has demonstrated remarkable text generation capabilities, not only imitating various styles but also generating logically coherent and creative content based on specific instructions. Such development undoubtedly brings new opportunities to the field of content creation but also raises discussions on copyright ownership.

#### **1.2 Types of AI-Generated Content Technologies**

AIGC, as an emerging technological phenomenon, encompasses various types of generation technologies, with specific applications including text, image, and video generation. These technologies not only enable efficient and diverse content creation but also find extensive applications across various industries. To deeply understand how these technologies are applied in content generation, it is necessary to analyze their respective characteristics in detail. For text generation technology, initially propelled by deep learning models such as generative adversarial networks and variational autoencoders, it can generate articles, stories, or dialogues with a structure similar to natural language by processing massive text data. In practical applications, the GPT series of models is an important representative, with its powerful language understanding and generation capabilities, widely applied in social media, customer service, and creative writing. For example, GPT4.0 is used to automatically write news reports, whose content is not only fluent and natural but also logical, effectively improving the efficiency and quality of content creation.

### **1.3 Application Scenarios of AI-Generated Content**

The application scenarios of AIGC cover a wide range of fields, with practical applications in art, literature, music, and journalism gradually revealing their unique value and impact. In artistic creation, image generation models based on deep learning, such as generative adversarial networks, can not only imitate the creative styles of human artists but also generate previously unseen artistic works. For instance, some studies have shown that AI-generated art works are warmly sought after in the art auction market, and their market value has rapidly increased in a short time, which undoubtedly impacts traditional artistic creation methods and raises questions about copyright ownership. In the field of literary creation, many AI

systems based on natural language processing technology, such as GPT4.0, are already capable of generating high-quality articles, poems, and novels. Especially in news reporting, AI systems can automatically write briefs or analytical articles based on real-time data, greatly improving the efficiency of creation. However, this automated content generation process brings with it the challenge to the rights and interests of creators, as there is still controversy over whether automatically generated text should be recognized as the owner of copyright.

### **II.** Basic Concepts of Copyright

#### 2.1 Definition and Characteristics of Copyright

Copyright, as a legal system, fundamentally aims to protect the creators of original works and their rights. Specifically, copyright refers to the rights that creators have over their literary, artistic, and scientific works, including the exclusive rights to reproduce, distribute, exhibit, perform, and adapt their works. Compared to other intellectual properties, copyright covers a broader range of fields, including not only text, music, drama, and film but also computer software, databases, and their contents, and other modern digital works. The definition of copyright not only embodies the creator's creative intent but also reflects society's recognition of innovation and creativity.

The characteristics of copyright are reflected in its exclusivity and territoriality. Exclusivity means that copyright grants creators exclusive rights to use their creative works, ensuring that others cannot use the works without authorization. This characteristic is based on international conventions such as the WIPO Copyright Treaty (WCT), emphasizing the inalienability of copyright. In actual case analysis, for example, the United States Copyright Act clearly states that copyright holders can allow others to use their works through explicit authorization or licensing agreements, which not only protects the economic interests of creators but also promotes the diversity and dissemination of cultural works. The territoriality of copyright means that copyright laws may vary across different countries and regions, bringing certain complexities to international creation and transactions. For instance, in European and American countries, copyright protection is usually based on the "first publication principle," while some Asian countries may focus more on the copyright registration system. In the context of highly developed globalization, this territorial characteristic can lead to legal conflicts and difficulties in rights maintenance in the practical application of cross-border works. This phenomenon is particularly evident in the dissemination of digital content, where many multinational companies face copyright responsibilities and risks under different legal jurisdictions.

#### 2.2 Objects of Copyright Protection

As an important part of intellectual property rights, copyright law protects a wide and diverse range of objects, covering various categories of literary, artistic, and scientific works. To discuss the copyright issues involved in AIGC, it is necessary to first understand the basic concepts of copyright and the objects protected, in order to lay the foundation for subsequent legal analysis.

In the field of literary works, the objects of copyright protection traditionally include novels, essays, scripts, and poetry. According to the Copyright Law of the People's Republic of China, the protection of literary works extends not only to the content expressed in words but also to their unique structure and language style. This framework provides a legal basis for analyzing the text content generated in AIGC. Although the creative process of artificial intelligence does not involve human subjective intent, if the works generated by it can independently display creative expression, they may still meet the legal

protection standards. For example, novel fragments generated by Open AI's GPT series models, if they show distinct creative characteristics, should theoretically be included in the protection category of literary works.

In the field of art, the objects of copyright protection include various forms such as painting, sculpture, and photography. Although some scholars are skeptical about the artistry of AI creation, in many international cases, AI-created works are considered original, such as AI-generated visual art works that have emerged in major art exhibitions. It is worth noting that the copyright ownership issues related to these works have become a controversial topic in the legal community. Comparative law analysis shows that different countries have different legislation and judgments on this issue. For example, the United States allows AI-generated works to be included in copyright protection in some cases, provided that the originality of the work can be proven.

#### 2.3 Legal Framework of Copyright

Copyright, as an important form of intellectual property rights, carries the basic concept of legal protection and moral incentive for creative achievements. Globally, the legal framework of copyright is mainly reflected in national legislation, international treaties, and related judicial interpretations. There are certain differences in the understanding of copyright between domestic and foreign countries, but the basic principles such as originality, expression, and protection of statutory rights are universally applicable. According to the "Copyright Law," the rights that authors have over their creative works mainly include economic rights and personal rights. This dual rights structure ensures the maximization of creators' interests and advocates for cultural diversity and creativity.

At the international level, the "Berne Convention" and "WIPO Copyright Treaty" provide a basic framework for copyright protection for member countries, emphasizing that all member countries should provide legal protection equivalent to that of their own creations for related. The "Agreement on Trade-Related Aspects of Intellectual Property Rights" further emphasizes the protection and enforcement of copyright in the context of trade, which is both an opportunity and a challenge for some developing countries. Therefore, countries need to consider the provisions of the above international conventions and their national conditions when formulating copyright laws to meet their national conditions. In legal practice, the implementation of copyright is greatly influenced by the legal framework. Specifically, judicial precedents and administrative enforcement are important links to ensure effective copyright protection. For example, in the "Zhihu plagiarism case," the court clarified the boundaries between originality and expression through in-depth interpretation of the relevant provisions of the Copyright Law, strengthening the protection of copyright. This case reflects the law's flexible response to copyright issues in the emerging media environment.

# III. Current State of Copyright on AI-Generated Content Worldwide 3.1 Policy Analysis on Copyright of AIGC Abroad

In today's society, the rapid development of artificial intelligence technology has sparked profound discussions on copyright issues related to AI-generated content. Especially under the legal frameworks of various countries, whether works created by artificial intelligence have the qualifications for copyright, and the current status of copyright ownership, exercise, and protection mechanisms, urgently need in-depth analysis. Against the backdrop of deepening globalization, the copyright issues of AIGC have become a

complex issue that needs to be resolved within the legal systems of various countries. There is a significant difference in the legal application of copyright recognition for AI-generated content in different countries, and some countries have not yet formed a clear legal framework. Through international comparative law analysis, we can deeply discuss this issue and explore the implications of various countries' laws for future policy development.

At the international level, according to the Berne Convention and the WIPO Copyright Treaty, the core principle of copyright law is to establish the concept of "human authors." However, the characteristic of AI-generated content is that its creation process does not directly involve the active creative actions of human authors, which is contrary to traditional copyright law. In the United States, the copyright ownership of AI-generated works is still controversial. Although the U.S. Copyright Office clearly stated in 2019 that it only recognizes the copyright of works created by human authors, case analyses such as the copyright registration application for "AI-generated art works" reflect the ambiguity and uncertainty in legal application, especially in how the law recognizes the role of AI as a creative tool.

Taking the United States as an example, the Digital Millennium Copyright Act has regulated copyright in the network environment to a certain extent, but it lacks systematic provisions for the protection mechanism of AI-generated content. This situation not only leads to the ambiguity of copyright ownership but also restricts the legal use and innovation of AI-generated content. American scholars have suggested that the initiative of AI in content creation, whether it can be regarded as the legitimacy of the creative subject, is worth further discussion. With the continuous improvement of artificial intelligence capabilities, in some cases, AI may be recognized as the owner of copyright in the future, which may bring new legal challenges.

At the same time, the European Union has begun to pay attention to the protection of digital content in the Copyright Directive. This directive attempts to address the copyright issues of AI-generated content through the formulation of a legal framework, especially when it comes to the originality standard of works, the EU emphasizes that the creative output must have "a certain personal imprint" to ensure the ownership of copyright. However, the ambiguity of this standard and how to effectively apply it in the context of highly intelligent AI is still a challenge that needs to be responded to.

### 3.2 Current Status of Copyright on AIGC in China

For China, with the rapid progress of these technologies, the copyright issues of AIGC that have emerged are also showing their complexity. The types of artificial intelligence generation technology and their application scenarios need to be carefully analyzed. The mainstream artificial intelligence generation technologies currently include deep learning and generative adversarial networks. In terms of application scenarios, AIGC is widely used in fields such as game development, advertising creativity, and news reporting. The continuous expansion of these scenarios further intensifies the copyright issues. It can be seen that the legal issues involved in the creative process of AIGC are particularly complex. It is necessary to further analyze the basic concepts of copyright to understand this issue. Specifically, the definition and characteristics of copyright, as well as the objects of protection, need to be clearly defined. The applicability of the current copyright legal framework faces challenges because existing laws are mostly centered on human creators and do not effectively cover the complexity of artificial intelligence as a creative subject. This legal blind spot directly leads to the diversification and complexity of the current status of AIGC copyright. Based on the aforementioned issues, analyzing the current status of copyright on artificial intelligence-generated content can help clarify the similarities and differences in how different countries deal with this issue. In response to this increasingly severe problem, countries have begun to revise laws and adjust policies, and related cases provide important reference for legal application. The following chapters will discuss the copyright ownership issues and copyright infringement issues of artificial intelligence-generated content in depth. On the issue of ownership, the discussion on the identification of the subject of work creation and the legal status of artificial intelligence is the core issue, as this issue concerns the rational allocation and protection mechanism of copyright. The clarification of infringement judgment standards and the discussion on infringement liability and compensation will provide important theoretical guidance for future specific cases.

# IV. Copyright Ownership Issues of AI-Generated Content 4.1 Identification of the Subject of Work Creation

Against the backdrop of the rapid development of the digital economy, the content generated by artificial intelligence is gradually becoming an important part of the creative field. Therefore, the identification of the subject of work creation, especially whether AI can be regarded as the subject of creation, has become a complex problem that needs to be solved urgently from the legal and ethical perspectives. A core content of existing copyright law is to clarify the subject of the work, which is mainly based on the traditional creative concept, that is, creation must be carried out by natural persons. However, in the scenario of AI-generated content, the traditional legal framework obviously faces many challenges and dilemmas.

According to the subject analysis framework, the subject of creation is not only involved in the creative process of the work but also includes the intent and essence of creation. Under this framework, AI's "creative ability" has sparked intense discussion. On the one hand, some scholars argue that AI can be regarded as the subject of creation, believing that its independent operation of algorithms and deep learning technology enables it to generate unique works. For example, Open AI's GPT4.0 has performed well in text generation, often showing excellent performance in high-level literary creation and professional content generation, thus raising questions about whether the traditional identification of the creative subject should be changed.

### 4.2 Legal Status of Artificial Intelligence as the Subject of Creation

When discussing the legal status of artificial intelligence as the subject of creation, it is necessary to first clarify the basic concepts of copyright and its scope of application. Copyright law aims to protect the creative achievements of original works and ensure that creators have the rights to use, reproduce, disseminate, and modify their works. However, with the development of deep learning and generative adversarial networks, artificial intelligence has gradually entered the creative field in the form of independent creation, posing challenges to the existing copyright legal framework.

If artificial intelligence is regarded as the subject of creation, its legal status needs to be reconstructed under the existing legal framework. Existing copyright laws generally require the subject of creation to be an individual with legal personality, such as a natural person or a legal entity. However, as a non-natural person entity, artificial intelligence does not have personality characteristics in law, which means that it is difficult to clearly define the rationality of its copyright ownership within the existing legal framework. For example, one of the core elements of copyright law is "creation," and the essence of

creation is based on individual creative thinking and expression. The creative process of artificial intelligence is mostly based on pattern recognition and generation through a large amount of training data, and it does not have consciousness and creative realization similar to humans. Therefore, if followed by the existing definition, the improper inclusion of artificial intelligence as the subject of copyright will lead to legal white.

### 4.3 Collaborative Creation and Inheritance Relationship

In the context of the rapid development of digitalization, the application of artificial intelligence technology has continuously penetrated various aspects of human creative activities, especially in the field of content generation. For example, using advanced algorithms such as "generative adversarial networks" and "long short-term memory networks," artificial intelligence can quickly generate text, images, and even music, which has sparked a wide discussion on copyright ownership issues. In this context, collaborative creation and inheritance relationships have become particularly important. The actual forms of collaborative creation are diverse, including but not limited to the interactive collaboration between human creators and artificial intelligence. Creation tools based on "deep learning" allow human creators to generate innovative content by inputting themes or keywords. The intellectual property rights ownership in this process is inevitably affected by the interaction between human creators and artificial intelligence. According to the "Copyright Law," copyright belongs to the author of the creation, and in this case, the subject of creation is not single, involving multiple subjects such as human creators, AI system developers, and users. In this situation of multi-subject interaction, the issue of copyright ownership seems to become more complicated.

In the works generated by collaborative creation, the legal inheritance relationship of copyright should also attract attention. According to relevant legal provisions, such as "works that are fixed in a tangible form after creation," human creators, as direct creators, still have copyright. Whether the copyright of AI-generated content can be attributed to AI itself, and how the inheritance rights and transfer rights of its creators are defined in law, are all unresolved problems. For example, the U.S. Copyright Act clearly states that the subject of copyright must be a human, so under the legal framework, the works assisted by AI in creation, their copyright still belongs to human creators.

In summary, this paper also agrees that the subject of copyright should belong to natural persons or legal entities, and AI does not have the subject status of owning copyright.

## V. Copyright Infringement Issues of AI-Generated Content

### **5.1 Criteria for Determining Infringement**

When discussing the criteria for determining copyright infringement in AI-generated content, it is first necessary to clarify the legal framework and applicable standards. According to the relevant provisions of the "Copyright Law," the objects of copyright protection include works in the fields of literature, art, and science. In the field of artificial intelligence, the subject of content generation and the corresponding copyright ownership have become more complex and need to be deeply analyzed from multiple dimensions. The determination of infringement usually based on two key elements: one is the subjectivity of the act, that is, "intent" or "negligence," and the other is the objectivity of the result of the act, that is, the damage caused by the infringement. This requires us to analyze specific cases of

AI-generated content in detail and evaluate the copyright involved, especially whether there are circumstances beyond the scope of fair use in production, dissemination, or adaptation behaviors.

In the existing legal framework, the determination of infringement behavior is based on the principle of "substantial similarity," that is, to determine whether the infringing work and the original work have significant similarities in expression and content. By comparing the content generated by artificial intelligence with the original work of the human creator, the court often needs to introduce professional intellectual property assessment tools, including "comparative analysis" and "statistical analysis" to quantify the similarity between the two. In the review of generated content, special attention should be paid to how the algorithm works and the characteristics of its output, as different algorithms can lead to the uniqueness and non-uniqueness of generated content.

### 5.2 Liability and Compensation for Infringement

In the context of copyright infringement issues in AI-generated content, the resolution is not simple, especially when it comes to the division of infringement liability and compensation. The responsibility analysis method is particularly important when defining the responsible party. This method requires a comprehensive consideration of the behavior of natural persons, social norms, and technical characteristics when defining the responsible party. It is necessary to clarify the ownership issue of AI-generated content, especially in the content creation process, the responsibility borne by the users and developers of artificial intelligence tools or algorithms often forms a complex legal relationship.

Based on the existing legal framework, the constituent elements of infringement behavior include the occurrence of infringement behavior, the existence of damage, and the causal relationship between infringement and damage. In cases of AI-generated content, assuming that a text generated by an AI model infringes on someone else's copyright, the responsibility analysis method can help clarify the responsibilities of different parties. For example, if the creation of the text entirely depends on specific instructions provided by the user, then the user may need to bear the leading infringement liability; if the design of the algorithm itself has plagiarism in the learning of copyright content, then the developer may also face the corresponding responsibility.

### **5.3 Prevention and Remedial Measures**

When discussing copyright infringement issues in AI-generated content, it is essential to pay attention to effective prevention and remedial measures to ensure the legal rights and interests of creators. In this context, it is first necessary to clarify the risks of copyright infringement that may arise in the process of AI-generated content. These risks are mainly reflected in two aspects: first, the generation algorithm of artificial intelligence may improperly use existing protected works, leading to substantial plagiarism; second, the automated generated content may fail to clearly define its copyright ownership, leading to legal disputes.

To effectively prevent the occurrence of copyright infringement, institutions and individuals need to take a series of comprehensive measures. In the training stage of the AI system, it should be ensured that the data set used complies with "intellectual property law" and regulations, avoiding a large amount of infringement of copyright content entering the training corpus through clear authorization, obtaining permission, and following the principle of fair use. For example, when enterprises develop content

generation models, they can conduct a detailed copyright review of potential source works to ensure that materials are obtained legally, thereby reducing subsequent legal risks.

Technical innovation at the technical level is also indispensable. By introducing "blockchain" technology for recording content generation and transactions, it is possible to achieve traceability and tracking of creative works, enhancing the transparency of copyright protection. Embedding "digital watermark" technology in AI-generated works provides creators with clear rights proof, so that even in the event of infringement, technical means can expand the strength of rights protection.

Timely remedial measures are particularly important when infringement occurs. When copyright infringement is discovered, the first step to take is to contact the infringer for "conciliation" negotiations. This non-litigation dispute resolution method is often faster and lower in cost, helping both parties to reach an agreement and avoid further escalation of the situation.

#### 5.4 Policy Recommendations and Legislative Outlook

When discussing copyright infringement issues of AIGC, the challenges faced by the existing legal system should first be taken seriously. Since the production process of AIGC usually involves complex interactions of various algorithm models, this brings considerable trouble to the recognition of copyright. It is necessary to consider the revision of the existing "Copyright Law" to better adapt to the rapidly developing technical environment. Based on this, this paper will discuss the direction of solving AIGC copyright issues from the perspective of policy recommendations and legislative prospects.

It is recommended to formulate an interim policy framework to cover the copyright ownership and responsibility clarity of AIGC works. At present, many countries have not defined the subject of work creation, resulting in many cases where AIGC-created works are not applicable to traditional copyright protection. Theoretically, the content produced by AIGC can be regarded as "copyrighted works," but the lack of clear legal provisions to support it is still a difficult area to define. Therefore, we suggest introducing the concept of a "creation system," that is, all technical participants involved in the content creation process should be regarded as potential co-owners of copyright. This approach not only protects the rights and interests of human creators but also reasonably defines the contribution of algorithm developers.

In summary, AIGC may have infringing acts. If AIGC has infringing acts or phenomena, corresponding laws and regulations should be formulated and can be used to remedy and protect the interests of the victims.

# VI. Conclusion

AIGC brings many legal and ethical issues, especially in terms of copyright ownership and protection, which are particularly complex. These issues are not only about the revision of legal provisions but also reflect the tension between social and cultural changes and technological progress. In the context of today's digitalization, the rapid development of AI technology has challenged the traditional definition of creative subjects and copyright law. The resulting copyright ownership issues have become a focus of attention from all parties, involving many levels such as developers, users, and the legal status of AI itself. The discussion on collaborative creation and inheritance relationships adds a new dimension to the application of copyright law. In the face of legal white brought by new technologies, it is urgent to establish a legal framework suitable for the AI era to reasonably divide the ownership of creative

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achievements and ensure that the rights and interests of creators are effectively protected. In this process, the legal community needs to work closely with the scientific and technological community and all sectors of society to discuss and formulate policies and laws that are suitable for understanding and application. The comparison and reference of different copyright protection mechanisms in various countries will have a positive impact on the improvement of the global legal system. Therefore, in the face of the continuous growth of AI-generated content, it has become a consensus among all parties to timely revise and improve copyright law to provide strong support for technological innovation and the sustainable development of the cultural industry. By comprehensively analyzing the multi-dimensional relationship between technological development, legal adaptability, and social and cultural effects, it is expected that future legislative adjustments will be based on grasping the balance between AI and copyright rights, achieving a harmonious unity of technological progress and legal protection. Only in this way can a legal and compliant development path be opened up for an innovative and diverse content creation environment. In summary, AI-generated content not only shows the impact of technological progress on creative methods but also highlights the necessary changes in the law in response to new challenges. In exploring the future legal environment, attention to the balance of multiple interests and reasonable predictions will be an important aspect of ensuring the rights and interests of all parties. Promoting the integrated development of AI and copyright fields, ensuring that the legal framework remains adaptable in the tide of technological evolution, will lay a solid foundation for promoting global creativity and cultural prosperity.

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