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Research on the Copyright Ownership of AI-generated Works

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Abstract: In the context of the rapid development of science and technology today, the vigorous rise of artificial intelligence technology has brought about many new challenges and reflections at the legal level. Among them, the issue of the copyright ownership of AI-generated works has become the focus of attention shared by the academic community, the legal community, and the industry. This article conducts an in-depth and comprehensive discussion around this core topic. Firstly, it provides an overview of artificial intelligence technology. Subsequently, it analyzes the legal status quo of the definition, characteristics, and copyright ownership of AI-generated works. And through the analysis of relevant domestic and foreign laws and cases, it demonstrates the handling methods and differences of the copyright ownership of AI-generated works in different legal jurisdictions. This article profoundly explores the issue of the copyright ownership of AI-generated works, aiming to provide a theoretical basis and practical guidance for the adaptation and progress of copyright law in the era of artificial intelligence.

Keywords: AI-generated works, Copyright ownership, Copyright law

1. Introduction

The rapid development of technology has enabled humans to achieve remarkable breakthroughs in the field of artificial intelligence technology. Currently, this technology is widely used in various fields. Especially in the field of content creation, artificial intelligence technology has been able to generate works with a certain degree of originality. For example, the work "Théâtre D'opéra Spatial" generated by the game designer Jason M. Allen using artificial intelligence won the first prize in the annual competition of the Colorado State Fair in the United States.

However, the issue of copyright ownership of these AI-generated works has sparked heated discussions in the legal community. From the perspective of modern law, traditional copyright mainly regulates natural persons. As a non-independent legal subject, it is difficult to clearly define the ownership of works generated by artificial intelligence. How to reasonably define the copyright ownership of AI-generated works not only relates to the protection of the rights and interests of creators but also affects the innovation drive and cultural prosperity of the entire society. In-depth research on this issue plays an important role in further improving China's copyright legal undertakings and promoting the harmonious development of science and technology and the legal system.

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2. Overview of AI-generated Works

2.1. Concept of AI-generated Works

In the field of modern artificial intelligence technology, it is generally believed that the term "artificial intelligence (AI)" was first proposed by John McCarthy at the Dartmouth Conference in 1956. Artificial intelligence enables computers to perform various tasks that the human mind can do. [1] In other words, artificial intelligence technology is a technology that simulates human intelligent behaviors and thinking processes, and its core is to achieve autonomous learning and decision-making through algorithms and data processing.

There is currently no unified and authoritative concept of artificial intelligence generated content (AIGC). Broadly speaking, any product generated with the participation of artificial intelligence technology is considered an AI-generated work. Narrowly speaking, AI-generated works only refer to the results output by an AI entity (including hardware, software, algorithms, etc.) after performing deep learning and processing on the existing data and works inputted to it, and then calculating according to the user's needs. [2]

2.2. Characteristics of AI-generated Works

From the perspective of the creation principle of AI-generated works, AI-generated works mainly have the following characteristics: Firstly, AI-generated works mainly rely on preset algorithms and databases as scripts for creation, and the generated content has no obvious difference in appearance from traditional human creations. Secondly, although AI-generated works are technological products created by humans, they are not affected by the external environment and the generation is relatively stable. With the popularization of the Internet and big data, the efficiency and accuracy of AI-generated works have been greatly improved and have met people's daily basic needs.

Therefore, the characteristics of AI-generated works can be summarized as follows: compared with traditional human creations, the creation process of AI-generated works is automated and intelligent, and the efficiency is much higher than that of humans.

3. Copyright Ownership of AI-generated Works

3.1. Current Status of Copyright Ownership of AI-generated Works

In recent years, due to the extensive application of artificial intelligence technology in the field of content creation, the copyright ownership of AI-generated works has triggered a series of intense discussions and disputes in the legal field. At present, the definition and nature of AI-generated works are relatively ambiguous, which makes the legal determination of copyright ownership face many difficulties.

Firstly, some scholars advocate that the content generated by artificial intelligence is the product created following the main will of the software designer and meets the "originality" standard. It should draw on the legal person work system and recognize the owner of the artificial intelligence as the copyright owner. [3] However, some other scholars believe that although the content generated by artificial intelligence is indistinguishable from the works created by humans in appearance, the former does not have personalized characteristics and does not meet the "originality" requirement, so it does not have copyright. [4] For example, in the production of a work, the user needs to input corresponding instructions according to their own needs, and the developer needs to input a large amount of relevant content into the artificial intelligence to enable it to create. Therefore, the developer or the user should be regarded as the subject of copyright. In addition, with the continuous progress of artificial intelligence technology, its autonomy is increasing day by day, and the

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originality of AI-generated works is gradually recognized, further complicating the issue of copyright ownership.

In addition, Article 3 of the newly revised Copyright Law of the People's Republic of China has also added a new definition of works, limiting the constituent elements of works to the following four aspects: within the fields of literature, art and science; having originality; being capable of being expressed in a certain form; belonging to intellectual achievements. [5] Therefore, the principle of copyright ownership under the current law is difficult to directly apply to AI-generated works.

Internationally, there are also certain differences in the legal attitudes and practices of different legal systems regarding the copyright ownership of AI-generated works. For example, the civil law system emphasizes centering on the copyright holder and protecting the personality and individuality of the author. While the common law system clearly gives computer-generated works exactly the same status as human works. [6] For example, the Copyright Law of Japan revised in 2018 clearly stipulates that AI-generated works do not enjoy copyright without human intervention. In the UK, Section 9(3) of the Copyright, Designs and Patents Act (CDPA) provides that: "For a literary, dramatic, musical or artistic work generated by a computer, the author shall be the individual who has made the arrangements necessary for the creation of the work." The differences between the two not only reflect the attitudes of legal systems towards AI-generated works, but also mirror the policy orientations of different legal systems towards the development of AI technology.

To sum up, the copyright ownership of AI-generated works is a complex issue, often involving multiple aspects such as subject, technology, and originality. With the continuous development of AI technology, the urgency and importance of this issue have become increasingly prominent, requiring the joint efforts of the legal and academic communities to find reasonable solutions.

3.2. Value of Establishing Copyright Ownership of AI-generated Works

Firstly, establishing the copyright ownership of AI-generated works is in line with the legislative purpose of the Copyright Law. The current legislative purpose of the Copyright Law is to protect the copyright of the creators of literary, artistic and scientific works and the rights and interests related to copyright, and strive to promote the prosperity and development of culture and the steady progress of society. At present, there is still a need for the Copyright Law to provide institutional incentives for the users of AI. [7] With the advancement of AI technology, transactions involving the sale of AI-generated works are common, and the establishment of the copyright ownership of AI-generated works has become an urgent issue. If AI-generated works cannot be recognized as having legal copyright and a legal copyright owner cannot be established, a large number of copyright holders will choose to abandon the use of AI technology to prevent copyright protection issues, which will not only hinder the progress of science and technology, but also bring a series of negative impacts on society.

Secondly, establishing the copyright ownership of AI-generated works conforms to the development of the times. The copyright protection of AI-generated works has received increasing attention nowadays. On the one hand, AI-generated works can help humans to greatly improve work efficiency and save working time. On the other hand, AI-generated works are constantly affecting all aspects of human life and have become an indispensable tool for humans. However, the issue of the copyright ownership of AI-generated works has not been effectively resolved, and the legal regulations in this field in the Copyright Law are still in a blank state. Establishing the copyright ownership of AI-generated works is conducive to conforming to the development of the current era and the long-term stability of society.

Finally, establishing the copyright ownership of AI-generated works can enhance the enthusiasm of the relevant parties involved in AI-generated works. After the copyright ownership of AI-generated works is determined, it provides effective legal protection for the relevant parties of AI-generated

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works and protects their creative enthusiasm. In addition, determining the copyright ownership of AI-generated works stimulates the enthusiasm of the relevant parties of AI-generated works, promotes the dissemination and promotion of works, and thus effectively promotes the transformation and upgrading of the relevant industrial chain of AI-generated works.

In conclusion, establishing the copyright ownership of AI-generated works has multiple practical significances. Therefore, corresponding laws and regulations should be improved as soon as possible to clarify the copyright ownership of AI-generated works, protect the legal rights of the right holders, and promote social development.

4. Current Status of Legal Challenges in Copyright Ownership of AI

4.1. Overview of Legal Challenges in Copyright Ownership of AI

In today's world, the practical applications of artificial intelligence generated content (AIGC) in daily life are constantly expanding, but the issue of its copyright ownership has not yet been clearly regulated by law. The core of this challenge lies in whether the products of artificial intelligence technology possess the "originality" required by modern copyright law. And even if they meet the conditions of "originality", there will still be legal challenges such as determining the subject and technical aspects.

Firstly, the originality of AI-generated works is a crucial legal challenge. According to Article 3 of the Copyright Law of the People's Republic of China, works referred to in this Law mean intellectual achievements that are original and can be expressed in a certain form in the fields of literature, art, and science. Originality means that a work is completed by the author through independent creation and reflects the author's independence and creativity to a certain extent. For AI-generated works, their essence is the works created after the designers of artificial intelligence technology, big data providers, and users input relevant instructions. Some scholars oppose regarding AI-generated works as copyrighted works because under the guise of digital algorithms, AI-generated works can neither reflect the author's personal characteristics, that is, "originality", nor can the emotions the author intends to express be perceived through the works. [4] More experts' views are that AI-generated works can be regarded as copyrighted works. They believe that the people-oriented copyright thought is rooted in the theory of copyright law. In most cases, any type of product generated by a computer requires a large amount of data input from the author or user, and it has "originality". [8] Therefore, clarifying whether the products of artificial intelligence technology possess originality is of great significance for studying the copyright ownership of AI-generated works.

Secondly, determining the subject of copyright ownership of AI-generated works is also an urgent challenge to be solved. If AI-generated works are successfully recognized as having originality, then to which subject should the copyright belong? The complexity of this challenge is no less than determining whether it has originality. The creation process of AI-generated works usually involves multiple subjects, including designers, big data providers, and users of artificial intelligence. Under the existing copyright legal framework, the rights and obligations relationships among these subjects have not been clearly defined. Moreover, the issue of copyright ownership of AI-generated works also involves the coordination and unification of international laws. Different countries and regions have different understandings and regulations regarding the legal status and copyright ownership of AI-generated works, which brings challenges to the copyright protection of cross-border AI-generated works.

Finally, the copyright protection of AI-generated works also faces technical challenges in the legal field. With the continuous progress of artificial intelligence, the creation process of AI-generated works has become more and more complex, and the unpredictability of the generation results has

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increased significantly. This makes it more difficult to protect the copyright of AI-generated works. Specifically, in the creation process of AI-generated works, large data sets and complex algorithms may be involved, and the sources and usage methods of these data and algorithms often involve the rights and interests of multiple subjects. How to balance the rights and interests of various subjects while protecting the copyright of AI-generated works is a question that needs in-depth discussion.

In general, the issue of copyright ownership of AI-generated works has caused extensive disputes and discussions in the legal field. Solving this problem requires not only a reexamination of the basic principles of copyright law but also in-depth discussions and coordinations at the levels of originality, subject, and technology. Only through multi-party cooperation and joint efforts can a reasonable and just legal framework for the copyright protection of AI-generated works be constructed.

4.2. Comparison of International Legislation on Copyright Ownership of AI

Internationally, the issue of copyright ownership of AI-generated works presents diverse legal frameworks and practical experiences.

The European Union has shown a cautious attitude in dealing with the copyright ownership of AI-created works. In 2021, the European Commission proposed to classify the risks of AI and put forward corresponding requirements. In the "White Paper on Artificial Intelligence" released by the European Commission in 2020, it was proposed that a special copyright protection mechanism should be considered for AI-generated works to reconcile the tension between technological innovation and legal protection. In 2023, the European Parliament, EU member states, and the European Commission reached an agreement on the "Artificial Intelligence Act", aiming to regulate the use and risks of AI through legislation. [9] Specifically, the EU tends to regard AI as a "tool" and advocates that AI achievements generated under human guidance can finally obtain limited copyright protection.

In Asia, Japan and South Korea have taken completely different paths in dealing with the copyright ownership of AI-generated works. Japan's Copyright Law revised in 2018 clearly stipulates that AI-generated works do not enjoy copyright without human intervention. South Korea, in the "Artificial Intelligence and Copyright Law" released in 2021, proposed that an independent copyright category should be established for AI-generated works to meet the needs of technological development. It can be seen that different countries and regions will adopt extremely different ways to deal with the copyright issues of AI-generated works.

In addition, China is also actively exploring in dealing with the copyright ownership of AI-generated works. In 2022, the National Copyright Administration of China issued the "Guidelines for Copyright Protection of AI-generated Content". The guidelines propose that whether AI-generated works meet the conditions for copyright protection should be judged according to specific circumstances. Specifically, if AI-generated works embody the "original expression" of humans, they can obtain copyright protection. This guideline also provides a preliminary legal framework for the copyright ownership of AI-generated works. In judicial practice, China is also constantly opening up the way to deal with the copyright ownership of AI-generated works. For example, in the "first domestic case of copyright infringement of AI-generated pictures from text" in 2023, [10] in this case, Chinese courts for the first time clarified whether AI-generated works belong to works and that AIGC belongs to AI users. There is also the "first global case of copyright infringement of AIGC platform" in 2024, [11] in this case, Chinese courts for the first time indicated that the AI platform operated by the defendant infringed the plaintiff's rights of reproduction and adaptation of the Ultraman works in the process of providing AIGC services and should bear relevant civil liabilities. The judgments of these judicial practices provide an important basis for the copyright ownership of AI-generated works in China.

In conclusion, different countries and regions have adopted different legal frameworks and practices to deal with the copyright ownership of AI-generated works. These differences reflect the

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different strategies of various countries and regions between technological innovation and legal protection, and also provide a reference for future international cooperation and legal coordination.

5. Suggestions on Copyright Ownership of AI-generated Works

5.1. Clarify the Legal Status of AI-generated Works

The legislative body has the responsibility to formulate comprehensive legal provisions, clarify the definition of AI-generated works and their legal status, fill in the gaps in this area, and ensure that they are effectively protected by the copyright law. At the same time, it is necessary for the legislative department to further establish a more professional judicial review mechanism to deal with the complex technical problems faced by the copyright ownership of AI-created works.

In conclusion, clarifying the legal status of AI-generated works is conducive to effectively protecting the legal rights of the right holders and enabling AI-generated works to thrive in a comprehensive legal environment.

5.2. Create a Registration System for AI-generated Works

The establishment of a registration system for AI-generated works aims to better facilitate the mutual exchange of AI-generated works among different countries and regions, so that AI-generated works in various countries and regions can be protected under equal conditions. Firstly, the registration authority for AI-generated works should be clearly defined. Specifically, the National Copyright Administration can create a special registration database for AI-generated works, and register those that meet the registration standards in accordance with the relevant copyright system regulations. Secondly, the registration content of AI-generated works should be stipulated. In the registration information, it is necessary to clearly "sign" the creators of artificial intelligence technology, the users of AI-generated works and other relevant information to distinguish between human works and AI-generated works, which can effectively ensure that the creators and users of AI-generated works enjoy the right to know and the right to independent choice.

In conclusion, the creation of a registration system for AI-generated works is conducive to the management and international exchange of a large number of AI-generated works.

5.3. Develop and Apply Digital Watermark and Blockchain Technologies

Digital watermarking technology is an advanced means of information hiding, which can embed an invisible mark in the works generated by artificial intelligence. This mark is mainly used to confirm the originality and ownership of the work, effectively avoiding the infringement of the subject's intellectual property rights. Blockchain technology also brings us a decentralized data recording system. By using blockchain technology, the production process and ownership information of AI-generated works can be completely and unalterably preserved. All changes in the creation process and ownership will be recorded in detail in a decentralized ledger, and no one has the right to change these records alone.

In conclusion, the development and application of digital watermarking and blockchain technologies not only ensure the originality of AI-generated works but also provide a reliable evidence chain for creators and owners to prove their ownership and creation rights of the works.

6. Conclusion

Generally speaking, this research on the copyright ownership of AI-generated works is of great significance. On the one hand, from a theoretical perspective, it provides new directions of thinking and a research foundation for the development of copyright law in the era of artificial intelligence,

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which helps to further improve the legal theoretical system. On the other hand, from a practical perspective, it offers reference suggestions for the creators of AI-generated works and legal professionals, prompting all parties to seek a balance between technological innovation and legal regulations, thus effectively promoting the sound development of the artificial intelligence industry and ensuring the effective protection of the legitimate rights and interests of all parties in the new technological environment.

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