Scientific Research Publishing

Authorship of Artificial Intelligence-Generated Works and Possible System Improvement in China

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Abstract

With the rapid development of artificial intelligence technology, artificial intelligence (AI) is able to create "original" literature, artistic or musical works that do not differ significantly from human works. This raises a series of new questions for copyright theory and practice. AI-generated works should be considered works protected by copyright law; it can meet a minimal degree of originality. Since giving authorship to AI would be contrary to civil law and the theory of natural person author, AI cannot be regarded as an author. The authorship of its creations should be vested in its users. For AI-generated works, there are some certain gaps in China's current copyright system that need to be filled, such as fair use and term of protection.

Keywords

Artificial Intelligence, Artificial Intelligence-Generated Works, Copyright, Authorship, Originality, Fair Use

1. Introduction

Technology advancements have enabled artificial intelligence (AI) to generate works with certain "originality". Back in the early twenty-first century, a famous American futurist Ray Kurzweil designed a program called Ray Kurzweil's Cybernetic Poet (RKCP) which could analyze the work of a particular author to create poems in a style similar to that author. Microsoft (Asia) released a cross-platform AI bot called Xiaoice in 2014 that has similar capabilities to RKCP. After several upgrades, Xiaoice can create poems from images and instructions uploaded by users (Spencer, 2018). With the development of related technologies, ChatGPT was launched in November 2022 and received worldwide atten-

tion for its overwhelming capabilities. The program is not only able to communicate with users like a human, but can also translate languages, create essays or write code. A number of countries have banned ChatGPT, including China, Iran, North Korea and Russia. According to the latest news, Italy has also joined the ban on ChatGPT. The Italian data-protection authority has banned the use of ChatGPT from March 31, 2023, due to privacy concerns (McCallum, 2023).

The use of AI in original artistic works has also stimulated much discussion. The New York Times reported last year that "Théâtre D'opéra Spatial," by Jason M. Allen, won first place in the digital division of the Colorado State Fair's annual art competition (Roose, 2022). However, Jason Allen did not make his entry with a brush or a lump of clay; he created his work with Midjourney, an AI program that turns lines of text into hyper-realistic graphics. Thus, many people questioned Jason Allen's qualification for the prize. Other AI programs that can create artwork were also listed in the report, including the free AI program Stable Diffusion. People only need to type descriptions of their desired image, and Stable Diffusion can create an "original" painting in just 10 seconds.

Stable Diffusion's influence has also spread to China. Novelai, a program that is based on the open-source code of Stable Diffusion but differs somewhat from it, has been discovered by Chinese network users. In addition to entering text descriptions, people can also input illustrations, allowing Novelai to create works similar to the given style. This sparked much buzz among illustrators.

As mentioned above, at today's technological level, the content that computer programs can generate is no longer limited to simple data collections or program logs. The work generated by programs like ChatGPT and Stable Diffusion is not so different from that created by humans and it is difficult to tell whether these works are "original" like human creations. These creations raise several issues in copyright law theory and practice. Whether AI-generated works are copyright protectable works? Can AI become the author of works? How should copyright law respond to the problems posed by AI? This article will discuss these issues in detail.

2. The Characterization of AI-Generated Work

It is necessary to determine whether AI-generated works are copyright protectable before discussing authorship. According to Article 3 of the Copyright Law of China, "'Work(s)' mentioned in this Law shall refer to intellectual achievements that are of originality in the fields of literature, arts and science and are capable of being manifested in a certain form (Copyright Law of the People's Republic of China, 2020)." In Article 2 of the Regulations for the Implementation of Copyright Law, the phrase "a certain form" means that the work "can be reproduced in a tangible form" (Regulations for the Implementation of Copyright Law of the People's Republic of China, 2013). Even though the law has defined copyright-protected work, there is still some ambiguity in establishing the attribute of works generated by computers. While it is easy to determine whether a work

belongs to the fields specified in the law and whether it can be reproduced, it is still a tough issue to determine whether an AI-generated work has originality.

The Berne Convention and the World Intellectual Property Organization Copyright Treaty (WCT) have not set a clear originality standard. China's current Copyright Law and its Regulations for the Implementation also do not contain any explicit provisions on originality. In Chinese academia, there are different attitudes on this issue. For example, Professor Wu Handong believes that regardless of the use, value and social evaluation, the works generated by machines should be protected by copyright if it is done independently by machines (Wu, 2017). Professor Wang Qian, on the other hand, believes that "AI-generated works are the result of the application of algorithmic rules and highly homogeneous templates. They leave no room for creativity and reflect no individual characteristics of the creator; thus, they cannot satisfy the work's originality requirement." (Wang, 2017)

This article's opinion is that AI-generated works have certain originality and should be protected by copyright law. The reason is partly similar to that of Professor Wu Handong. There are some doubts about whether robots can complete their works independently. It is challenging to separate AI's creative process from humans since, even though AI can run programs autonomously, these programs are designed by humans and require human input while producing. However, the point of independent creation could be focused on something other than the creation process of AI. The point could be put on whether the contents of AI-generated products are significantly different from existing works so that readers can perceive the creation of new content. This is consistent with Professor Wu's claim, "A work must be original, which means the work is the author's own creation and is not at all or substantially copied from another work."

In addition to independent creation, AI-generated works need to meet the minimum degree of originality requirement to constitute a work protected by copyright law. This view is mainly derived from the originality standard established in the United States under the famous *Feist* case. Originality not only means that the work is created by the author independently but also requires at least some minimal degree of originality, which can be satisfied by a small degree of originality (Guadamuz, 2017).

This article suggests that computer-generated works can meet this requirement. As an example, the Novelai program mentioned above requires the user to select words and images to be entered into the program. After that, Novelai needs to analyze the user's request, select the "pieces" that match the request through data mining, chose the "pieces" that can be used and determine how to combine the pieces to produce an illustration. Thus, the minimal degree of originality lies in the choice and combination of materials by the user and the Novelai program. Referring to a famous Australian case *IceTV Pty Ltd v Nine Network Australia Pty Ltd*, Gummow, Hayne and Heydon JJ say, "The originality… lay in its selection and presentation…" (IceTV Pty Ltd. v. Nine Network Aus-

tralia Pty Ltd., 2009). It can be considered reasonable to regard the choice and combination of materials as being original.

Moreover, there is a relevant case in Chinese justice. *Shenzhen Tencent Computer System Co Ltd v Shanghai Yingxun Technology Co Ltd*, also known as the *Dreamwriter* case, is a landmark AI case in China's copyright law area. In this case, the court focused its reasoning on the issue of whether the passage generated by the plaintiff using Dreamwriter software constituted copyright-protected work. The court held that the determination of whether the passage is original should be analyzed in terms of whether it is independently created and whether it differs to a certain extent from existing works in its external expression or has a minimal degree of originality. "The passage has a reasonable structure and a clear expression logic, and the content expressed therein reflects the selection, analysis, and judgment of the pertinent stock market information and data on that morning (Shenzhen Tencent Computer System Co Ltd, v. Shanghai Yingxun Technology Co Ltd, 2019)." The court's decision is that the passage has a certain amount of originality and belongs to works covered by copyright. It can be seen that Chinese judicial practice admits the "selection can meet the minimal degree of originality" and takes a positive stance on the copyright protection of AI-generated works.

However, in *Beijing Feilin Law Firm v Beijing Baidu Technology Co Ltd*, a case earlier than *Dreamwriter*, the court reached an opposite conclusion from *Dreamwriter*. In *Feilin v Baidu*, the court acknowledged that the analysis report generated by the computer program embodied the selection, judgment, and analysis of relevant data and was somewhat original (Beijing Felin Law Firm v. Beijing Baidu Technology Co Ltd, 2019). However, it was not a work within the meaning of copyright law because the computer program was not a natural person. China is not the only country using this reason to deny the copyright protection of AI-generated work. In *Telstra Corporation Ltd. v Phone Directories Company Pty Ltd.*, an Australian case, the plaintiff sued the defendant for copyright infringement for copying a telephone directory compiled by the defendant. The court held that Australian Copyright Act did not protect the telephone directory, one of the reasons is that the directory was not a natural person creation but was generated by a computer (Telstra Corporation Ltd. v. Phone Directories Company Pty Ltd., 2010).

Should AI enjoy the same rights as natural persons and become authors under copyright law? This question will be discussed in the following section.

3. Authorship of AI-Generated Works

The fact that computers can generate original works does not mean they acquire authorship and become the subject of copyright. Many countries do not recognize the authorship of AI. Article 11 of China's Copyright Law states, "A natural person who creates a work is its author." The European civil law copyright system, represented by France and Germany, believes that a work is an extension

and reflection of the author's personality rather than a general commodity (Yang & Yang, 2012). Australia also strictly links authorship with natural persons and denies the authorship of AI, a good example of which is the decision in *Telstra* mentioned above.

Nevertheless, with the current technological advancements, the traditional framework has been challenged and AI programs may be given legal qualifications. A decision made by the Indian copyright office in 2021 challenged the present situation. For the first time ever, the copyright office has recognized an artificial intelligence tool—the RAGHAV Artificial Intelligence Painting App—as the co-author of a copyright-protected artistic work (Sarkar, 2021). In addition to co-author, the proposed subject also seems to be a way to make AI an author. Apart from natural persons, legal persons or organizations without legal person qualifications can be deemed the author of the work in China. Legal persons can get authorship if the work is created by their organization, embodies their will, and they will bear the responsibility for the work (Civil Code of the People's Republic of China, 2020). Since legal persons, as non-natural persons, can be authors under copyright law, it seems possible to formulate AI as proposed subjects of copyright rights similarly.

3.1. A Fundamental Question of AI Authors: Civil Subjects

There is a fundamental problem in whether AI is recognized as a co-author, proposed to be the author or directly recognized as the author in the copyright law. When AI authors acquire the corresponding rights, how do they exercise their rights or take their obligations? Even assuming that AI is a copyright subject, it still cannot find subject status in civil law because there are no relevant or equivalently applicable provisions. In contrast, legal persons and organizations without legal person qualifications can become subjects of copyright rights because they are civil subjects defined by the Civil Code. They have the ability to exercise rights and take obligations. Therefore, the issue of subject recognition of AI is a thorny problem that cannot be solved under the single perspective of copyright law and needs to be discussed back in civil law.

AI is neither a live natural person nor a group of natural humans with their own free will. It is difficult to comprehend how the current civil law theory may legitimately justify treating AI as a "person" and granting it the requisite subject qualification. In civil law, a person must have an independent personality. According to most scientific and technological experts, artificial machines do not have their own purposes, they work for specific purposes designed by human designers; thus, their purposeful behaviour is utterly different in nature from humans' independent, purposeful and conscious ones (Wu, 2017). Although AI is quite intelligent, it lacks autonomy and cannot be compared to a normal human being with intelligence.

As to the question of whether AI can be considered a legal subject by reference to legal person, it must face the following obstacles. Firstly, legal persons are essentially a collection of natural persons while AI is the product of condensing

the interests of different natural persons and is the object dominated by natural persons. Thus, AI cannot be regarded as a collection of natural persons (Yang, 2021). Secondly, AI does not undergo the process of generating independent will from natural persons like legal persons and does not acquire the independent will required as a civil subject. Finally, returning to copyright law, intellectual property's purpose is to stimulate more subjects' innovative activities and promote intellectual achievements. This purpose is also certified by Article 1 of China's Copyright Law and the Preamble of WCT. "This Law is enacted…to encourage the creation and dissemination of works…and promote the development and prosperity of socialist cultural and scientific pursuit." "Recognizing the profound impact of the development and convergence of information and communication technologies on the creation and use of literary and artistic works." (World Intellectual Property Organization Copyright Treaty, 1996) The effectiveness of robots in producing works is mainly influenced by objective factors like infrastructure and operational procedures; hence recognizing AI as a subject of copyright will not increase AI's effectiveness.

Considering the above reasons, giving AI authorship or proposing it as a subject of copyright lacks sufficient rationality. In this case, who will be the author of AI-generated work?

3.2. The Author of AI-Generated Work: The User

Since AI cannot be an author under copyright law, the authorship of AI creations needs to be discussed in order to promote the effective use of AI-generated objects. The Copyright, Designs and Patents Act (CDPA) in the UK, widely adopted by other countries such as New Zealand and Ireland, profoundly influences the computer-generated work area (Guadamuz, 2017). Section 9(3) of the CDPA states, "In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken." (CDPA, 1988) In the case where the computer is not the author, the CDPA considers that the copyright of its creations belongs to the person who made the necessary arrangements for the work. The same description can be found in judicial practice in China. In *Dreamwriter* mentioned above, the court held that "the passage was a work completed by the overall intellectual creation formed by multiple teams and division of labour under the plaintiff's auspices" and found that the passage was a work of the legal person, which is the plaintiff.

However, such a statement also has certain defects. Who makes the necessary arrangements for "computer-generated works"? Was it the designer of the computer program or the user? If authorship is assigned to the designer, the following inevitable problems will be raised. First, there lies the problem of double profit of the AI designer (Yang, 2021). Under Article 10(1) of the Agreement on Trade-Related Aspects of Intellectual Property Rights, a computer program is a literary work protected by the treaty (Agreement on Trade-Related Aspects of

Intellectual Property Rights, 1995), so that the designer can obtain private protection in respect of the AI itself. If the authorship of computer-generated works is also granted to the designer would result in the obtaining of double protection for the same creative act. Secondly, the designer is not actually involved in the process of generating the work. AI-generated objects are mainly generated by the choices made by the user and the AI. Although AI's selection is made by programs written by the designer, the designer himself is not actually made the selection and combination of materials for a specific work, so it is questionable whether his intellectual input meets the minimal degree of originality. Thus, the designer may not become the proper author.

Although there is no current law directly stating that the author of a computer-generated work is the user, this view has more advantages than the designer view. The user is closely entwined with intelligent work. Although the user does not engage much in creative work, the act of inputting instructions plays an essential role in the production of intelligent work. Without these prior actions, intelligent work would not exist. Moreover, the user, as the author, is conducive to establishing a benign benefit distribution model for AI-generated works (Yang, 2021). More individuals will be willing to use AI software when their rights and interests are completely safeguarded, increasing revenue for the software developing team and drawing in more funding, creating a positive loop.

Even though there are some answers to the authorship question, there are still many problems with AI-generated materials that need to be found in China's current copyright law. The following section will discuss them.

4. Possible System Reform in China

From the above analysis of whether AI-generated objects are copyrighted works and their authorship attribution, China's current law lacks consideration of AI applications. It has only been about two years since the last revision of the Copyright Law of China, and there will probably be no significant changes in a short time. However, through directives or policies, China should point out the general direction for the above issue. AI-generated works should be copyrighted, but their copyright should be vested in the user of AI. In addition to the issue of authorship, the fair use and duration of protection for AI also need attention. This part will mainly discuss these two issues.

4.1. Fair Use System

According to the working procedure of AI, AI creation is generally divided into three stages: "input—learning—output". In the input stage, massive data are the important material and foundation for AI training and learning. AI must and can only learn and try through data mining to summarize specific models, styles and rules (Lin, 2021). The painting program Novelai has caused much controversy among Chinese illustrators partly because they think users have prejudiced their copyrights by feeding their illustrations into AI. Not only Novelai but also

its source program Stable Diffusion has faced similar controversy. Although Stable Diffusion generates images from textual instructions entered by the user, it still needs to learn a large number of images during its generation process. It can be seen that computer programs' data mining process usually involves acts such as reproduction, distribution, adaption, and translation of data protected by copyright law. Do these acts constitute infringement? Does the existing fair use system cover such acts? This section will focus analysis of reproduction on explaining these two questions.

1) Fair Use System's Current Situation

It is necessary to clarify whether the act of AI's extensive use of copyrighted works through data mining is reproduction before exploring fair use. Article 9 of the Berne Convention does not describe the act of reproduction in detail, but Article 1 of WCT suggests that "It is understood that the storage of a protected work in digital form in an electronic medium constitutes a reproduction within the meaning of Article 9 of the Berne Convention." Article 10(5) of the Chinese Copyright Law also mentions, "Right of reproduction, i.e., the right to make one or more copies of a work by means of…digitalization…" Following the above laws, input works to AI would fall under the copyright holder's reproduction rights and unauthorized use will result in infringement.

An option to prevent the possibility of infringement is to seek the author's permission and pay for each one individually. However, in practice, it is unlikely that users can obtain licenses for hundreds of works involved in data mining. Therefore, if people want to use massive amounts of data in the input process without infringing the rights of copyright owners, the applicability of the fair use system must be discussed.

After careful analysis, China's current fair use system may apply to individual AI users but can hardly meet the needs of AI scientific research.

According to the Copyright Law of China, Article 24(6) not only restricts the subject must be limited to "teachers and scientific researchers" but also restricts the number of copies that can be used in "a small number". However, the users of AI are not limited to schools and research institutes. In July 2017, China's State Council issued a notice about the Development Plan for a New Generation of Artificial Intelligence. This notice encourages the advantageous domestic enterprises, industry organizations, scientific research institutions, universities and others to jointly form China's AI industry technology innovation alliance (China State Council, 2017). It can be seen that the subjects in this notice exceeded the scope of Article 24(6). In addition, as mentioned above, the use of data in AI creation often involves extensive reproduction and therefore does not meet the "small amount" requirement.

Another possible provision is Article 24(1). Although it is not limited fair use to the manner and quantity, the subjects are limited to individuals. The current scientific research work has basically bid farewell to the mode of individual solo work, which is especially true for AI as one of the most complicated scientific research fields (Zhang & Xiao, 2021). In addition, although the third revision of

China's Copyright Law has added a miscellaneous provision after the statutory types of fair use, it does not mean that China's fair use system has changed from a limited category to an open-ended model. Judges are still not allowed to create new types of fair use for AI on their own.

The Development Plan for a New Generation of Artificial Intelligence published in 2017 states that China should generally reach a world-leading level in AI theory and applications and become a major AI innovation centre in the world by 2030. In order to achieve this goal, the copyright system must respond to the use of relevant copyrighted works and the development of AI technologies by making changes to the fair use system.

2) Possible Reform for the Fair Use System

EU regulations are at the leading edge of the fair use regime. The EU's Single Digital Market Directive defines the subject of "text and data mining" in two articles. Specifically, Article 3 provides for two types of subjects: "research organization" and "cultural heritage institution" (Copyright and Related Rights in the Digital Single Market and Amending Directives, 2019). With regard to the specific type of "research organization", Article 2 defines it in two ways: first, in subparagraph (1), it is defined as "a university, including its libraries, a research institute or any other entity, the research institute or any other entity, the primary goal of which is to conduct scientific research or to carry out educational activities involving also the conduct of scientific research". Secondly, in subparagraph (2), "any other entity" in subparagraph (1) is further defined as "on a not-for-profit basis or by reinvesting all the profits in its scientific research; or pursuant to a public interest mission recognized by a Member State." The above subjects are strongly non-commercial. In these situations, the exception might not hold for research organizations that are strongly influenced by commercial organizations because the commercial ones might have preferential access to the research's findings (Zhang & Xiao, 2021).

Drawing on and improving the above provisions, there are some ideas for improving the existing fair use system in China. First, there should be no subjective restriction on the fair use of AI data mining. Whether it is a state, private research institute or a higher education institution, if it conducts text and data mining for the purpose of scientific research, it falls within the scope of freedom of scientific research as stipulated in the Constitution, and is in line with the national expectation of promoting the development of AI technology. At the same time, the purpose should be limited to "scientific research". This will not significantly harm the rights of copyright owners while strengthening the nation's capacity for scientific research and advancing national technological progress. In addition, "profit use" should not be included in the scope of fair use for the time being. Commercial AI is in great demand, and it is more likely to form a market substitution for copyright owners, thus harming their interests (Zhang & Xiao, 2021).

In conclusion, China should amend its copyright laws in the future to include a new category of fair use called "To data mining or reproduce copyrighted works

for scientific research purposes."

4.2. Reasonable Adjustment for the Term of Protection

According to the above analysis, the authors of AI-generated works are the user; therefore, the term of protection should be based on Article 22 and 23 of China's Copyright Law which is "life of the author plus 50 years after his or her decease".

However, there is no need to grant such a long period of protection to AI-generated works as the originality embedded in AI-generated works is at a low level. As "the minimal degree of originality" mentioned earlier in this article, computer-generated work's originality comes from the choice and combination of materials by the user and the computer program. AI technology can create multitude options and combinations in an instant, such works are rapidly evolving and highly substitutable. Their early entry into the public domain is more conducive to the generation of more intellectual output (Yang, 2021).

A worthwhile reference is the Australian Copyright Act's provision about published editions. The Act itself does not define published editions, but in *Nationwide News Pty Ltd v Copyright Agency Ltd*, Sackville J deems, "Published edition copyright protects the presentation embodied in the edition." (Nationwide News Pty Ltd. v. Copyright Agency Ltd., 1995; Bowrey et al., 2021) The term "presentation" here is similar to the selection and combination process used in the generation of AI works. According to Section 96 of the Australian Copyright Act, the term of protection for published editions is "25 years after the expiration of the calendar year in which the edition was first published" (Australian Copyright Act, 1968).

Therefore, the view of this article is to appropriately refer to the provision of the Australian Copyright Act about published editions, moderately reducing the protection term for AI-generated works to "25 years after the expiration of the calendar year in which the work was first published".

5. Conclusion

China enacted a newly revised copyright law in 2020. While the law has made some improvements, its content does not respond to booming AI-related issues. This law does not answer two fundamental questions about computer-generated works: whether they are protected by copyright and the question of authorship. For the first question, China has provided some answers in judicial practice—the *Dreamwriter* provides the basis for the view that AI-generated works are copyright protectable. As for authorship, there is no basis for considering AI as a subject of copyright either in copyright law or civil law. The UK CDPA considered the author of a computer-generated work to be the person who made the necessary arrangements for the work, and a similar approach was taken in the *Dreamwriter*. Of the many people who make arrangements for work, the user should be more likely to be the author to facilitate the generation of new intellectual output.

In addition to the issue of authorship, fair use and the term of protection of the work are also issues that need to be concerned for AI-generated works. China has high hopes for the development of AI technology, but the current fair use system is hardly compatible with this demand. China's law can make appropriate reference to the EU's Single Digital Market Directive and add a new fair use provision for AI. In addition, since the protection value of AI-generated works is slightly lower than that of traditional works generated by natural persons, the protection period can be appropriately reduced to 25 years after the publication of the work.

Future advances in AI will enable human civilization to advance in a more sophisticated and intelligent way. The copyright system should actively regulate the copyright problems caused by AI technology so that the copyright system can be the compass in the flood of AI evolution.

Acknowledgements

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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