

Study on Copyright Protection of Artificial Intelligence Products ---A Case Study of "Nearest Entrance to Heaven"

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Abstract: *The large-scale application of artificial intelligence in the field of literature and art is the focus of attention all over the world, which brings new challenges to the traditional copyright system. Artificial intelligence products involve many issues such as legal subjects, protection modes, rights ownership and so on. At present, the American intellectual property academic circles have put forward the theory of expanding the scope of identification of deductive works, employment works and artificial intelligence virtual authorial identity to protect artificial intelligence products and solve the problem of copyright ownership. In order to build the copyright protection mechanism of artificial intelligence products in China, this paper discusses the latest theoretical research in the United States, and suggests that China should use the artificial intelligence copyright protection model and apply the employment work protection model to attribute the rights of artificial intelligence products to employers, including artificial intelligence investors, creators and users.*

Keywords: *Artificial intelligence products; Copyright ability; Copyright protection and ownership*

On November 3, 2018, Dr. Stephen Thaler applied to register the copyright to a work created by an artificial Intelligence Creativity Machine, "A recent entrance to paradise." Taylor applied to register the work as a work-for-hire for the owner of the Creative Machine. In 2019, the U.S. Copyright Office rejected the application, finding that a human author was necessary to support a copyright claim. Taylor then petitioned the Review Board to reconsider the ruling, arguing that the requirement of human authorisation violated the United States Constitution and was not supported by statute or case law, and the request was again denied. Taylor again asked for a reconsideration of the case, The Copyright Office "now relies on outdated, non-binding judicial opinions to answer the question of whether computer-generated works are copyrighted," the Copyright Review Board denied Dr. Taylor's initial request for reconsideration on March 30, 2020. In its first reconsideration, the Copyright Office held that it would not abandon the long-standing interpretation of the Copyright Act by Supreme Court and district Court precedents that only works created by human authors meet the legal and formal requirements for copyright protection. Dr. Taylor made a second request to the U.S. Copyright Office for reconsideration on May 27, 2020, and on February 14, 2022, the U.S. Copyright Office Review Board again denied Taylor's application. In a second review, the United States Copyright Office held that the work was not eligible for registration. This was after its review of statutory texts, judicial precedents, and longstanding Copyright Office practice, once again concluding that human authorship is a prerequisite for copyright protection in the United States and therefore the work cannot be registered. The United States Copyright Office affirmed the originality of the artificial intelligence product involved in the case, but denied the subject qualification, and the subject qualification of intellectual property involved in artificial intelligence has become an insurmountable mountain for the artificial intelligence product.

The "copyright" system of the common law system is different from that of the civil law system. The former's copyright law is built on the basis of "property values", pursues the theory of "commercial copyright", focuses on protecting the author's property rights with the commercial use of the work as the core, and believes that the essence of copyright is the right to copy the work for commercial purposes. For a long time, British and American countries have been committed to the copyright system as a product of public policies to encourage and stimulate creation, and promote the dissemination of knowledge and protect property interests as the main direction of copyright system. Therefore, its copyright protection method is more flexible and more market-oriented. But the U.S. courts, the U.S. Copyright Office, and the U.S. Patent and Trademark Office have all failed to recognize these artificial intelligence products, which has caused us to think endlessly. In short, the new impact of artificial intelligence products on the traditional copyright system in China and the United States is worth our in-

depth discussion[1-2].

1. Consideration of the Three Elements of U.S. Copyright Law for Artificial Intelligence Works

Through the accumulation of experience in a large number of cases and the in-depth interpretation of the Copyright Law, the American court finally considers the product from three dimensions on whether to give copyright protection to the creation. According to Section 102(a) of the Copyright Act of 1976, a work created in the United States must satisfy three elements to qualify for copyright protection: fixation, originality and Works of authorship. Based on this, the copyright discussion of artificial intelligence products should also start from the above three elements.

1.1 Artificial Intelligence is Fixed in Tangible Media

According to the TRIPs Agreement, copyright protection should extend to expressions, not to ideas, processes, manipulations or mathematical concepts. Section 102(b) of the United States Copyright Act states: "In no event shall copyright protection of an author's original work extend to ideas, procedures, processes, systems, methods of operation, concepts, principles, or discoveries, in whatever form they may be described, explained, stated, or embodied in the work." The "dichotomy of expression of thought" runs through copyright law, and this theory has made it clear that copyright protects the form of expression rather than the specific idea. Therefore, the expression and fixation of ideas in tangible media is the most basic element of copyright protection. Fixation in a tangible medium as required by the U.S. Copyright Act means that a work meets the requirement of fixation when it exists permanently or for a relatively long period of time and can be perceived, reproduced, or disseminated. AI products can be output in a digital format, fixed to paper and virtually any other medium available to any human creator, easily meeting the requirements of being fixed to a tangible carrier.

1.2 The Definition of Artificial Intelligence Originality

Artificial intelligence products also meet the basic criteria of originality in most cases. The standard of "forehead sweat" is the standard of judging originality in the copyright law of the early Anglo-American law system. The "sweat on the forehead" standard does not meet the requirements of the Berne Convention, which, although it does not use the term "originality" directly, protects the results of the author's "intellectual creations." This implies that a protected work is not merely the result of physical labor or "sweat on the forehead," but of the intellectual activity of the author. However, in the Feist case of the United States Supreme Court, it overturned the "forehead sweat" standard and adopted the new requirement of independent completion and creativity. Although in the Feist case, creativity was also included as a factor in determining whether a work was original, the court adopted the originality minimum requirement that the author created the work independently, not by copying the work of others, and that only a minimum of modicum of creativity was required. Therefore, the requirements for originality in the US Copyright Act do not need to be very high. At present, many artificial intelligence products can be identified as having some originality[3-5].

1.3 The Subject Qualification of Artificial Intelligence Products

It can be seen that artificial intelligence products can meet the specific requirements of the above objective conditions, but there are some insurmountable legal obstacles in terms of the qualification of copyright subjects. Through a series of precedents in legal practice, the United States finally established the rule of identifying the creator in Article 101 of the Copyright Act, that is, the copyright belongs to the creator of the work. As far back as the Supreme Court in *Burrow-Giles Lithographic Co. v. Sarony* (1884), the Court noted that the author is the person to whom anything owes its origin; May be called an originator, or creator, if it has completed a work of science or art; And the photograph is indeed the expression of an author's original intellectual conception. In that decision, the court referred to authors as "human beings," including saying that copyright is a person's exclusive right to their own genius or intelligence; Or to quote the English judgment that the author is the person who produced the photograph, or created the concept or limited the concept to the work. But until now, the "Nearest entrance to Heaven" case, there has been no case directly involving artificial intelligence copyright. As previously noted, the U.S. Copyright Office, in its second review, held that the work was not eligible for registration. This was after its review of statutory texts, judicial precedents, and longstanding Copyright Office practice, once again concluding that human authorship is a prerequisite for copyright protection in the United States

and therefore the work cannot be registered.

The results have implications for understanding how the US Copyright Office today examines the issue of whether non-human authors are entitled to copyright protection. It can be seen that whether artificial intelligence products are protected by copyright law is, in the final analysis, a discussion on whether artificial intelligence is a qualified subject.

2. The Challenge and Evolution of Artificial Intelligence to Copyright System

2.1 The Challenge of Artificial Intelligence to the Copyright System

The subversion of the subject of the creation of works by artificial intelligence. Human beings have long been the subject of creation, whose creation comes from the expression of inspiration and ideas, while the creation of artificial intelligence is a mechanical creation, which is carried out under the mechanical principle, data collection, and setting algorithms. With the in-depth development of artificial intelligence, people have begun to get used to including artificial intelligence into the main scope of practical activities. For example, AlphaGo, as an artificial intelligence program, stunned the world in 2016 with a 4-1 victory over top South Korean Go player Lee Sedol, and in 2017 with a 3-0 aggregate victory over then-world No. 1 Go champion Ke Jie.

Artificial intelligence is subverting the way works are created. No matter what the content and form of the work is, it is the result of the author's emotional, ideological and other psychological activities. However, AI does not have the unique thoughts and emotions of humans, and its creative approach is very different from that of human writers. Although news about artificial intelligence often catches our eye, people still lack a clear understanding of artificial intelligence due to technical difficulties. AI does not think like humans and does not have human emotions. The work created by artificial intelligence through calculation may have the appearance of the work, but its core is very different from the work created by human authors relying on emotion, ideology and other inner activities. If the works obtained through this calculation are included in the scope of protection of copyright law, it will also have a great impact on the current copyright system.

The subversion of artificial intelligence for the efficiency of work creation. The Anglo-American law countries, deeply influenced by Benthamite utilitarianism, regard "incentive" as the source of copyright system construction. The Intellectual Property Clause of the United States Constitution is intended to protect creators, promote the dissemination of knowledge, and preserve the public domain. Rather than giving inventors and authors exclusive rights that incentivise them to create more, AI seems to need no such protection to ensure its continued creation. Therefore, in the absence of creators, if AI products are subject to the same copyright protection, the ultimate benefits and actual incentives will not be the creators themselves, but the owners, users, or other stakeholders of AI. However, with the continuous development of computing power, the creation time of artificial intelligence is getting faster and faster, which is enough to stun every prolific writer in history. If you imagine that a work can be created in just a few seconds, but is granted a long period of protection, this seems to be a misallocation of rights. AI is many orders of magnitude more efficient than human writers, which also has a big impact on the long term of protection provided by the copyright system.

2.2 The Evolution of Copyability Caused by Technological Innovation

As more and more cases involve the computer field, Congress has struggled to deal with new and unexpected problems brought about by technological progress. In 1974, the United States established the Commission on New Technological Uses of Copyrighted Works (CONTU) to address copyright problems caused by computer technology innovation. And make suggestions to this end. In his 1978 final report, CONTU argued that computers, cameras and typewriters are essentially passive creative tools, and that the key to determining whether a computer-generated object can be regarded as a work under the copyright law is whether its creativity meets the standard of copyright. If a human author directly uses a computer as a tool, such as a camera or printer, to assist in the completion of the work, the involvement of the computer does not therefore affect the determination of copyright. In this case, the author of the product should still be the person using the computer to create the work, not the computer, and the work created by the author is still within the scope of copyright law. CONTU has made it clear that the concept of artificial intelligence products is still hypothetical, and therefore, there is no reasonable basis for computers to have a significant contribution to creativity and active creativity. The CONTU report was published early, and CONTU placed computers in the same category as tools such

as cameras and typewriters, indirectly avoiding the question of whether humans were co-authors with interactive computers. However, with the rapid development of The Times and the continuous progress of artificial intelligence, this suggestion seems to have been unable to cover many artificial intelligence creations at this stage.

The United States Copyright Office and the courts, adhering to strict authorship requirements, only recognize the creativity of human authors. Neither the Push Button Bertha case, which dates back to 1956, nor the 2018 monkey selfie case seem to have substantially changed their conclusions. Although the United States established CONTU in 1974 to take charge of the copyright issue of computer creation, it does not provide useful experience for the current stage of the copyright issue of artificial intelligence products. However, in the second half of 2019, the United States Patent and Trademark Office twice solicited public opinion on whether artificial intelligence products should be protected by copyright. This shows that the topic may be put on the agenda in the future[6-8].

3. The Theoretical Path of Copyright Protection of Artificial Intelligence Products in the United States

Although the current legal practice in the United States does not recognize that artificial intelligence works of non-human authors are protected by copyright, in the development of artificial intelligence in recent decades, many American scholars have made a lot of research on the reasonable arrangement and ownership of artificial intelligence copyright in the future, which has built a valuable theoretical foundation for the United States to better protect artificial intelligence works in the future.

3.1 Definition of Deductive Works and Their Application

The United States' derivative work protection is broader, including "any work based on one or more preexisting works." Therefore, in the issue of copyright protection of early computer-created works, some scholars believe that computer-created works can be protected as deductive works, and computer-created works can be regarded as deductive works based on or adapted from their codes. Many American scholars believe that by expanding the definition and scope of deductive works and treating artificial intelligence as an extension of source code, the creative process is the deductive process of source code. There has been controversy over this proposal, with the main argument being that procedurally-produced works do not necessarily fit within the scope of deductive works, since they do not actually contain any of the code that produced them, and are largely dissimilar to the original code. Treating works created by computers or artificial intelligence as deductive works does not seem to solve the ownership problem well. Because with the unprecedented development of computer technology, when computers and artificial intelligence machines can independently produce creative works by copying, it is difficult to determine whether the works produced by them are deductive works in judicial practice, and if the person using the technology may provide a large amount of data sufficient to influence the output of the works produced by them, Users seem to have more reason to be copyright owners.

3.2 Virtual Author Theory

In order to specifically analyze the copyright rationality of artificial intelligence products from an objective point of view, as early as the last century, some scholars in the United States proposed to distinguish the Fact author (author-in-fact) from the Law (author-in-law). Even if a robot can be the de facto author of a work, that does not make it the legal author of that work. American scholar Butler put forward the famous Fictional Human Author Theory to make this distinction. According to this theory, a "Fictional Human Author" can be created in order to determine the copyright of a work that is wholly or partly self-generated by computer software. As long as the work meets the requirements of the law in terms of originality, the copyright of the author of the virtual person shall be recognized, and the specific power of the copyright shall then be assigned by the judge to any investor, software developer or computer owner whom he deems appropriate. In this theory, artificial intelligence only acts as a virtual copyright holder, and the real right holder is still an artificial intelligence investor, producer or even user. However, this approach is faced with the dual problems of whether artificial intelligence itself has the qualification of legal subject status and the complexity of the copyright ownership procedure, which has no great significance for the virtual ownership of copyright.

3.3 The Expanded Interpretation of Employment Works

In order to stimulate the enthusiasm of the majority of investors and program owners, and promote the continuous development of the AI field. Many American scholars believe that the work for hire doctrine can be applied to solve the problem of the ownership of artificial intelligence copyright. Section 201 (a) of the U.S. Copyright Act states: "In the absence of any transfer, the author of the work is the creator of the work, unless it is a 'work created for employment.'" Thus, work for hire is an exception to the general principle that the person who actually creates the work is the author. Under U.S. copyright law, if a work is recognized as a work of employment, then the employer is recognized as the legal author and has rights related to the author, and the employer or client can be a natural person or a company or organization. The rule represents an existing mechanism for resolving the rights of actual authors and copyright owners, and provides practical experience on how to protect AI-generated works. American scholars believe that the United States should recognize the author identity of artificial intelligence, and through the expansion of the interpretation of the principle of employment work, the person who makes necessary arrangements for the work is regarded as the employer. Some scholars also have a similar view, arguing that it is possible to avoid identifying the author of artificial intelligence and simply redefine the interpretation of employees and employers. The AI creation employment work protection model regards AI as "employee" and expands the scope of "employer", which is conducive to reasonably solving the problem of the ownership of rights of AI products and achieving incentives for AI creation activities.

4. Research on Copyright Protection of Artificial Intelligence Products in China

For a long time, the upgrading of technology is closely related to the limitation and expansion of intellectual property rights. Countries are on the eve of a revolution in artificial intelligence. As the second largest artificial intelligence research and development country in the world, it is imperative to regulate and protect the copyright of artificial intelligence products.

4.1 The Theoretical Basis for Copyright Protection of Artificial Intelligence Products

In his *Treatise on Government*, Locke said, "The land and all the lower animals are common to all men, but each man has a right of ownership over his own person, which no one else has." The labor of his body and the work of his hands, we may say, are rightfully his." "Labour distinguishes them from the public, adds something to the work already done by nature, the mother of all things, so that they become his private rights. According to Locke's labor theory, in order to have private property rights in the corresponding goods, labor must be applied to the previously shared goods. Locke's labor theory of property rights has become one of the bases for the legitimacy of intellectual property rights. Scholar Feng Xiaoqing believes that the principles of natural law and Locke's labor theory of property rights are important theoretical bases for the legitimacy of intellectual property rights system, which can not only be used to explain the formation of intellectual property rights, but also play a very important role in the process of transforming intellectual property rights from traditional forms to modern forms.

Intellectual property as a kind of property rights, labor theory still has room for application. Artificial intelligence products are artificial intelligence creators who use computer equipment to design and optimize core algorithms, extract, integrate and analyze massive works, information and materials on the basis of specific algorithms, and make artificial intelligence products complete the creation of works. In contrast to the creations of human creators, AI creations are constructed in strict mathematical models. However, no matter which way, from the perspective of property rights labor theory, it belongs to intellectual labor and should be protected by property rights.

In addition, based on Rousseau's "social contract theory", intellectual property rights are generally considered to be the result of the contract between the owner and the user of intellectual property rights. Social contracts and economic models will keep pace with technological developments. Therefore, the ownership arrangement and protection mode of artificial intelligence products will be related to scientific and technological development. Although there is a diversified interest pattern behind artificial intelligence products, which involves users, research and development personnel, investment companies, industry competitors and public interests, but under the promotion of the market and capital, how to weigh and distribute the relevant interests will be gradually formed in the game of all parties. The philosophical system of intellectual property law in the age of artificial intelligence may be reinterpreted.

4.2 Copyright Analysis of Artificial Intelligence Copyright in China

In the two cases concerning the copyright of artificial intelligence products in China, the fundamental dispute point leading to the completely different judgment results is whether artificial intelligence products should be excluded from the scope of copyright protection because of the subject problem. Based on this, judging the copyright of artificial intelligence products from the subject qualification of artificial intelligence, it is easy to get the dilemma of the circular argument that the products do not meet the requirements of the work. Since a work is an objective existence, the possibility of its protection cannot be directly denied because the subject producing the work can only be "human". Therefore, the copyright of artificial intelligence products is analyzed from the product itself, which can more objectively analyze the creation and quality of the product itself, but the adoption of objective measurement standards is not simply to exclude the view of "work reflects personality". But considering the uniqueness of artificial intelligence, it can be deepened on top of the originality standard of human authors, and the originality judgment of its products is discussed from two levels: first, the proportion of human factors in the creative process. The second is whether the artificial intelligence product has reached a minimum level of creativity. It is of legal significance to distinguish the degree of human intervention or the connection between human and the work.

By analyzing the proportion of human factors in the generation process, on the one hand, we can more reasonably distinguish the generalized artificial creation and artificial intelligence generation process. If the production of the product is mainly a simple mechanical calculation or simple procedural reasoning led by humans, that is, artificial intelligence creation without human intervention, in this case, artificial intelligence is undoubtedly just an auxiliary tool without autonomous consciousness, and can be generally regarded as human self-creation. In the case that the product can meet the minimum creative requirements of copyright protection, it should be protected. Considering that AI is no longer limited to auxiliary tools, its powerful learning ability and development potential will eventually lead to new creative modes. At present, the originality of artificial intelligence works that really needs attention is the autonomous deep learning and creation that is almost divorced from the initiative of humans themselves. On the other hand, it can also provide useful ideas for the copyright ownership and even profit distribution of artificial intelligence products.

In addition, in terms of minimum creativity, the development of AI technology may lead to an explosion of products, among which there will necessarily be some works of uneven quality. These products must not meet the minimum creative requirements, and thus cannot be protected by copyright. At the same time, the judgment of the lowest creativity should also be based on the specific analysis of the objective content of the product, rather than just the process of artificial intelligence creation. Too strict regulations on the mechanics and data sources in the creation process of artificial intelligence will easily lead to the lack of substantive analysis of originality. The objective content of the artificial intelligence product, as long as it is not copied, plagiarized, plagiarized, or cobbled together from existing forms, the content presented is different from the existing work, and the product cannot be distinguished as being made by the artificial intelligence if the source is not clearly indicated. Then, the AI product meets the criteria of minimum creativity.

4.3 Protection Mode and Right Attribution of Chinese AI Works

4.3.1 China's artificial intelligence works protection model

Judging from the judicial decision in the Tencent case, Chinese courts are currently inclined to protect artificial intelligence products, but the premise of protection is that the products are still the result of human creation, and the author is a human and not the artificial intelligence itself. When considering what kind of legal rights should be used to protect artificial intelligence products, the author believes that artificial intelligence creators who use artificial intelligence to achieve the purpose of creation and pay corresponding labor should use the copyright protection mode to protect artificial intelligence products with the appearance of the work stipulated by law. The copyright protection mode is also the mainstream protection mode of artificial intelligence products in today's theoretical field.

4.3.2 Ownership of the Rights of Artificial Intelligence Works in China

In order to bring China's artificial intelligence industry into line with international standards, it is not only necessary to formulate relevant laws and regulations based on local conditions, but also to strive to formulate universal artificial intelligence laws and regulations on a global scale to avoid the embarrassing situation that Chinese protection standards are incompatible with foreign legislation. The author believes

that by learning from the employment work model of the American theoretical circle, artificial intelligence is regarded as an "employee", and the person who makes necessary arrangements for the work is regarded as an employer, which can more directly identify the ownership of artificial intelligence products.

China already has the legal and practical basis for applying the employment work model of artificial intelligence products. First of all, China's copyright law has introduced a relatively mature legal works system, which has been stipulated in the first paragraph of Article 16 of the Copyright Law. In the field of copyright law, the mode of employment works has been recognized as one of the institutional foundations of the copyright of artificial intelligence products. Secondly, it can realize the transformation of creators from "people" to "artificial intelligence". Although e AI cannot be granted full legal personality, it does not prevent its status as an "employee". The employment work model can acknowledge the contribution of artificial intelligence to the production of works to a certain extent. The copyright system in our country is a dual structure system including the personal right of copyright and the property right of works. In the realization of copyright protection of artificial intelligence products, the most difficult point in theory is personal rights, because artificial intelligence is not a "person" in the traditional sense. The work for hire model solves this problem and the will of the employer represents the will of the AI. Finally, the employment work model ADAPTS to the characteristics of artificial intelligence creation integration. Artificial intelligence extracts, integrates and analyzes massive works, information and materials on the basis of specific algorithms to create works. Although artificial intelligence is a creator, it does not have the subject qualification in the legal sense and cannot enjoy property interests. Among human subjects, it is reasonable to regard the owner or user of artificial intelligence as an "employer". The owner of artificial intelligence uses its capital, technology and other means and represents the will of artificial intelligence. Although he has not paid original labor, he can therefore be regarded as the author and get property benefits[9-10].

The work protection mode of artificial intelligence creation is conducive to the stimulation of artificial intelligence creation activities. The Anglo-American law countries, deeply influenced by Benthamite utilitarianism, regard "incentive" as the source of copyright system construction. The incentive object is not for artificial intelligence itself, as long as the corresponding data and enough time for artificial intelligence, it can create thousands of works, but artificial intelligence investors, designers and users still need the protection and incentive of the legal system. Treating investors, designers and users as "employers" and giving them copyright law protection can make use of the economic benefits of artificial intelligence products to fill the cost of investment, and more incentive to the development and use of artificial intelligence, which is conducive to the development of artificial intelligence industry.

The protection mode of artificial intelligence creation works is conducive to clarifying the infringement liability subject of artificial intelligence creation activities. In the creation of artificial intelligence, the legitimate rights and interests of others will inevitably be damaged. The protection mode of employment works can not only clarify the ownership of the interests of the creation object, but also clarify the identity of the responsible subject, which is conducive to solving the problem of difficult responsibility. Article 1191 of the Civil Code provides for vicarious liability of the employer, by treating the investor, designer or user as the "employer" of the AI and the AI as the "employee", the employer is liable for the damage caused by the tort liability because of the copyright and profit rights. This can effectively solve the problem of the lack of responsible subjects, which is conducive to encouraging employers to develop more advanced artificial intelligence systems, avoid infringing on the legitimate rights and interests of others at the root, and balance the interest relationship between the owners of artificial intelligence and the infringers.

5. Conclusions

The advent of the era of artificial intelligence has brought a great impact on social ethics, privacy and security, and the legal system. At present, the key and difficult problems in the research of artificial intelligence products are the copyright of artificial intelligence products, the protection mode of artificial intelligence products and the ownership of rights. With strong support from the state, China's AI research has also ranked among the top in the world. However, there are no corresponding laws and regulations, and there is still a long way to go for the legal improvement of all aspects in the field of artificial intelligence. When discussing legislation in the field of artificial intelligence, in order to bring China's artificial intelligence industry into line with international standards, it is not only necessary to formulate relevant laws and regulations based on local conditions, but also to strive to formulate universal artificial intelligence laws and regulations on a global scale to avoid the embarrassing situation that Chinese

protection standards are incompatible with foreign legislation. Only in this way can we work hand in hand with other countries to promote the sustainable development of the AI industry, on this basis to create a stable and orderly market environment, so that scientific and technological development and legal systems complement each other.

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