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RESEARCH ON COPYRIGHT PROBLEM OF ARTIFICIAL INTELLIGENCE GENERATIONS IN CHINA

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Abstract:

With the advancement of machine learning and the rapid development of AI technology, AI generations cover many fields, such as science, literature and art. They can create paintings, poems and musicals, films and comedies, etc. The emergence of this new thing has brought challenges to the existing copyright law, and how to define the copyrightability and attribution of rights and obligations of AI generation has never been reached in the legal community. This article presents two typical cases. This article analyses and summarises the legal issues arising from the cases by introducing two specific cases. It also analyses and discusses them from the perspectives of creation, originality of the work and attribution of rights in an attempt to build a copyright protection mechanism for AI generations, taking into account the existing laws and regulations.

Keywords:

Artificial Intelligence; AI Generations; Copyright; Originality

Introduction

The study of artificial intelligence can be traced back to the middle of the last century, first proposed by John McCarthy at the Dartmouth Conference in 1956 and has gone through four periods of development: the initial stage, the knowledge era, the characteristics era, the data era, and under the influence of new theories and technologies, gradually from the weak artificial intelligence era to the strong artificial intelligence era. The era of strong artificial intelligence has evolved. Artificial intelligence is generally referred to as a concept corresponding to human intelligence. These technological means arise from human intelligence

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and incorporate it into its intelligence. This technical science allowed the methodological theory of artificial intelligence and the existing operating system to be simulated, run, and extended for training and was first within the scope of computer science (Cui, 2019). The aim of studying artificial intelligence is to create intelligent machines that can respond similarly to human intelligence through technology and replace humans in certain scenarios to complete specific work tasks. In recent years, based on the interplay of deep data learning and machine learning, artificial intelligence, through autonomous learning, has been able to rapidly surpass the cognitive limits of humans and be used in various fields of science and facts, literature and art, bringing new achievements to social development, as well as challenges to the law (L. M. Wang, 2018). When the AI generation frequently appears in our lives, it forces copyright law not to be able to avoid the many issues it brings regarding subject qualification, rights and obligations, and attribution of results that need to be clarified. Therefore, in today's increasingly advanced science and technology, discussing the relevant parts of AI generation to avoid disputes and create a better legal environment for developing science and technology is necessary.

Literature Review

The research on AI generations focuses on the issues of whether they are works and the attribution of copyright. On determining whether an AI product is a work, relatively more scholars affirm that AI generations are works, mainly confirming that AI generations have originality. The criteria for determining identity require that they meet the minimum creativity' or use the principle of "sweating on the forehead" to determine originality. Ma Zhiguo and Liu Zhen (2018) analyse the essence of artificial intelligence generated from the aspects of "originality" and "creation". Li Weimin (2018) also argues that it is inappropriate to say that AI generations do not belong to works because of the unique characteristics of AI. Wu Handong (2018) argues that AI generations are the intellectual achievements of human-computer cooperation, do not leave the personality-based basis of copyright law, and are creative. The opposing view is that AI generations do not belong to works. On the one hand, It is asserted that artificial intelligence is not human and that the thoughts and feelings of the author are not conveyed in its generation. Wang Guo (2016)**, a** scholar, points out that copyright law protects the expression of ideas from the author's will and that AI does not meet the authorship requirements. Thus its generated objects do not have originality. On the other hand, it is believed that all AI generations are the result of programming. Wang Qian (2017)**,** a scholar, argues that AI generations are now the result of algorithms, rules and templates. The final result is unique and cannot reflect the author's personality and, therefore, cannot be judged as a work.

Chinese academics have differing opinions on who owns the Copyright of AI generations. Liu Ying (2017) believes that it is necessary to amend the relevant provisions of the existing copyright law because of the importance of regulating AI generations. Xiong Qi (2017) believes that the owner of the AI can be regarded as the author, mutatis mutandis, in the copyright law. For the first time, Yuan Zeng (2017) proposed that the "principle of piercing the veil of artificial intelligence" could be applied to separate the copyright subjects of AI generations and attribute them to the owners or actual users. Wu Handong (2017) argued that AI generations could be attributed by referring to the principles of attribution stipulated in the Copyright Law regarding works of office or works for hire.

In summary, the mainstream view of domestic academic circles is positive about whether AI generations can be protected by copyright law. The main controversy lies in whether AI generations meet the criteria for judging originality, whether they are works protected by

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copyright law, and whether there are differences in the attribution of rights, which are subject to further study.

Methodology

This qualitative research requires a detailed analysis of relevant literature and cases of copyright infringement disputes in AI generations. Qualitative research gains keen insight by uncovering problems, understanding the phenomenon of events, analysing human behaviour and perspectives, and answering questions (Anwarul, 2007). The nature of this research writing is theoretical and aims to discover, explain, examine, and analyse the operation of certain laws in a systematic form. It focuses on the reading and analysis of primary and secondary sources. The primary sources include legislation and cases, which constitute the actual sources of law. On the other hand, secondary sources consist of commentaries by scholars in the field and can be found in textbooks and legal journals. A specific analysis of the research methodology is presented in the following section.

Firstly, the paper reviews and examines the literature, searching for keywords such as "artificial intelligence" and "artificial intelligence generation" on the China Knowledge Network and using libraries to find works on copyright and intellectual property. The collected literature was browsed, categorised, integrated, and appropriately applied to the writing of this paper and combined with the case study of this paper for research writing. Secondly, this paper summarises the two points of contention in the cases by analysing the 2018 case of Filin Law Firm v. Baidu.com copyright infringement and the 2019 case of Tencent v. PCG copyright infringement, demonstrating the lack of clear legal provisions for the protection of artificial intelligence generation in China, and thus putting forward feasible suggestions.

Judicial Practice of Copyright in AI Generations and Major Issues

Representative Cases of Copyright Disputes over AI Generations

Artificial intelligence is developing rapidly in literature, art and science, and disputes like those over Tencent's writing software Dream Writer are increasing daily. The first case of a copyright dispute over AI generation in China --- Filin v. Baidu Copyright Dispute (from now on referred to as the "Filin v. Baidu case") --- is a case with implications for the development of Internet technology in copyright law and judicial practice(X. Q. Li & Pan, 2020). On 10 September 2018, the defendant, Baidu, published a search of the case on its website without the plaintiff's permission. The plaintiff considered that the defendant's relevant conduct infringed its right to information network dissemination, the right to protect the integrity of works and the right to attribution concerning the article, and brought the defendant to the Beijing Internet Court. 25 April 2019, the first instance judgment was handed down at the Beijing Internet Court, which held that the software automatically generated textual content that did not constitute a work.

At the end of 2019, another infringement of copyright and anti-unfair competition dispute involving artificial intelligence generation was heard in Shenzhen Nanshan District Court (from now on referred to as the "Tencent v. Yingxun case"), in which the plaintiff, Shenzhen Tencent Computer Co. The plaintiff claimed that because it had a copyright licence for the computer software Dream, an intelligent writing assistant developed by Tencent Technology (Beijing) Company, to write articles representing its will to create. For which it was responsible, the plaintiff should be regarded as the author of the completed content of Tencent's intelligent writing assistant by the law, and the plaintiff should enjoy the copyright of such content. The defendant Shanghai Yingxun Technology Company, disseminated the content

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completed by the Dream Writer intelligent writing assistant to the public on its website, infringing its information network dissemination right (H. F. Zhang, 2022). The Nanshan Court reasoned and argued based on the evidence related to the facts of the case and finally concluded that it should be protected by copyright law. The judicial aspect of the Nanshan District Court's decision gave an opposed answer to that of the Beijing Internet Court, and there have been numerous controversies in the theoretical and practical circles regarding the decisions of the judicial cases in these two disputes.

The Case at Issue

With the rapid development of artificial intelligence technology, the emergence of many artificial intelligence-generated objects has led to various cases, and the controversy over whether to be protected by copyright has become increasingly intense. This section browses, collates and summarises the above two cases and summarises that the focus of their disputes and related issues concerning copyright protection include the following aspects.

Does the Subject of Copyright Protection have to be a "Person"?

In the case mentioned above of Filin v. Baidu, the Beijing Internet Court responded for the first time to the subject matter of computer software generation. In the case, the plaintiff argued that the defendant had infringed the copyright of the article in question, but the defendant argued that the plaintiff was not a competent subject of the case. The specific reasons were as follows: firstly, the article in question did not have the constituent elements of a work in terms of copyright. Secondly, legal persons, as proposed subjects, do not qualify as subjects, legal persons are not able to implement creative acts, and the articles should all be created by natural persons. The Beijing Internet Court considered the following: firstly, the data analysis report in the article in question was output by WK Advance Library, but WK Advance Library is not a natural person; even though the analysis report has originality, the database cannot be the author; secondly, the software developer participated in the process of generating the database analysis report, but it did not show the original ideas of the developer, so the software developer did not create it. Finally, the software user, Philadelphia Law Firm, only submitted keywords for the search, and the database analysis report did not convey the thoughts of the software user, the original expression of feelings, thus denying that the article in question was created by a natural person(Anwarul, 2007). As a result, the Beijing Internet Court held that the completion of a natural person's creation should still be a necessary condition for a work under copyright law and should not be protected for artificial intelligence to break through the basic norms of civil law.

The natural person is the author as expressly provided for in China's Copyright Law, and the work of the legal person is a proposed qualification given to the legal person by the law to enjoy rights and responsibilities. The judgment, in this case, followed the existing copyright law and held that the analysis report "created" by the data software library was not created by a natural person, i.e., the possibility of its being protected by copyright was excluded in terms of subject matter, and therefore even if it had originality, it was not a work in the sense of copyright law. Neither WK, as the developer (owner) of the software, nor Filin & Associates, as the software user, enjoys the relevant rights under copyright law.

Whether AI generation is a Work for Copyright Purposes

In the Philadelphia Law Firm case, the Beijing Internet Court denied that the generated object in question was a work because although it was original, it was generated by artificial intelligence and was not created by a natural person. That copyright law only protects works

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created by natural persons. Some scholars argue that the product in question is not an intellectual achievement, does not meet the originality standard, and denies that it is work. On the contrary, some scholars argue that the product in question meets the above requirements and constitutes a work. In the Tencent case, the Nanshan District People's Court held that the article in question constituted a work because it divided the creation process into several stages, not only the two minutes of the article generated by the artificial intelligence Dream writer, which did not involve a natural person, but other processes in which a natural person was involved, and therefore held that the article in question had a relationship with a natural person and conveyed the thoughts and feelings of a natural person and that the article in question constituted a work (S. H. Zhu, 2020).

One court held that it was a work, while the other denied that it was a work. However, in determining whether the AI generations belonged to a work, they both held that the creation of a natural person was a constituent element of a work, only that their determination of the creation process was different. In the academic community, there is a great controversy over whether AI generations are works, and the controversy mainly revolves around the main constituent element of works under copyright law, i.e. whether they have originality. Therefore, whether the AI generations belonged to works under copyright was one of the controversial points in the case.

Copyright Ownership of AI Generations

Artificial intelligence generators have a considerable property value, and the debate over their own is about benefits distribution. In this process, not only the designer, owner and user of the AI but also the massive investor in the software are involved in the distribution of interests. In the case of Filin v. Baidu, the court confirmed the legal standing of the user, Filin Law, and the legitimacy of its claim. However, the decision was controversial because, in the case, the designer and the user were not the same subjects, and there was no distinction between the graphics and the text in the article in question, whether they were done by the joint intellectual activity of the designer and the user or by the user alone. However, the article in question is still intellectual work done by humans; therefore, the user's and designer's rights and interests should be protected.

The controversial view is that AI plays a more significant role in this case; while humans simply input, AI also contributes to the article in question, so the developers and investors of AI also enjoy certain rights to the content generated by its software(C. Zhang, 2020). There is also a controversial view that different regulations should be distinguished between AI generations and human workers. Currently, at the stage of weak AI, AI needs to rely on humans to input commands to execute the program-generated objects. If the AI software can be generated independently in the future, then the ownership will be reallocated again(Jiang, 2021).

In summary, the legal issues relating to copyright protection in AI generations, such as whether AI generations are works which should be identified as their authors and to whom their copyright should be attributed, will be analysed and resolved in the next section of this article.

Qualification of Copyright Subjects of AI Generations

The emergence of AI generations has impacted the traditional perception of people's copyright rights and obligations, and even with the rapid development of technology, it is still tricky for the logic of the public to escape the inherent model that a work is created by a citizen, legal person or other organisation as a subject, and that the work itself must be a reflection of the

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human way of thinking and content (M. Y. Zhu, 2021). In 2016, the Legal Affairs Committee of the European Commission submitted a motion to grant the status of "cyborg" to robots with the most advanced activation technology, which, in addition to enjoying specific rights and obligations, would also have the status of "cyborg". In addition to specific rights and obligations, it was also proposed that AI robots be registered in a single register to facilitate the creation of a unified fund account to pay taxes, contributions and pensions. This event has undoubtedly shaken the stability of the legal subject system(Q. Zhang, 2019). However, the "author-centric" view is that it is the creator of the work who embodies the personality of the work and that only the natural person is the actual author. However, these views have become obsolete, and some civil law countries still adhere to the "creationist principle" and do not recognise authorship other than that of a natural person. However, the author in China's Copyright Law has long since broken away from the category of natural persons.

In China, from the current state of development of artificial intelligence, although the level of artificial intelligence in certain areas has reached a level comparable to that of human beings, showing characteristics similar to those of human beings, these changes are not enough to challenge the traditional status of legal subjects, and the current stage of the theory of legal subjects should still adhere to the traditional qualification of subjects (C. Li, 2019). First of all, as a civil subject of law refers to those who exist in the law, enjoy rights, have obligations and need to be responsible, and the "person" here mainly refers to the natural person, that is, the citizens of China, is the most basic civil subject unit. The General Principles of Civil Law stipulate that equal subjects include natural persons, legal persons and unincorporated organisations. This indicates that based on treating natural persons as subjects of law, the scope of subjects in law is extended outwards to include legal persons and unincorporated organisations, which are mock subjects of law, but does not express that robots with artificial intelligence can also exist as subjects in law. Moreover, the copyright subjects mentioned in Articles 2 and 9 of the Copyright Law mainly cover Chinese citizens, legal persons or other organisations, and only the works created by these copyright holders are protected by the Copyright Law, regardless of whether they are published or not. According to the relevant provisions of the Copyright Law, the scope of copyright subjects does not include artificial intelligence, so as a legal relationship, the expression of the existence of artificial intelligence as a subject cannot be established. Secondly, AI cannot independently bear infringement liability, and existing technology cannot prove AI's true meaning and its source, nor can its subjective fault be considered. Article 15 of China's Tort Liability Law clearly stipulates the nine ways and means of assuming tort liability. This means that AI cannot act as a tort subject to bear the corresponding legal consequences and make corresponding compensation measures when an infringement or breach of contract occurs. Finally, the mouth of the copyright law is to protect the labour of the copyright owner, that is, to protect the results of human intellectual activities; the product of human intelligence is bearing the spirit of the copyright owner, manifesting the value of the copyright owner's personality, while artificial intelligence has no self-awareness and no free will. Still, only the object of human control and manipulation, it will not be able to measure the value of its own making nor to see its embodied quality of will.

In summary, AI cannot be a subject of law and cannot independently acknowledge infringement liability nor reflect the quality of its own will, so making AI the subject of copyright rights is still open to question. However, it is undeniable that, with the steady development of technology and the gradual improvement of social operation in the future, it is just around the corner to confirm the subject qualification status of artificial intelligence people legally.

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Properties of AI

Criteria for Determining the "Originality" of a Work in China

According to Article 2 of the Implementing Regulations of China's Copyright Law, as amended in 2013, the definition of a work for copyright law generally refers to an intellectual work in the field of literature, art or science that is original and can be reproduced in some tangible form. According to the provisions of the Implementing Regulation, it is easy to judge that the critical criterion for recognising a work in China is whether its constituent elements satisfy the requirement of "originality". The specific meaning of "originality" is not clearly defined in the laws and regulations, and the definition of "originality" is not clearly defined. There are two main views on "originality" in China's academic circles: one is that the author is the dominant influence, mainly emphasising that the work reflects the author's true feelings and individual expression, and only when the content of the work is the author's original creation and expresses his thoughts and feelings, reflecting his spiritual qualities, can it constitute the originality of the work and be called a work (Wei, 2019); the second is that copyright itself is the dominant influence. In other words, even if a work is not of high artistic attainment, as long as it is independently created by the author with wisdom and constitutes a certain degree of creativity, it can have the same copyright as the master's literary and artistic works. In other words, even if a work of art is not of high attainment, as long as it is independently created by the author with his wisdom and constitutes a certain degree of creativity, then it can have the corresponding copyright as the master's literary and artistic works(Z. F. Ma & Xiao, 2019).

As China's laws and regulations do not specify the conditions for the establishment of the "originality" of a work, combined with the theoretical and practical recognition of the originality of a work, it can be summarised into two main elements of establishment: firstly, the creation belongs to the author's independent creation, the content does not constitute infringement, does not copy others' works and substantial content, and is in the public domain with others' works in the form of expression. The second is that the work is an extension of the author's ideas, a choice of values and an individual expression, forming a style of expression unique to the author and possessing a minimum degree of creativity. The above two conditions must be met for the work to be considered original.

Determination of "Originality" for AI Generations

Overview of the Theory of the Origin of AI Generations

In determining whether AI generations have originality, scholars in China hold two views, affirmative or negative, but most scholars hold a positive view. Professor Xiong Qi (2017) believes that AI generations are now difficult to distinguish from natural human works and meet the minimum creation requirement in originality. Professor Ma Zhiguo and Liu (2018) pointed out that AI is capable of "independent completion" and "distinctive expression" of its creations through deep learning networks (RNN), which meets the basic requirement of originality. According to Professor Yi Jiming (2019), the criteria for judging originality in copyright law should be objective, i.e., different in form from existing works. Li Weimin (2018) believe that the generation of artificial intelligence as a work is an objective existence, and the originality of its work cannot be denied because the subject which generated the work has special characteristics". Wu Handong (2018) argued that AI generations, intellectual achievements of human-computer cooperation, are creative and do not leave the personality-based basis of copyright law. The deniers' view is that AI is not a person, and its generated content is not original. For example, Wang Guo (2016) argues that copyright law protects the

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expression of ideas that originate from the will of the author and that computer "creative works" do not meet the requirement of authorship, which means that computer "creative works" cannot have originality in a substantive sense. Wang Qian (2017) argues that AI generations cannot express the author's personality and result from template calculations, which do not meet the originality requirement. This paper argues that this view is too mechanical, and from another perspective, it argues that only the creations of natural persons can express the author's personality.

This article agrees with the affirmative view that subjective factors should not be taken into account for the time being in determining whether AI generations can constitute originality and that only if too many factors relating to natural persons are taken into account will they fall into a logical loop, and that AI generations will always be deemed not to be works because AI is not "human", and that they will not be protected by copyright law. It will always be the case that AI is not a "person" and that AI generations will not be considered works and will not be protected by copyright law.

Analysis of the Originality of the AI Generations

The key to whether an artificially generated work can be considered a work is whether it meets the two originality requirements in copyright law. Some Chinese scholars have advocated that the originality of work should be analysed from two perspectives: "originality" and "creation". From the perspective of "originality", a work is created by the author independently, from nothing to something. From the point of view of 'creation', the work must be created by the intellect, with the author's individual choices. Secondly, concerning the element of 'minimum creativity', the requirements for creativity are not very high at home and abroad, and work can be considered work if it has a minimum level of creativity without regard to whether it has a high artistic value.

Firstly, we look at AI generations from the perspective of "uniqueness". The term "unique" refers to whether or not the work was created by the author independently and whether or not the work was created from scratch by the author. AI generations are different from general mechanised generations in that they are generated in a way that gives the AI more autonomy and choice. Although natural persons initially provide the AI generations to the AI with keywords, data and other materials, the artificial intelligence generation is created independently by the AI without the participation of natural persons, and the AI will select suitable templates to apply in the face of various materials provided by humans, and then generate the relevant content. Article 3 of the Regulations for Implementing the Copyright Law of China stipulates that creation refers to intellectual activities directly producing literary, artistic and scientific works. Providing auxiliary work for a work is not considered as creation. The act of a natural person providing keywords and data to an AI is, in fact, auxiliary work, assisting the AI in generating works. The process of generating things by artificial intelligence is that the AI selects and edits the material on its own, edits and typesets the material according to its learning, and finally generates the work. The creative process has nothing to do with the natural person (Wei, 2019).

In the Filin Law case, the Filin Law staff entered the keyword "film" into the AI software (WK Advance Library) system and set the year's conditions, trial procedure, type of document, etc. The AI software retrieved the relevant cases independently, then conducted statistics and analysis of these cases, and finally generated a report. In generating the report, the staff only played a supporting role and did not participate in creating the case-related report, which was

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completed independently by WK Advance Library from scratch. Therefore, the report in question satisfied the "unique" originality requirement. In the Tencent case, the Shenzhen Nanshan District Court of Guangdong Province held that the creation process of the article in question was not only the two minutes of automatic generation of the article by the artificial intelligence Dream writer but also the participation of Tencent's employees. It broadened the creation process, which this article argues is incorrect. The company's employees participated in the process without directly generating the article. Still, they only provided auxiliary work to generate the article in question. Hence, the creation process was only for the AI at the end of the stock market, automatically generating the article for those 2 minutes, which was done independently by the AI software, directly generating the article in question. Therefore, in this case, the article in question also satisfies the "unique" requirement of originality.

Secondly, AI generations are viewed from the perspective of 'creation'. "Creation" is a matter of whether the work reflects a degree of individual choice on the author's part, whether the author's creation makes it creative and original, and whether it meets minimum creative standards. The emergence of artificial intelligence has overturned how previous works were created and the efficiency with which they were created. The creative act of artificial intelligence is based on certain materials combined with what one feels and thinks and then expressed using words, numbers, symbols, letters, sounds, colours and other elements, just like the creative act of a natural person. Although artificial intelligence cannot think like a natural person, it can edit material through its learning. The "creation" is not related to the quality of the work as long as it reflects the author's individual choices. A child who has just learned to use a paintbrush and has not been trained systematically can express their observations and understanding of the world through a drawing. As long as the drawing is complete and has the author's emotions, no matter how simple the content or the colours, the drawing meets the requirements of "creation" and constitutes a work. A human being who learns to express their ideas about something through words, symbols and other elements is creating. The same is true of artificial intelligence, which, through deep learning, autonomously judges, selects, and organises what it needs to create its generation, forming its generation very much. The efficiency of artificial intelligence learning is far greater than that of human beings; Microsoft's Ice learns the poems of 519 poets 10,000 times in 100 hours, which would take a natural person around 100 years (Cao, 2019). As we can see, AI has access to far more literature than a natural person. Humans only need to provide AI with some simple rules, so AI can create its work, which may not reach a certain level but can still reflect AI's personality and meet the requirement of "creation" in originality.

To sum up, AI generations are created independently by AI, which meets the requirement of "uniqueness"; it is also an AI that, after deep learning, selects and matches elements for expression independently, which is highly individual and can meet the minimum standard of creativity, meeting the requirement of "creation". "It also has a minimum level of creativity. If it has the minimum level of creativity, then to a certain extent, it also meets the conditions for the protection of works under the copyright law, i.e. the artificial intelligence generations can be given certain legal protection by the copyright law and enjoy the same legal status as the works created by natural persons. In a fiercely competitive market environment, the admission of AI generations not only injects fresh blood into the market but also makes the market operate more dynamically.

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Whether the AI Generations in the Case meet the Originality

Whether it is the generated report in the Philadelphia law firm case or the article in the Tencent case, both are works expressed in words and belong to the written works of works. According to those mentioned above, as long as the AI generation meets the requirement of originality, the AI generation can be considered a work. Therefore, the analysis of the work attribute of the generation report and the article in question starts from originality.

The generated report in the Filin Law Firm case was a written work for copyright purposes. In the Filin Law Firm case, the court held that a natural person should create the work. It denied that the generated report was a work that did not break through the legal logic that creation and intelligence are exclusive to natural persons. This article argues that the report in question satisfies the requirement of originality, as the above analysis has already shown that the report, in this case, was independently created by artificial intelligence, which satisfies the "unique" requirement of originality. The specific process of generating the report, in this case, was as follows: the AI software (WK First Library) first searched and collated the cases in the film industry in 2017 through the keywords and search conditions entered by the staff of Philadelphia Law Firm, and then the AI independently collated and analysed the data to explain the judicial situation of the film industry in Beijing and generated textual content. The arrangement of the text in the case-involved generation report can reflect the individual choice of the AI, which is the result of the AI's own choice. In addition, the report in question is significantly different from existing works in terms of material and data and conclusions, satisfying the requirement of "creation". In conclusion, the generated report, in this case, satisfied the requirement of originality. The Artificial Intelligence product in the Flynn Law Firm case was a written work for copyright purposes.

The article in the Tencent case was a textual work for copyright purposes. As for analysing the attributes of works generated by artificial intelligence in this case, the same analysis was conducted in the Filin Law Firm case. Firstly, the article in question met the condition of originality. As to whether the AI generation satisfies the condition of "originality", as explained above, it was independently produced by the AI Dream writer and satisfied the requirement of "originality". In addition, the content of the article in question reflects the selection of stock market information and the analysis of data, expressing a clear logic, and the structure of the article meets the needs of various types of stockholders for stock market information, reflecting the individuality of the AI's selection. In this case, the AI generation is a written work within a work.

Attribution of Rights to AI Generations

Who owns the Copyright of AI Generations?

Until a breakthrough is achieved in the personality system of civil law, artificial intelligence itself cannot qualify as a subject of legal mimesis. If the attribution of its creations is not clarified, many "orphan works" may have no attribution of rights but exist in reality. We must look at the issue of copyright ownership from a developmental perspective. In the era of weak artificial intelligence, the issue of copyright ownership of artificial intelligence, which is essentially a tool, has been studied in depth. Most opinions are that the copyright owner of the artificial intelligence itself should be the central focus. In contrast, in the future era of strong artificial intelligence, the issue of copyright ownership of works created directly by artificial intelligence is more controversial.

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Analysis of Copyright Ownership in the Weak Artificial Intelligence Phase

At present, the development of artificial intelligence is at the stage of weak artificial intelligence, and the premise of the discussion on the attribution of rights is that the artificial intelligence generator has "copyrightability". In the whole process of AI generation, there is not only a single user of the AI generation, but also the developer of the software, the investor and many other subjects do not overlap, and the participation of multiple subjects overlaps and crosses, resulting in the unclear definition of its copyright owner. If only in the era of weak AI, the content generated by humans with the help of AI is used as a tool for creation, then the rights owner of the generated content certainly belongs to humans (J. W. Sun, Yuan, & Yuan, 2019)**.** The process of artificial intelligence generating things based on deep learning is similar to human creation. Still, under the framework of copyright law, a work is the result of human creation and expresses human thoughts and emotions. The "author-centric" view is that the work's creator embodies the work's personality, that only a natural person is the author in the true sense of the word, and that the ultimate rights are still vested in humans. Under China's Copyright Law, if we analyse the attribution of rights to creative works in strict accordance with "author-centrism", legal persons or unincorporated organisations would not be able to enjoy the author status and thus enjoy copyright.

With the advent of the age of artificial intelligence, the 'author-centric' assertion of the unique subjectivity of humans in creative activity is being challenged. This means that the age of AI may be essentially non-human-centred. Current AI technology is not yet capable of autonomous uncrewed operation, and the data input from the subject who initiates and uses AI significantly impacts the quality of AI artefacts. The process of generating AI is closely related to human operations. It reflects the user's consciousness to a greater extent, but forcing the rights and interests associated with AI generations directly on the user would be detrimental to the interests of other participating subjects. Artificial intelligence has a powerful creative capacity because of investors, developers and users' economic input and labour value. Although the act of research and development and operation is closely related to the final product of artificial intelligence, the developer has already received a certain amount of remuneration when inventing the patent. In the process of generating the product, the developer and the user do not necessarily pour their thoughts and expressions into the relevant work, so they cannot obtain the copyright of the artificial intelligence product accordingly. If a certain degree of adaptation or modification is made to the AI product, then it is legitimate for these subjects to obtain the corresponding benefit in return (Ji & He, 2018). Take Dream Writer, the AI writing assistant in the Tencent v. Yingxun case, as an example; Shenzhen Tencent Computer System Co. The business model of binding or transferring the rights of artificial intelligence in various forms has certain desirability in judicial practice.

There is another way of determining Copyright ownership based on the parties' agreement or the provisions of civil law or contractual autonomy. In granting certain rights to a computer, the computer user, the designer and the developer will be responsible for determining their respective rights by contractual agreement, but this is not conducive to standardised and uniform management. China recognises the existence of works of legal persons. Still, some countries do not recognise subjects other than human beings, but this does not affect the copyright enjoyed by the author of his work (C. Zhang, 2020). In this case, the issue of the ownership of the rights of AI generations can be regulated by contract regarding the copyright law on works of office or works for hire, and it is not the AI itself that enjoys the rights, but the humans who create, invest in or use it. This also implies a shift from authorship to work-centric protection of AI generations, with the work being the standard for determining

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ownership and highlighting the protection of legal persons and unincorporated organisations. However, the AI itself does not yet have an autonomous consciousness and is not qualified to enter into contracts, so jurisprudential obstacles in practice need to be further discussed.

Analysis of Copyright Ownership in the Era of Strong Artificial Intelligence

With the development of AI technology, in the era of strong AI, AI will no longer be a materially existing creative aid but maybe a "creative machine" or a relatively independent "machine author" that cooperates with human authors (H. Dong Wu, 2020). The owner of an AI has the right to create works independently of the AI. Can an AI enjoy all the rights of a human being when humans do not influence it or when it can operate independently? So far, some scholars have argued that the rights of AI as a hired person belong to the employer. Others have argued that its copyright belongs to the investor or user. Unlike a corporation, where the owner is the shareholder, in the case of AI, the owner would be the creator, and the creation would be the employer or purchaser. Just as a company has shareholders and directors, an AI may have owners or programmers, but ultimately the actual ownership will be vested in humans. The development of AI technology in the era of strong AI and the emergence of vast quantities of AI generations will inevitably impact traditional human creativity, thereby dampening the incentives for human creativity to impact the incentives for intellectual property.

It has been argued that the user should enjoy Copyright in AI generations. Because of the advent of the era of strong artificial intelligence, the ability of computers to learn on their own has been further refined, and the designer developer of the program is not the subject of extensive use of artificial intelligence. Because this creation does not originate directly from the designer, the designer does not necessarily play a controlling role in the process of AI generation, nor does it reflect the expression of the designer's ideas. Therefore, the designer's will is reflected when the designer and the user are the same subjects, and the user enjoys the right to the AI through purchase or other means, indicating that he has paid for certain results. Therefore, the user enjoys The user's right to the work produced by the AI is the user's property right.

In summary, in the era of weak AI, a mechanism for attributing rights to investors, supplemented by contractual agreements, has been established, whereby rights are granted to "user rights" holders without an agreement (Han & Sun, 2020). In this way, it is possible to give full play to the incentives of investors and users, to actively weigh and balance the interests of all parties, to promote AI research and development, and, in the judicial sphere, to give judges the scope to exercise their discretion based on different facts. The judicial standards traditionally applied to works created by non-natural persons exclude the possibility of their protection by copyright. Since it does not support exercising the personal and property rights contained in copyright by artificial intelligence in the same way as natural human subjects, it is not subject to the corresponding obligations and responsibilities. As far as the development stage of AI, it has yet to reach the stage of strong AI, where the attribution of rights stimulates the creation of AI itself. Still, the law should provide value-based guidance for this purpose and look at the framework of future rights ownership from a developmental perspective.

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Copyright Protection Mechanism for AI Generations

Justification for the Establishment of Protection Mechanisms

As mentioned above, AI generations have the substantive conditions for becoming copyright objects as stipulated by law. Although there is some controversy over the definition of the subject of creation, certain legal protection should be given in light of the high level of development of AI nowadays. In actual judicial practice, the content and number of AI generations are increasing due to the application of AI in many fields, such as journalism, visual arts and writing. Some of the generated works have already presented a scene indistinguishable from works created by human beings, making it difficult for the judiciary to make clear and reasonable judgments in copyright dispute cases. Suppose the work properties of the artefacts are denied, and no corresponding legal protection is provided. In that case, the legal properties and rights of a large number of AI artefacts will be left in an uncertain and unstable state, with the consequent lack of application of legal provisions and the inability to obtain effective remedies for the unauthorised exploitation of human-created works by AI and the unauthorised exploitation of AI artefacts by humans. The lawful remedies are not available. These "works", which are unregulated by law, not only give rise to a large number of difficult copyright disputes but also disrupt the stable functioning of the market, ultimately reducing the incentive for cultural innovation and hindering the development and application of technology.

With the emergence and application of increasingly advanced science and technology, such as deep learning, the evolution of artificial intelligence has become more pronounced and has maintained a high rate of development worldwide. As a core strategic technology leading the future, AI has become the new driving force of the world's economic development and the new focus of international competition (Z. F. Ma & Xiao, 2019). In the past five years, the number of new AI companies, the number of investments they have received, and the size of AI financing have all outpaced other industries in the same period. The economic contribution of AI is increasing dramatically every year and is expected to reach US$1.57 billion by 2030, making it the largest business opportunity in today's rapidly changing economy. Because of the rapid development of AI in all horizons of the world, combined with the existing doctrines on AI generations and the actual development needs of China, this paper believes that the establishment of a copyright protection mechanism for AI generations is practical and feasible at both the legislative and political levels, and is also a pressing need for market development and social and technological progress. Establishing a certain degree of registration protection and infringement liability mechanism is conducive to forming healthy competition in the AI industry, ensuring the steady profitability of the AI industry and thus promoting the healthy and sustainable development of the AI industry.

Implementation of Registration of AI Generations

However, it is not easy to regulate the form and scope of copyright protection for humans: intelligence-generated works through the provisions of the traditional Copyright Law, and it is necessary to provide the judicial discretion and policy interpretation required by society by exercising the flexibility of the law. Today's artificial intelligence industry generates many literary and artistic works indistinguishable from natural human creations through technological means such as big data computing and deep learning. Therefore, to ensure that the AI industry can handle disputes and develop steadily in the field of writing, to ensure that AI generations occupy a certain proportion of the market share, and prosper in the market of literary and artistic works, it is necessary to adopt a reasonable and universal registration

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procedure for AI generations to protect the relevant rights from being damaged (Qin & Zhang, 2018).

First, before an AI creates a work, its owner, including the creator of the original design of the AI, and the current user authorised or purchased by it, should register the AI with the relevant department prescribed by the state to clarify the subject of the use or rights of the AI, which will help determine the source in judicial practice. Only registered AI technology may be used for literary creation, and its works may enjoy copyright and be protected by copyright law. Secondly, once an AI generation is created, its owner needs to register it with the relevant authorities and then apply for an originality review, and only after passing the review can it obtain copyright and be protected by law, not the same as a natural person creating a completed work, which does not need to go through any approval process or registration procedure and can automatically generate copyright from the date the work is completed. The purpose of restricting the creation of works by artificial intelligence is that the number of generated works is relatively large to raise the threshold standard for obtaining copyright protection for artificial intelligence-generated works, reduce the entry of artificial intelligence-generated works with low originality and poor quality into the market, alleviate the impact brought about by the entry of artificial intelligence generated works, and avoid causing the phenomenon of machine monopoly in the copyright market.

Finally, along with the registration and review of AI generations, their owners must also pay registration fees and annual fees to the relevant authorities to register AI copyright. The reasons are as follows: firstly, the payment of registration fees can stop the owners from protecting their AI creations at the registration stage and select those with market value and high creativity so that users can purchase high-quality AI works for exploitation and prevent the emergence of a large supply of mixed high and low-quality AI copyrights, which will bring confusion to the market; secondly, the payment of annual fees is mainly for later regulation and economic relief. Secondly, the annual fee is paid for later regulation and economic relief. The state will collect the annual fee paid by the owner and set up a special fund for compensation of damages for infringement of AI generation, better integration of AI generations into the public domain, and improve a series of public guarantees. At the same time, considering that the owners of AI generations do not make many contributions to the creative process and that AI technology is more advanced, the protection of generated works that have been registered and examined should be appropriately narrowed, and a shorter period of copyright protection should be granted to them than to human works so that copyright protection is more reasonable.

Constructing a Mechanism to Assume Liability for the Tort of AI Generations

Due to the special nature of AI generations, the issues they raised regarding the assumption of responsibility have also attracted much attention from countries worldwide. UNESCO released a preliminary draft report on the ethics of artificial intelligence in 2016, which gives a clear and concrete operational solution to the attribution of responsibility for artificial intelligence robots, proposing to adopt the path of shared responsibility to deal with it so that all those involved in the whole process of creating, authorising the use of and distributing the benefits of artificial intelligence share the responsibility for infringement. As it is difficult to assess the damage consequences caused by the infringement of artificial intelligence generation, which makes it extremely heavy economic pressure on the one hand, combined with UNESCO's approach to the sharing of responsibility for artificial intelligence, the construction of a suitable mechanism to bear the responsibility for the infringement of artificial intelligence generation in China. First of all, formulate a compulsory insurance system for AI generations, and, like

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China's compulsory insurance for motor vehicle traffic accident liability and coal workers' accident insurance, take it as a statutory compulsory insurance under national laws and regulations and have it purchased by the subject of copyright rights of AI generations (S. Sun, 2018). It is guaranteed to be an effective way of sharing liability in the event of an infringement of copyright works. Secondly, the state will pool the annual fees paid at the time of registration and set up a special AI generations infringement damage compensation fund, which will bear the corresponding damage compensation liability for AI generations infringement cases with excessive pressure on the compensation amount and great negative impact on society, to alleviate the financial burden of individual responsible subjects and become a national remedy to make up for the inadequacy of the compulsory insurance system. Finally, a sound tort liability tracing system should clarify the subject of responsibility when liability is assumed through comprehensive supervision of the various stages of the AI creation process. When AI is involved in the creation process as an auxiliary tool, Chapter 5 of China's Tort Liability Law applies to product liability. The subject of tort liability is the user of the AI: When the creation is written entirely by AI, the subject of rights will include not only its user but also the inventor, program editor and even the producer and seller of the AI. Only when the subject of responsibility is clarified can we ensure that national protection policies and remedies can be used efficiently and avoid wasting economic resources. For the expired AI generation, the protection period automatically enters and belongs to the public domain and can be reworked and reused by anyone without purchase or authorisation. This will also encourage the public to continuously innovate and promote the improvement and sublimation of AI work.

Conclusion

With the rapid development of artificial intelligence, there are more and more generative products and infringement on artificial intelligence generative products has also occurred occasionally. This article analyses the focal issue reflected in the case and draws out the feasibility of China's copyright protection for AI generations. Firstly, it analyses whether AI is recognised as an author and argues that in China's current legal system, AI has no subjective qualification and cannot be recognised as an author. Secondly, it analysed the AI generations from the composition elements of originality of works and concluded that AI generations satisfy the composition elements of works and constitute works. This is followed by analysing the attribution of rights in the context of the different eras from the era of weak artificial intelligence and the era of strong artificial intelligence. Finally, the justification for establishing the protection mechanism for AI generations is analysed, and it is proposed that the registration of AI generations and the construction of a mechanism for bearing the liability for infringement of AI generations are proposed to improve the protection role of copyright better and adapt to the development of the AI era. In addition, apart from the issues discussed in this paper, there are still many legal issues to be resolved, which require more in-depth research to optimise the rule of law in the future.

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