Research on the Copyright Protection of Artificial Intelligence Generation in the Smart Media Environment

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Abstract. The application of AI technology in the whole process of information dissemination has promoted the arrival of the era of intelligent media. While improving the production efficiency of intelligent media, enhancing the communication power and influence, the full AI manuscript magnifies the contradiction between AI and copyright law. This paper combs the legal protection practice of AI products in some countries and international organizations, and summarizes the triple obstacles to the protection of AI products copyright in combination with the characteristics of the smart media environment. In order to promote the healthy development of samrt media, the article starts from determining the objective nature and subject qualification of AI products, identifying the nature of replication behavior in the intelligent media environment, and constructing a fair competition mechanism between human works and AI works, clarifying the ownership of rights and responsibility of AI products to respond to the copyright protection obstacles faced by AI products.

Keywords: smart media · artificial intelligence · copyright

1 Introduction

Smart media is a new media form generated by intelligent reconstruction of the whole process of information dissemination with artificial intelligence technology as the core, which is an advanced stage after the accumulation of full media and integrated media [1]. Foreign research on smart media formed a hot spot in 2013, with research focusing on effective communication strategies, political communication, and related information technology applications. Guo Quanzhong analyzed the essence and characteristics of smart media [2] and Peng Lan pointed out the future trend of "smart media is coming" based on the new technology environment such as artificial intelligence, Internet of Things and VR/AR [3]. In 2018, the 13th Annual China Media Conference "Towards Smart Media" was held, the further development of traditional media and new media should be based on the direction of smart media to rearrange the industry's general

consensus [4]; September 26, 2020, the General Office of the CPC Central Committee and the General Office of the State Council issued the "Opinions on Accelerating the Development of Deep Integration of Integrated Media", which promotes traditional media towards smart media from the concept, technology, layout and other aspects.

Thanks to mature artificial intelligence technology, machine editing, intelligent auditing, intelligent data news, intelligent content management, machine writing, etc. have become a reality, constituting a rich practice of smart media, showing the characteristics of light weight, intelligence and specialization [5]. The "AI editing parade", which won the second prize of the "China News Award" award, is the first collection of CCTV News "AI editor", which is a successful application of artificial intelligence in the field of content production. Through the learning of a large number of artificial samples and the formation of "multi-way signal AI editing mode", not only can complete multiple video editing and switching of multi-angle screen, its editing strategy can even be adjusted instantly according to the change of live camera position and other conditions. This has greatly improved the efficiency of news production, and the quality of news works is higher and more unique. The reading volume of more than 200 million shows the strong practical significance of artificial intelligence in the production of content in the intelligent media environment. However, the production method and the nature of works produced by "AI editors" have also caused the author to ponder, firstly, whether the works created by AI constitute works under copyright law; and secondly, whether the existing copyright law can provide due protection for this new production method. Responding to the above questions is not only a way to explore the nature and status of a new type of object at the level of intellectual property theory, but also a way to regulate the production, dissemination and responsibility of content at the level of industry practice, which will ultimately promote the further development of smart media and realize the deep transformation of media.

2   Sorting Out Laws Related to Copyright Protection of Artificial Intelligence Generation

Artificial intelligence generated objects, refers to human-based intelligent programs or machines, based on massive data information, through machine learning and artificial neural networks, etc., to produce objects including but not limited to poetry, novels, music, news, etc. [6]. Its kinds will be extensive, complex and unpredictable along with the development and in-depth application of computer technology.

In 1965, in the "Problem Arising From Computer Technology" section of the 1965 Annual Report on Copyright Registration, the United States Copyright Administration expressed its concern about whether the code can become the author of music works, and first raised the question whether the subject of copyright ownership of works is limited to people and does not include machines. From this point, the debate about whether and under what conditions AI products enjoy copyright protection, which is still in dispute today, began. In order to illustrate the current practice of legal protection of AI products, based on the research of relevant papers and some national regulations and policy documents, the author has sorted out the relevant laws of the world's major

Table 1. Laws related to copyright protection of AI-generated materials in some countries and international organizations

Country/Organization	Protect or not	Protection path	Specific protection measures
Australia	Yes	Copyright Law (Neighboring Rights)	Adopting Neighboring Rights to Protect Computer Generated Products
World Intellectual Property Organization	Conditional Protection	Copyright Law, Neighboring Rights	world Intellectual Property Congress Adopts Resolution on Copyright in Artificial Intelligence Generative Works (2019) to Negotiate Copyright or Neighboring Rights Protection Rules for Artificial Intelligence Generative Works; However, the Mainstream View Does Not Support Copyright Protection for Artificial Intelligence Generative Works in the Absence of Subject Matter Eligibility
EU	Yes	copyright, labor rights, etc.	Propose to grant specific rights such as copyright and labor rights to the most advanced level of AI; do not completely deny the possibility of granting legal personality to AI
UK	Yes	Copyright Law	Article 9(3) of the Copyright, Designs and Patents Act of 1988 provides that computer-generated works are protected by copyright law
US	Yes	Copyright Law	Registration of computer software to generate written works
Japan	Yes	Anti-unfair competition law	Japan now passes anti-unfair competition law to protect AI products and safeguard the interests of AI investors

developed countries or international organizations on the protection of the copyright of AI products (computer products/AI works), as shown in Table 1.

It can be seen from the above table that the main developed countries or international organizations basically provide protection for AI products, only in terms of protection path and degree. The reason for this difference is that they have different understanding of the object nature and subject qualification of AI product copyright protection. In the former, if Australia chooses to protect AI products with neighboring rights rather than copyright law, it is because the country believes that the product object is not original and therefore does not constitute a work. In the latter, such as the mainstream view of the World Intellectual Property Organization, AI products should not be protected by

copyright if they do not have the subject qualification; Although the UK uses copyright law to protect AI works, it does not recognize that AI has the right of personality; The United States uses the copyright registration system to provide copyright protection for AI products. However, there are still major disputes on the subject of the ownership of work rights, and the essence is still the discussion of the qualification of AI subjects. Nevertheless, the practice of copyright protection of AI products abroad is still a useful inspiration and reference for China.

3   Obstacles to Copyright Protection of Artificial Intelligence Generators in the Smart Media Environment

Artificial intelligence provides solid technical support for the development of intelligent media, and in turn intelligent media provides a broad application context for artificial intelligence. Currently, the working mechanism of AI is evolving and has achieved the conversion from machine learning to deep learning to augmented learning. Based on the learning of the corpus, AI algorithms automatically identify the required input, transform it into text and then distribute it to users, which directly leads to the creation of works that are no longer a simple aggregation of content, but an unpredictable outcome of works created after understanding and thinking, and the process of works output increasingly shows a trend of evolution from automaticity to spontaneity [7]. Under this trend, the most widely used in major intelligent media platforms is fully artificial intelligence writing [8], which is different from hotspot search discovery and assisted writing, and its disruptive spontaneous creation mode makes the content of generated works more unpredictable, which in turn leads to more prominent problems of copyright protection. It includes not only the controversies that have already emerged from the previous legal combing, but also other disputes, such as whether the deep learning process, which is a necessary pre-requisite for AI output content, may involve copyright infringement of existing works, how to divide the responsibility when the infringement occurs, and so on. These become obstacles to the copyright protection of AI-generated materials in the intellectual media environment.

3.1   Obvious Differences in the Determination of the Nature of the Object of Copyright Protection for AI-Generated Objects

The essence of the determination of the nature of the object is to determine whether the artificial intelligence generated object constitutes a work as referred to in the Copyright Law. A work is the object of protection under copyright law, and is an intellectual achievement with originality and can be expressed in a certain form. Although China's intellectual media industry is growing and AI-generated works are widely produced, the enumeration of works in the latest copyright law does not include the category of AI-generated works. The openness and unclearness of the legal provisions directly lead to the obvious disagreement among the academic circles on the determination of the originality and intellectual achievements of AI-generated works.

Wu G.D. argues that AI creations do not belong to works in the sense of copyright law in principle from the perspective of originality, but right holders can seek other alternative

protection mechanisms in copyright [9]; Gu Y.N. argues that copyright protection for AI creations should be classified according to whether the program code of AI is open source or not, with open source protected as orphan works and non-open source protected by contractual agreement on the division of ownership [10]; Lin Z.H. and Shi Y. point out in their article that at the present stage, the characteristic of AI only assuming auxiliary functions determines that its generation can only be the final form of the AI designer's work, so it should be regulated by reference to the way of functional works or commissioned works [11].

It can be seen that scholars mostly start from copyright directly, and discuss the nature and protection of the object of artificial intelligence generation from two aspects: originality and the existing categories of copyright-protected objects, but the inherent defects of the existing legal provisions make scholars unable to convince each other although they can justify themselves.

3.2 Controversy Over the Determination of the Nature of the Subject of Copyright Protection for Artificial Intelligence-Generated Materials Continues

The essence of the identification of the subject nature is to determine whether AI has legal personality. Legal personality is the premise of becoming a legal subject, enjoying legal rights and assuming legal obligations. Therefore, the identification of AI subject qualification is the prerequisite for it to become the subject of copyright law.

Due to the influence of interest position, analysis perspective and other factors, at present, the identification of AI subject qualification in domestic academic circles can be roughly divided into positive and negative sides. Yuan Z., who affirmed one side, believed that since AI has independent capacity, it is entitled to enjoy legal rights and assume responsibilities and obligations, and advocated that AI should be endowed with limited legal personality [12]; Shi G.B. pointed out that the legal person system can be used to explore the rationality of AI's right capacity and appropriately expand the scope of civil subjects [13]. The negative party has launched a more diverse demonstration from the traditional subject qualification to the emerging incentive mechanism. The "incentive theory school" represented by Liang Z.W. proposed that artificial intelligence has no incentive and therefore does not need to be granted rights [14]; Liu C.L. who starting from the criteria and path of author qualification, believes that AI can neither refer to the path of proof of legal personality nor use the path of author qualification under the existing theoretical framework, and advocates that investors should be recognized as the author behind AI works [15].

3.3 Absence of a Mechanism for Balancing Interests in the Protection of Copyright of Artificial Intelligence-Generated Objects

The essence of copyright is to balance the interests of all parties and to achieve the maximum dissemination of intellectual achievements while protecting innovation. In the smart media environment, because of its subversion of the traditional production method, the interests of all parties need to be balanced, not only in terms of quantity, but also in terms of quality. In short, the generated products based on the logic of AI

production bring new challenges to the three aspects of traditional reproduction rights, copyright owners' licensing rights, and copyright rights attribution.

First, how to deal with the contradiction between the traditional reproduction right and the emerging dissemination right, i.e., the inevitable reproduction, storage and use of copyrighted works by algorithms in the output process of artificial intelligence generation, and the due meaning of the dissemination right in the construction of the personal use system in the Internet environment, how to deal with the legality of personal reproduction and use and the economic right of the copyright owner to reproduce under the technological flood of the Internet and artificial intelligence This is the first set of contradictions that need to be resolved. Secondly, how to deal with the contradiction between licensing cost and knowledge dissemination, i.e., the contradiction between the exclusive right granted by copyright law to the right holder to restrict others from using copyrighted works and the free dissemination of excellent culture, is the second set of contradictions that needs to be resolved. Finally, how to deal with the contradiction between the attribution of rights and the distribution of responsibilities of AI-generated works, i.e., the contradiction between the determination of the subject of attribution of rights and the operability of realistic responsibilities, is the third group of contradictions that needs to be solved urgently.

4 Suggestions for Copyright Protection of Artificial Intelligence Generation in the Intelligent Media Environment

In view of the obstacles to the copyright protection of AI-generated materials in the intelligent media environment, combined with the practical exploration abroad, the author tries to explore the justification and protection strategy of the copyright protection of AI-generated materials, and seek institutional guarantee for promoting the deep transformation of media.

4.1 Determining the Nature of the Object and the Qualification of the Subject for Copyright Protection of AI-Generated Objects

In terms of object nature identification, it is important to return to AI technology itself. Content output is an intellectual creation process that follows a certain production logic. Thomas Margoni divides the process of generating works by AI systems using natural language processing systems into five steps, including required material identification and collection, format conversion, database construction to be detected, model training, and work generation [16]. The core of which is based on the deep learning and enhanced learning sessions after data collection. In practice, in order to minimize the algorithm error and select the maximum input training data, the AI, through the deep learning of massive data, summarizes the laws and finally produces different works for different audiences, the process is not a simple application of algorithms, its nature is far beyond the means of human creative tools. Even though there are views that copyright law, which provides protection for human intellectual achievements, should pay more attention to the input of human thoughts and emotions, under the guidance of the dichotomy between thoughts and expressions, the work can be judged as satisfying the object elements of

copyright law if the objective expression has certain creativity. Therefore, from the viewpoint of output logic, the artificial intelligence generated object constitutes a work under the copyright law.

The determination of subject qualification is a matter of choice of social governance mode by the legal system in the new technological environment. Retracing the formation of legal personality it is not difficult to find that the legal subject goes through the stages of human can be non-human and non-human can be human, reflecting a certain openness. Therefore, under the combined force of technology and economic development, the possibility and trend of shifting the status of artificial intelligence from the previous object of legal relations to the future subject of legal relations cannot be simply excluded. And from the prospect of the development of a new generation of artificial intelligence technology, there is also a period of necessity to give AI a legal personality. First, the moral and ethical needs. The Montreal Declaration on Responsible Development of Artificial Intelligence released in 2018 looks forward to a beautiful picture of harmonious coexistence between human and AI, granting legal personality to AI and effectively preventing AI from becoming a moral aberration of slaves is an instinctive need of human, a moral animal. Second, it is conducive to solving the real dilemma of unclear rights and responsibilities. Multi-subject synergy, open support of artificial intelligence is the main existence form of the technology at present, so the product tort liability brought by the algorithm black box is difficult to be reasonably allocated in the context of the coexistence of multiple subjects. Giving it legal personality and independent responsibility can effectively solve the real dilemma of blurred responsibility subjects brought by the openness of AI technology and multi-subject collaboration.

Take the CCTV news "AI editor" cited in the previous article as an example, the high degree of autonomy it embodies in the process of work generation, according to the live camera position changes instantly adjust to complete the work, as well as the advantages of taking into account the manual cannot take into account the camera position and create a more original work, not only shows the "AI editing parade" collection of copyright works The nature of the AI editing parade, and the title of master given to it by the industry, also reflect the openness and acceptance of the society at a certain level. Under the premise that it has the legitimacy and superiority to become a legal subject, it is only natural to give "AI editor" the legal qualification of a subject.

4.2 Responding to the Dispute Over Reproduction and Distribution Rights in Content Production

It is commonly believed that algorithms inevitably generate the copying, storage and use of copyrighted works in the learning process, thus conflicting with the economic rights of copyright owners. However, based on the logic of content generation of AI, the copying of copyrighted works by its algorithms should be characterized as incidental private copying, i.e., the ultimate purpose is not for dissemination, but a necessary part of training algorithms, and is only preparatory work for generating new works, which is not subject to copyright law due to the lack of independent economic significance. In contrast, private means that all people in the Internet era can make copies of all works under the premise of non-commercial nature. For example, based on common sense, reading aloud one's legally acquired e-book with a voice reader is not considered to

have any moral or legal problems, because such copying presents a private nature and can be exempted by fair use.

In practice, all copying acts in the intellectual media environment can be characterized as incidental private copying. At this time, if the traditional evaluation meaning of copying acts is continued to be given, the exclusive rights of copyright owners will be interpreted in an expanded manner in the intellectual media environment, thus forming excessive control of copyright owners over works and threatening the balance of interests mechanism. The separation between the act of reproduction defined in the era of print publishing and dissemination becomes clearer and clearer in the era of internet, and the right of reproduction is covered by the right of dissemination in almost all aspects. Some scholars have even proposed to abolish the reproduction right based on this. Although the abolition of the right of reproduction is subject to further debate, the exemption of the right of reproduction for incidental private copying in the intelligent media environment should be a matter of course in the construction of the personal use system.

4.3 Resolving the Conflict Between Licensing Costs and Knowledge Dissemination

The exclusive rights granted to copyright owners by China's copyright law restrict the freedom of others to use copyrighted works. Except for special circumstances such as compulsory license, statutory license and fair use explicitly stipulated by law, any other use requires the permission of copyright owners and payment of corresponding fees. In the smart media environment, there are already huge licensing costs for the massive works required to AI, and the massive content production of PGC and UGC, which belong to scattered copyright owners, thus making it more difficult to get licences. On the other hand, the massive content production capacity of artificial intelligence forms a large number of copyright barriers for human to use the corresponding works, which greatly hinders the free dissemination of excellent knowledge and culture.To resolve the questions above, the key lies in building a fair competition mechanism between human works and AI works, which can be created from the perspectives of improving the functions of copyright collective management organizations, limiting the content and duration of rights of AI works, and raising the standard of originality of AI works. For example, the collective copyright management organization may consider concluding special license contracts with AI, and appropriately restrict the scope of use, limitation of use, and usage fees, so as to balance the shortcomings in time and efficiency of natural persons and legal persons, which are the subjects of use. In terms of copyright objects, based on the massive and rapid work generation capacity of AI, in order to create a fair competition environment between AI and natural creators, the criteria for determining works should be appropriately raised to judge the "originality" of AI works, and the number of AI works receiving copyright protection should be appropriately reduced through a high standard of work determination. In order to create a level playing field between AI and natural creators, we should appropriately raise the criteria for determining the "originality" of AI works and reduce the number of AI works that receive copyright protection through a high standard of work recognition.

4.4 Clarifying the Rights Attribution and Responsibility Allocation of Artificial Intelligence Generated Objects

The establishment of the attribution of the rights of artificial intelligence generated objects is of great significance to the resolution of copyright disputes in the intellectual media environment. However, the academic circles are divided on this issue.

One type of argument attributes rights to the developer of the AI, and scholars on the subject argue that the issue is similar to the video game case. That is, as the court emphasized in Stern Elec v. Kaufman, Sega Enterprises v. Accolade Inc., since the entire sequence of images generated by a video game based on user interaction is only a copy stored in the memory file of a computer program, the whole process does not involve originality and autonomy, so the copyright of the game display belongs to the programmer. Referring to this logic, it is logical that the AI programmer becomes the owner of the works generated by the AI system with his creation of the system. However, according to the analysis of the aforementioned AI output logic, it is clear that AI works are created by AI technology with autonomous learning ability, which is clearly different from video games created on the basis of memory programs entered by programmers when programming. Therefore, the conclusion that the copyright of the AI work is attributed to the programmer by inferring the video game as the basis is faulty in its preconditions. Other assertions, such as the attribution of rights to users and owners, are similarly deficient. First, according to the principle of "idea-expression dichotomy", the developer of AI cannot be the owner of the rights of AI works. Secondly, AI does not have the qualification of legal subject and thus cannot become the owner of the right of AI works; finally, under the premise that the first two cannot become the right owner, the user and owner can become the right owner of AI works because of the investment of capital and so on. This path of proof is more or less a second-best expedient.

Comprehensive analysis of the origin of the above-mentioned views and their shortcomings, the rights of artificial intelligence generated objects should be attributed to the artificial intelligence itself, which not only adapts to the trend of continuous development and change of the civil legal subject system, but also is a convenient choice of the system. Specifically, the openness of the legal subject qualification makes the artificial intelligence itself become the subject of rights with the possibility of jurisprudence, not only that, to give the artificial intelligence to legal personality to solve the distribution of tort liability is more practical necessity. For example, once the AI becomes the subject of rights, it can be independently liable to avoid the unclear responsibility between the user and the controller brought about by the algorithm black box, open source, etc. in practice. Of course, in order to match the independent responsibility and avoid stimulating the AI industry to implement wrongdoing and transfer responsibility due to limited liability protection, it is necessary to require the injection of liability capital for AI or the purchase of liability insurance for AI. In addition, the scope of its specific rights capacity can be determined according to the specific social governance needs, not necessarily enjoying the rights in the basic human rights.

5 Summary

In today's society, many new business forms are benefited from the support of artificial intelligence technology. While promoting the leap from integrated media to smart media, artificial intelligence has posed many challenges to the copyright field. For legislators and the judicial system, it is their duty and mission to recognize the urgency of the problem at an early stage and conduct in-depth research to find a solution. Identifying the object nature and subject qualification of copyright protection for AI-generated materials is the key issue to solve its legal protection, which can regulate the application of AI technology in intelligent media platforms at the present stage and effectively promote the development of China's cultural undertakings. Of course, more specific protection measures are yet to be studied with the participation of the theoretical and practical sectors.

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