

The Protection of Hologram Copyright

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Abstract: With the rapid development and application of hologram technology, the copyright protection problems in this field have become increasingly prominent. The particularity of hologram technology, such as the display method of virtual three-dimensional image and the combination of source program and image, brings new challenges to the traditional copyright law. By analyzing the characteristics of holographic imaging technology, we discuss the current situation and dilemma of copyright protection, and put forward the corresponding protection strategies. This paper believes that the copyright protection of holograms should clarify the legal orientation of holographic image and work type, strengthen the holographic image copyright registration and management system, improve the legal responsibility system of holographic image copyright infringement and strengthen international cooperation and exchanges to enhance copyright protection level, to meet the development of holographic imaging technology needs.

1. Introduction

With the rapid development of science and technology, hologram technology, with its unique three-dimensional display effect and immersive experience, has gradually entered people's vision, and has shown broad application prospects in entertainment, education, medical care and other fields. However, the innovation of technology is always accompanied by the challenge of legal and ethical issues, and the rise of hologram technology also puts forward new topics for the current copyright protection system. In the traditional copyright legal system, there are clear provisions on the reproduction, distribution and interpretation of works. However, the particularity of hologram works lies in that it not only contains traditional image elements, but also integrates advanced technical means, which makes the definition and protection of its copyright more complicated. In addition, the creation of hologram works often involves multiple parties, including the creators, technicians of the video content, and possible investors. This leads to the complexity of copyright ownership. How to protect the rights and interests of creators while ensuring the reasonable application and dissemination of technology is a new challenge that copyright law needs to face.

In this context, this paper aims to explore the copyright protection of hologram, we will analyze the characteristics of the holographic imaging technology, the convergence and conflict with existing copyright law, discuss how to define the hologram of copyright, and how to protect the rights and interests of creators at the same time, promote the innovation and development of technology. This research is not only of great significance for the improvement of the copyright legal system in China, but also provides legal support and guidance for the promotion and

application of hologram technology[1].

2. Overview of holimaging technology

2.1 Principle and characteristics of hologram technology

Hologram is a method to record and reproduce 3 D images of objects. The principle is mainly based on the light interference and diffraction phenomenon, by recording the holographic information of the object, and then using the diffraction principle of light to reproduce the three-dimensional image of the object.

Hologram is characterized by stereoscopic property, severability and scaling. Stereality means that the holographic image can reproduce all the optical wave information of the object, including the amplitude and phase, so that the reproduced image has exactly the same stereo sense as the original object; severability refers to the reproduction of any part of the image of the original object; scaling means that the image can be enlarged or reduced by changing the laser wavelength of the irradiation hologram[2].

2.2 Classification and application of holographic imaging technology

At present, hologram technology is mainly divided into holography and digital holographic display technology. The former is the most basic form of holographic image technology, which involves using interference and diffraction principles with an object and reference beam to record them on a dry plate or film. Digital holographic display technology, on the other hand, primarily utilizes computer-generated holographic images and employs digital optical equipment to transmit them to the eyes of observers for decoding and reconstruction, presenting a realistic digital stereo image.

Table 1: Advantages of holography and digital holographic display technology

Technology type	Merit	Shortcoming
holography	1. Be able to record all the information of the object light wave and reproduce the realistic stereoscopic image	1. Chemical and wet treatment process is required, and the experimental process is more complicated
	2. The hologram is easy to copy and divide, and each part can reproduce the complete image	2. High requirements for record conditions
	3. Can be exposed multiple times on the same negative, overlap multiple images	3. The photo quality is affected by the processing process
	4. It can be used to study object microdeformation and precision measurement	

Holographic technology is widely applied. In terms of art display, holographic technology provides innovative means for art design and display, and can produce artworks with three-dimensional and realistic effect to bring immersive art experience; in medical diagnosis, holographic technology is similar to CT and MRI, etc., which can generate realistic three-dimensional images of human organs and tissues to help doctors make more accurate diagnosis and treatment; in optical storage and experiment, holographic technology can also be used for optical storage to realize high density and long life information preservation. At the same time, it can also simulate optical experiments, providing convenience for teaching and scientific research.

As shown in Table 1-2.

Table 2: The advantages of holography and digital holographic display technology

Digital holographic display technology	1. Digital storage and display for convenient processing and transmission	1. The resolution is limited by the performance of the optoelectronic devices
	2. Short exposure time, fast response speed, and high sensitivity	2. The image quality of the reproduced images may be worse than that of the traditional holography
	3. Eliminate chemical wet treatment and simplify the experimental process	3. Limited by the photosensitive area, the reproduction image size and clarity are limited
	4. The complex amplitude information of the object can be directly obtained and applied to quantitative measurement	4. Only low-frequency information can be recorded for small objects or long distances

3. Challenges of hologram copyright protection

3.1 Protection problems brought about by technical characteristics

The characteristics of hologram technology complicate its copyright protection. On the one hand, the generation of holography involves multiple technical stages, including material acquisition, model reconstruction, motion capture, virtual synthesis, and holographic reproduction. In this process, the selection, processing and re-creation of the original material may involve multiple rights subjects, such as the creator of the original material, the producer of the hologram, and the possible investors[3]. These disputes over copyright ownership often become the first problem of copyright protection; on the other hand, the "fleeting" nature of hologram also brings challenges to copyright protection. Because the generation and disappearance of hologram are short, and the carrier is usually holographic film or air layer, which makes it difficult to infringe copyright and obtain evidence. Once the infringement occurs, how to timely fix the evidence and determine the degree of infringement and damage, has become an important issue of copyright protection[4].

3.2 Gaps and deficiencies in legal protection

At present, there are still some legal gaps in the copyright protection of hologram in China. Although the copyright law of copyright protection has clear provisions, but hologram as a new form of technology, its orientation in the law and the classification is not clear, this causes in the copyright infringement dispute, how to define the nature of the hologram works, how to evaluate its value and how to determine the compensation standards are controversial[5].

In addition, the production process of hologram may involve the adaptation or modification of others' works, such as without legal authorization, which may violate the right of modification and adaptation of the original work. However, the current law for the identification and punishment of such acts of infringement is not perfect, allowing some lawbreakers to take advantage of it.

3.3 The complexity of right licensing and authorization

The production and use of hologram often involve the licensing and authorization of multiple rights subjects. For example, when making holograms, you may need to obtain permission from the work of the creator of the original material, the performer, and the rights holders of the music, scripts and other works. However, in practice, due to the numerous and scattered rights subjects, it is often difficult to obtain the necessary authorization. This not only increases the legal risk of hologram production, but also may impede technological innovation and development. At the same time, the licensing use of holograms also faces many challenges. For example, when authorizing others to use holograms, how to clarify the rights and obligations of both parties, how to determine the scope and period of use, how to formulate reasonable cost standards and other issues need to be carefully considered[6].

3.4 Public awareness and the universality of infringement

With the increasing popularity of hologram technology and the continuous expansion of its application fields, the public's understanding of and interest in this cutting-edge technology is also deepening. The immersive experience brought by the hologram technology makes it shine in the entertainment, education, medical care and other fields. However, at the same time, with the widespread use of technology, some legal and social problems have gradually surfaced. A significant problem is that although hologram technology increasingly by the attention of people and love, but about the legal publicity and education is relatively backward, which leads to part of the public in the use, sharing or create hologram content, may because of the lack of relevant legal knowledge and inadvertently violated the copyright of others. In this case, the rights and interests of the original author are easily damaged, which further affects the innovation atmosphere and motivation of the whole industry[7].

4. Suggestions and measures for copyright protection of Hologram images

4.1 Clarifying the legal positioning and work type of the hologram

On the one hand, it is necessary to clarify the positioning of the hologram in the copyright law. According to the characteristics of holograms, they can be classified as audio-visual works or the type of film works in the Copyright Law. This is because holograms, like movies, express content and emotion through a series of continuous images and sounds. At the same time, the production process of hologram also involves many links, such as screenwriter, director, photography and editing, which is similar to the film production process. Therefore, classifying holograms as audio-visual works or similar film works helps to better protect their copyright; on the other hand, after determining the type of works, the copyright subject of hologram should be further defined. Generally speaking, the copyright of the hologram should belong to the production team or the producer. This is because the production of holograms requires a lot of human, material and financial resources, and the production team or producer has made great efforts in the creation process. Therefore, they should enjoy the copyright of hologram, including the copyright right of reproduction, distribution right, lease right, exhibition right, performance right, projection right, projection right, broadcasting right, information network communication right, film production right, adaptation right, translation right and compilation right, etc.

4.2 Strengthen the registration and management system of hologram copyright

In order to protect the copyright of hologram, a perfect registration and management system should be established. Copyright registration is an important basis to confirm the ownership of copyright, and also a powerful weapon for rights protection. Therefore, it is suggested that relevant departments should set up a special hologram copyright registration agency to provide convenient registration services for producers. At the same time, a perfect copyright database should be established to store and manage the registered hologram works, so as to provide timely evidence in case of disputes. In addition, the supervision of the holography market should also be strengthened. The act of copying, issuing and disseminating holographic images without the permission of the copyright owner shall be severely cracked down on according to law. At the same time, all sectors of society are encouraged to actively participate in the copyright protection work, set up a reward mechanism for reporting, and give certain rewards to individuals or organizations that provide infringement clues.

4.3 Improve the legal liability system for hologram copyright infringement

In view of the hologram copyright infringement, it is urgent to improve and strengthen the relevant legal liability system to ensure that the legitimate rights and interests of the originator are fully protected and effectively curb the infringement of criminals. On the one hand, it is necessary to clarify and refine the components and identification standards of hologram copyright infringement. For the intentional infringement of the copyright of holograms, such as unauthorized reproduction, distribution, distribution, and the use of holograms for profit-making activities, the infringer shall be investigated for legal liability in strict accordance with the legal provisions. This includes not only civil liability, such as compensation for losses, cessation of infringement, but also administrative liability, such as fines and confiscation of illegal income. When the infringement is particularly serious and constitutes a crime, criminal responsibility should be investigated according to law to demonstrate the majesty and justice of the law; on the other hand, the infringement compensation standard must be significantly raised to greatly increase the cost of infringement and thus reduce the incidence of infringement. At present, some infringers are unscrupulous in their infringement, largely because they find that the cost of infringement is relatively low, and the profit is quite rich. In order to change this situation, it is suggested to substantially raise the standard of infringement compensation, so that the infringer can pay a heavy economic price, so as to play a deterrent role. At the same time, for serious acts such as malicious infringement and repeated infringement, more severe punitive compensation measures should be taken, not only to let the infringer bear the actual losses, but also to pay additional punitive damages to show punishment.

4.4 Strengthen international cooperation and exchanges and enhance the level of copyright protection

In order to more effectively crack down on transnational infringement of hologram copyright, China can actively sign bilateral or multilateral agreements with other countries and regions. These agreements can clarify the responsibilities and obligations of all parties in copyright protection, and provide strong legal support for the joint fighting against infringement. Through international cooperation, synergy can be formed to more effectively combat transnational infringement, so as to safeguard the legitimate rights and interests of hologram creators. In addition, actively participating in the activities of international intellectual property organizations is also an important way to improve the level of copyright protection in China. Through these activities, we can keep abreast of the latest developments in international intellectual property protection and learn from the advanced

experience and practices of other countries and regions. This will not only help us improve our own copyright protection system, but also improve our voice and influence in the field of international intellectual property protection.

5. Conclusion

Hologram technology occupies an important position in the field of modern technology and culture. However, with the wide application of technology, the copyright protection of hologram has become increasingly prominent. In order to protect the legitimate rights and interests of the creators and promote the healthy development of the hologram industry, it is particularly important to strengthen the copyright protection of the hologram.

First of all, the protection of hologram copyright needs to clarify its legal positioning. According to the technical characteristics and expression forms of the hologram, it can be reasonably classified as audio-visual works or electrical works in the copyright law, so as to determine its status protected by the copyright law. This classification not only helps to clarify the ownership of copyright, but also can provide a legal basis for the subsequent right licensing, transfer and the identification of infringement behavior.

Secondly, the registration and management system of hologram copyright should be further improved on the basis of clear legal positioning. Through the establishment of a special registration agency and database, the ownership of the hologram works can be ensured clearly, so that the right holder can provide evidence in case of infringement. At the same time, it is the key to strengthen the market supervision and severely crack down on the infringement behavior of maintaining the market order and the interests of the right holders.

Thirdly, for hologram copyright infringement, a perfect legal liability system must be established, including clarifying the constitutive elements and identification standards of infringement, raising the infringement compensation standards, and taking punitive compensation measures. Through these measures, we can effectively curb the occurrence of the infringement act and protect the legitimate rights and interests of the right holder.

Finally, strengthening international cooperation and exchange is also an important way to improve the level of hologram copyright protection. By signing agreements with other countries and regions, participating in the activities of international intellectual property organizations and holding international seminars, we can jointly crack down on the transnational infringement of hologram copyright, learn from advanced experience, and promote the healthy development of global hologram technology.

In short, the copyright protection of hologram is a systematic and complex project, which requires the joint efforts of law, technology, market and other aspects. Only by establishing a sound legal system, strengthening market supervision, clarifying legal responsibilities and strengthening international cooperation and exchanges, can we provide a strong legal guarantee for the innovation and development of hologram technology and promote the prosperity and progress of the cultural industry.

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