



Compound Protection of Network Short Video Copyright Based on Blockchain and DRM

Wenyan Jia^{1*}, Jing Su², Yaqing Si³, Yuzhu Liu⁴

^{1,2,3}School of Economics and Management, Beijing University of Posts and Telecommunications, Beijing, China

⁴China Press and Publication Research Institute, Beijing, China

¹1921199184@qq.com, ²bysj@sina.com, ³siyaqing@bupt.edu.cn, ⁴liuyuzhu2@sina.com

Abstract. Short video has developed rapidly in recent years due to its fragmented characteristics, but the establishment of industry regulation system fails to keep pace with the development of the market, resulting in serious copyright infringement. In view of the infringement phenomenon and market governance pain points in the short video industry, this paper proposes that a "third party" should build an independent "copyright protection and service platform". The platform is characterized by a blend of DRM and blockchain technology. At the same time, this paper hopes to use integration to realize copyright-based "rights item" transactions and services, fundamentally solve the phenomenon of "small, scattered, and chaotic" short video rights protection, and propose a multi governance model for copyright circulation.

Keywords: Blockchain; DRM; The governance of infringement; Governance mode of multi governance.

1 Introduction

Since the release of Viddy, the first short video software, in 2010, the network short video service has entered people's lives with an overwhelming momentum. Its short and fast characteristics cater to people's fragmented living habits in the new media era^[1], and has become an important pastime for the public. In the process of development, domestic platforms with hundreds of millions of users, such as Tiktok and Kwai, have also been born. By June 2021, the number of short video users in China had reached 888 million, accounting for 87.8% of the total Internet users^[2].

Short videos generally refer to short videos that are shot, produced and transmitted on mobile terminals or PC terminals and are about 5 minutes long^[3]. Short video has developed rapidly due to its characteristics of timeliness and sociability, close to daily life scenes, low creation threshold and large business opportunities. However, because the establishment of industry regulation system fails to keep pace with the development of the market in time, the serious copyright infringement problem poses a great threat to the innovation and protection mechanism of China's short video industry.

On the basis of systematically sorting out the infringement phenomenon of short video industry and the pain points and difficulties of market governance, this paper will analyze the advantages and limitations of the latest Digital Rights Management (DRM) technology in video copyright protection, as well as the problems exposed in the early practice of people's recent introduction of blockchain technology for copyright protection, and propose to start from the whole industry chain governance of network short video. By comprehensively using blockchain and DRM technology, we can achieve an open solution for the protection and service of short video works, and provide a more comprehensive composite governance model for the chaos of copyright rights circulation in the short video industry.

2 Infringement Types of Short Video Copyright

Due to the variety of creation types, the infringement types of short videos are also complicated, including the following categories: ^[4]:

(1) Direct handling infringement: without authorization or permission of the author of the original short video, use "crawler software" or some means to upload the originator's video to his own account, or even create an account with the same name as the originator on other platforms to impersonate the originator to obtain traffic and exposure.

(2) Fragment transmission infringement: the content of popular movies, TV dramas, concerts and other contents are disorganized into fragments and uploaded to the account of short video platform without the permission of the author of the original short video, thus causing disputes over the right of information network transmission.

(3) Infringement of creative editing: short video users, without the permission of the originator, upload video content such as popular film and television ensembles, sports events, game pictures, etc. to their personal short video accounts through secondary editing and splicing, after configuring commentaries, with the laudatory name of "enabling the audience to quickly understand the content of a few hours or even dozens of hours in a short time".

(4) Infringement of the use of music works: In order to achieve better effects of short video works, the creators of short video will add certain background music to render the works during the creation process. Short video creators insert background music without the authorization of music copyright owner, which infringes the right of information network communication of music works.

(5) "Micro-processing" infringement: slight processing of the original video and re-uploading it to its own account, such as blocking the original video logo with Mosaic, deleting the ending clip, changing the size ratio of the video, etc.

3 Difficulties in Copyright Protection of Short Videos

In 2021, China's copyright law revised "film works and works created by similar methods of shooting films" to "audio-visual works", which laid a legal foundation for the copyright protection of short video works, including 4 personality rights and 13

economic rights, a total of 17 rights. However, whether short video works can be protected by copyright or not should be determined according to the type, creation mode, creation process, etc., which cannot be generalized. Therefore, this paper is committed to providing a certain mechanism and platform for short video creators to realize relevant protection and services when they want to protect their works.

Short video has always had the advantage of universal participation, but also caused low access threshold, frequent infringement and difficult rights protection problems. Different from other articles discussing short video infringement, this article does not intend to identify from a legal perspective whether the works arising from the above possible infringement constitute infringement. Instead, we should first focus on how to provide "rights confirmation service" for "originators", and on this basis, provide convenient, open and free copyright inquiry, transaction, targeted distribution and income monitoring services to the society, advocate legal creation, provide compliance convenience, reduce the cost of law-abiding, and promote harmonious development.

In view of the frequent infringement of short video, the traditional technology detection has encountered difficulties in the regulation process of short video. Part of the core monitoring technology based on AI used for long videos are not suitable for short video detection; At the same time, the subject of infringement may be scattered on various platforms, it is difficult to find infringement clues, obtain evidence, the cost of rights protection is high, and the amount of compensation is low. The subject of rights protection is highly likely to give up rights protection after weighing the advantages and disadvantages, which also contributes to the occurrence of infringement on the other hand.

Therefore, it is proposed to build an independent "copyright protection and service platform" integrating DRM and blockchain technology by a "third party", and realize the transaction and service based on copyright "right items", which will fundamentally solve the "small, scattered and chaotic" phenomenon of short video rights protection and enable the copyright circulation to realize multi-party governance mode.

4 Copyright Protection Application of Traditional DRM

DRM, Digital Rights Management is an overall mechanism to define, describe, protect and monitor the rights and interests of all parties involved in the network transaction, transmission and utilization of digital information products^[10], It can also be said that DRM is a management scheme that digital content providers use software or hardware means to restrict digital permission content in order to protect digital content copyright^[11].

DRM adopts the "authorization-license" mode to encrypt works. Only the license unit with targeted key can decrypt and use the works, which to a large extent ensures the secure dissemination of works. Secondly, products in DRM solution must be used in specific equipment or client software/plugin to ensure that the products after the transaction are genuine and intact, as well as a fair and transparent capital flow during the transaction. Finally, whether it is a specific hardware device or client software, the

obligee can monitor the use of the work through DRM to guarantee the realization of various rights and interests of the work.

In the process of DRM development, the technology and management methods are updated with each passing day. From the initial digital watermarking and digital fingerprint technology of content identification, symmetric encryption algorithm of content encryption, public key infrastructure of content access, regional coding control mode of content protection to today's audio fingerprint technology, asymmetric encryption algorithm, digital authentication technology, etc., it is fully proved that DRM in copyright management still has irreplaceable function. However, due to the high professional requirements of DRM technology on the R & D team, small teams cannot afford and build a complete DRM system, which to a certain extent caused the industry monopoly, and the whole market tilted to large enterprises, further aggravating the imbalance of the industry ecosystem.

5 Copyright Protection Application of Blockchain

Blockchain is a distributed storage accounting technology jointly established and maintained by multiple parties. It is decentralized, tamper-proof, traceable, safe and reliable, etc.^[7]. The characteristics of blockchain technology are extremely in line with the relevant requirements of copyright registration and circulation. In particular, non-Fungible Token (NFT) of blockchain can realize the separation, transaction, traceability and rights protection of all rights of each independent work, and realize flexible circulation of copyright value.

To establish an NFT mechanism based on blockchain technology, first of all, it is necessary to ensure the association between the obligee and the "original" attribute of short video works, so as to realize that "when the works are linked, the right is confirmed, and when the right is confirmed, the certificate is issued". An NFT is defined to uniquely identify a digital work and its rights according to needs. After the author uploads the work, the rights of the work are disassembled and issued according to the transaction needs, which are stored in the author's account. The platform realizes the independent transaction or bundled transaction of each right of the work in the stages of right confirmation, right exploitation and rights protection.

6 Network Short Video Copyright Composite Protection Application Based on Block Chain and DRM

The infringement of network short video is serious and it is urgent to use the deep integration of DRM technology system and blockchain technology system to improve the governance ability and environment of copyright circulation market under the condition of digital economy. DRM's authorization mechanism, digital watermarking, algorithm encryption and other technologies can encrypt the short video works themselves. At the same time, combined with blockchain in video upload, and so on each link of the registration function, can not only ensure the safety work in the process of

transmission, ensure the integrity of the work flow process, but also can guarantee work infringed the traceability. Based on the combined application of the above blockchain technology and DRM technology, the corresponding short video ecological industrial chain model is constructed:

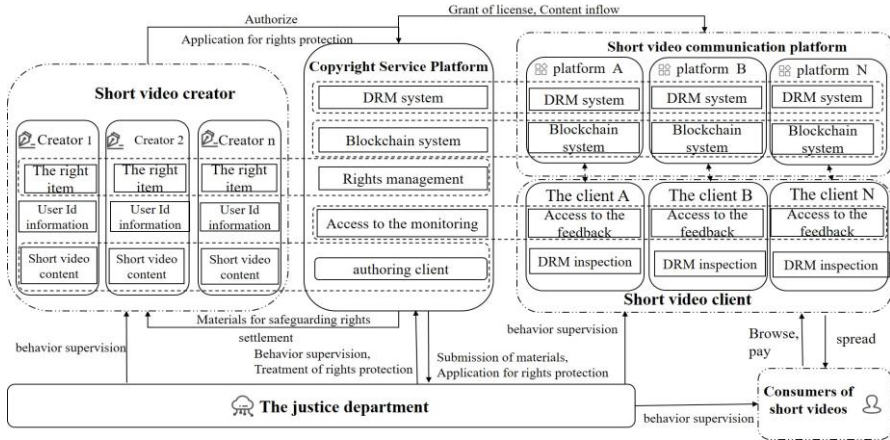


Fig. 1. Network short video copyright composite protection application based on block chain and DRM

6.1 Build a Core Copyright Protection and Service Platform:

In view of the current chaos in the short video industry, an independent "third party" builds an "intelligent copyright protection and service platform" that integrates DRM technology and blockchain technology to strengthen creators' control and dominance in the copyright market. The services provided by the platform mainly include: the development of short video creation and work management client, which is used to support the whole creation process of creators and the "built-in" work rights confirmation service; Provide universal accounts for creators to realize the management and rights transaction control functions of short video works; The core of the platform is an intelligent copyright trading system, which provides creators and users with comprehensive work display, intelligent recommendation, flexible trading, safe delivery and tracking protection services. The built-in DRM technology adapts to users of various network communication platforms or other types of works to jointly realize the whole DRM protection of works; In the process of spreading and using the works, the blockchain system collects and verifies the real use information of the works to serve the trading parties to carry out efficient and fair "option trading". All kinds of key work information, transaction information and settlement information in the process of various services on the platform can also be reliably stored with the help of blockchain technology, which is convenient for tracing the source of all kinds of infringement acts and carrying out rights protection services.

6.2 Secure and Efficient Copyright Circulation Process and Innovative Business Model

The short video creator shall upload the content of the short video and the authorized rights to the copyright service platform after completing the creation of the short video on the creation client provided by the copyright service platform or other creation clients; In the DRM system of the platform, the work files are encrypted and packaged according to the creator identification information, and the NFT of confirming the right of the work and the rights that can be transferred or licensed is created in the creator account on the blockchain. Works according to the creators and buyers in the trading platform, generated by a DRM system has work information, and identification information, information of the unique identifiers rights deal content encryption transmission files, and provide specific buyers for network communication, network communication platform of the client should also be built into the corresponding "decryption" plugin. Final short video consumer short video viewing, the client will DRM inspection and at the same time the user in the use of feedback to network communication platform at the same time, also tells the service platform to summarize and monitoring, the copyright "feedback mechanism" to allow buyers and sellers can, according to the actual consumption to achieve a more fair work mode of "clearing" later, It not only improves the transaction efficiency, but also reduces the transaction risk of all parties. All the key information mentioned above will be written into the blockchain system together with the time stamp, so that judicial supervision departments can verify and handle cases according to law against the records of rights protection submitted by the copyright service platform.

6.3 Advantages of the New Short Video Industry Chain

The new model increases the market position and control of creators. The standard service of "creation means confirmation of rights, confirmation of rights means certification" provided by the service platform solves the difficult problems of copyright registration, confirmation of rights and subsequent evidence collection of infringement rights and rights from the source, which can protect the rights and interests of the originators to the greatest extent and stimulate their enthusiasm for creation. The client of the service platform only needs the short video creator to easily record or download the video suspected to be infringed, and file the blockchain certificate, submit the application for rights protection to the service agency in time, and the service platform will submit all rights protection materials to the judicial department and follow up according to the blockchain certificate.

Improve the fairness of benefit distribution in the whole industrial chain. Each network transmission platform need to purchase work permission from each service platform, lifted a communication platform for binding "depth" of the creator, and at the same time, the usage of feedback mechanism to make the service platform can be profit distribution according to the actual contribution of each part, and is based on the effect after the settlement, promote the fair and just, a void the interests of disputes.

Protect the rights and interests of consumers. Each communication platform can purchase the license of all works from each service platform, which will not only make the communication platform pay more attention to user service, but also make it possible for consumers to see all works in one communication platform, thus avoiding the dilemma that consumers with wide interests have to register and pay on different platforms.

Encourage business strategy innovation of communication platform. While short video originators become the market leaders, the appeal of the communication platform to originators and consumers completely depends on the service level and business strategy of the communication platform. Therefore, the new short video copyright circulation model further stimulates the innovation of the business strategy of the communication platform.

7 Conclusion

The birth and prosperity of short video is a proposition with great achievements and challenges in modern society. How to guarantee the copyright interests of short video creators, improve their social status and control, get rid of the unilateral binding of communication platforms, effectively crack down on infringement, and mobilize the enthusiasm of creators are the common problems facing the society at present. The establishment of an independent third-party copyright service institution that integrates the blockchain system and the DRM system and the construction of a new short video industry model can first enhance the fairness of the distribution of benefits in the entire industry chain, and secondly, it can promote healthy competition among participants, and most importantly, it can form a multi-win situation for creators, service platforms, communication platforms and the prosperity and development of national cultural undertakings.

Acknowledgments

This work was financially supported by National Key R&D Program of China under Grant (2019YFB1406500).

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