

Study on Copyright Protection Path of Music from the Perspective of Blockchain Technology

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Abstract. Similar to the emergence of the Internet, the introduction of blockchain technology indicates a disruptive change in the music industry. This article in view of the realistic problems that have been existing for a long time, such as ownership unknown, unequal distribution of income, lack of accountability for safeguarding rights. Based on the characteristics of blockchain technology, such as decentralization, non-tampering and distributed sharing, the solution of unclear ownership and uneven distribution of music copyright is proposed, and innovative business model of the music copyright operation, through the operation ways of virtuous circle to promote the strengthening of music copyright protection.

Introduction

The total scale of music industry in China was about 347 billion Yuan in 2017. However, the annual revenue of music market in China is reduced by 20 billion Yuan due to piracy and infringement. The piracy and infringement issues of music copyright emerge in an endless stream, which is always accompanied by the booming development of domestic music market, which is not conducive to creating a good development environment in the domestic music market. Strengthening copyright protection of music has become important to promote the development of domestic music.

Ye Ming et al. [1] believe that the exclusive licensing model of digital music copyright is helpful to fight against the piracy of music industry, but at the same time, the conflict of interest in the exclusive licensing model of digital music copyright needs to be solved through copyright law, anti-monopoly law and other relevant laws. Jiang Han [2] studied the copyright protection of music under the Internet environment, and believed that the current situation of music copyright protection should be improved from the two aspects of improving the legal system construction and improving the public's awareness of copyright protection. Si Si and Cui Hengyong et al. [3,4] analyzed the copyright protection of music under the mode of *music&content* of popular short video application and live broadcasting platform in recent years, and believed that the copyright protection of music should be strengthened from three aspects: public copyright awareness, market players and copyright environment. Some scholars also analyzed the significance of foreign music industry development model for China's music industry. Liu Jia et al. [5] analyzed the economy, technology, social system and development mode of music industry in the US, South Korea and India, and put forward relevant suggestions based on China's specific situation. By studying the reform path of music industrial system transformation in the US, Xiong Qi [6] proposed the path selection for the development of music industry in China from two aspects of music industrial system adjustment and system design.

With the development of blockchain technology, many scholars have found that blockchain technology can be well applied in intellectual copyright protection. Xia Chaoxian [7] studied the problem of network copyright protection from the perspective of blockchain technology, and proposed countermeasures for possible problems. Hua Jie [8] analyzed the application of blockchain technology in the confirmation and transaction of intellectual property rights and its possible legal regulations. However, there are still few domestic researches on the copyright protection of music based on blockchain technology. The existing researches mainly analyze the possibility of music copyright protection from the basic characteristics of

blockchain, but fail to propose specific implementation strategies for music copyright protection in China. Based on the analysis of the characteristics of block chain technology and its latest development, combined with the status quo of music copyright protection in China, this paper analyzes the path selection of music copyright protection in China from multiple perspectives.

Existing Problems in Copyright Protection of Music in China

The Creator of Music Does Not Receive All Its Legitimate Proceeds

At present, the copyright owners of music mainly get the corresponding income from both inside and outside the website. Inside the website refers to the income of music works through playing times in the cooperation platform, while outside the website refers to the income of music works from playing in other channels outside the cooperation platform. The music distribution platform generally provides monthly reports, and the copyright owner can directly view the playing amount of a music work and calculate the station's income through the playing amount. However, the data of off-site income is extremely opaque to the copyright owners of music. Without the knowledge of the copyright owners, the works may be sublicensed to short video, games, movies, advertisements and other channels, but in fact these sublicenses are authorized by the copyright owners through contracts. For music copyright owners, they can only get a small part of the off-site income.

Centralization

From the early large-scale publishers and record companies, to the existing copyright collective management organization and the network music platform, there has been a "gatekeeper" in the music market for a long time. In order to raise more creative funds, music creators often rely on the financial support from central institutions such as record companies, and music copyright is usually centrally licensed to third-party organizations such as collective management organizations. The original intention of the establishment of the central organization is to reduce the transaction cost of music copyright and improve the transaction efficiency. However, in practice, the central organization is often the main obstacle to reduce transaction costs. On the one hand, the pricing mechanism of licensing fees provided by collective management organizations is not scientific. On the other hand, the distribution mechanism of authorization income is unfair [9].

Low Cost of Infringement and High Cost of Safeguarding Rights

Most people listen music through smart devices now. Because music files have great replicability and portability, it provides great convenience for infringement and piracy and reduces the cost of infringement and piracy [2]. Generally speaking, litigation rights protection usually takes 1-2 years, and copyright owners need to pay a lot of litigation costs. In contrast, copyright owners generally receive lower compensation for it. In the infringement cases of music, the evidence of infringement is often presented as electronic evidence such as web pages, which is perishable and easy to be modified, so it is difficult to obtain evidence for the copyright owners, and to some extent, it hammers the enthusiasm of the copyright owners to safeguard their rights.

Incomplete Contract

In the process of copyright transaction, the copyright owner of music will sign relevant transaction contracts, because the copyright owner belongs to the party with weak information in the process of transaction, so it is likely to encounter incomplete contracts. The incompleteness of the contract comes from many aspects, such as the benefit distribution scheme of both parties, the definition of rights and responsibilities of both parties and the final attribution and interpretation right of music copyright. Music copyright owners are not familiar with relevant laws and regulations, and the domestic music market is still dominated by music record companies, so when there is a problem of incomplete contract, there may be an opportunistic behavior afterwards.

Path Selection of Copyright Protection of Music in China Based on Blockchain Technology

Blockchain is a new application mode of distributed data storage, point-to-point transmission, consensus mechanism, encryption algorithm and other computer technologies [10]. Blockchain has the following characteristics:

Decentralized distributed account [11]. Due to the use of distributed accounting and storage, there is no centralized hardware or management organization, and the rights and obligations of any node are equal. The data blocks in the system are jointly maintained by the nodes with maintenance functions in the whole system.

Non-tamper and traceable system [11]. Once the information is verified and added to the blockchain, it will be stored permanently. Unless more than 51% of the nodes in the system can be controlled at the same time, changes to the database on a single node are invalid, so the data stability and reliability of the blockchain are extremely high.

Consensus mechanism of de-trust [11]. Blockchain uses the proof of work to reach a consensus, and through the automatic execution of smart contracts without third-party supervision, fundamentally changing the phenomenon of using neutral institutions to verify transactions.

The copyright protection of music cannot only rely on the market, but also need to coordinate different interest subjects in the whole music industry chain. The excellent characteristics of blockchain technology can effectively solve the practical problems in the process of music copyright protection, and provide a new possible path for the copyright protection of music in China, especially under the market environment of rapid development of the Internet and repeated prohibition of music copyright piracy and infringement. Combined with the current situation of music property right protection in China, this paper proposes the copyright protection path selection of music in China based on blockchain technology from three aspects: copyright ownership establishment, copyright interest distribution and business model operation mode.

Establish the Ownership of Music Copyright

Music files are easy to save and transfer, it is difficult to resist piracy, a large number of consumers listen music for free in the case of unauthorized, it is seriously damage to the music copyright owners' interests, because of the unrestrained tort of the consumer, *tragedy of the commons* occurred throughout the market[12]. From the perspective of economics, once the copyright is clearly defined, each value subject in the music industrial chain will conduct market transactions efficiently under the powerful role of the market, thus reducing the occurrence of piracy and infringement.

Blockchain technology can record the occurrence of an event in detail and stamp the time so that we can understand the rights to a particular music copyright. Music copyright holders can upload their music works to the blockchain platform, the platform record the related information and affix a time stamp to it. Since the blockchain is open and Shared, other people can use the information and the time stamp on the blockchain to look for the original creator of the music, which reduces the time cost of determining the copyright ownership of music works.

Based on the above research, since the blockchain platform can solve the problem of copyright ownership, the use range of blockchain can be expanded. After uploading music works on the blockchain platform, the copyright owners can directly use the blockchain platform to register their intellectual property rights, so that the establishment of copyright has legal effect.

Music Copyright Tracking and Profit Distribution

The traditional copyright protection of music is mainly regulated by legal means. However, due to the high cost of safeguarding rights, some copyright owners supervise the copyright infringement of music in the market through professional third-party supervision institutions. For example, the four major copyright protection companies in the US, led by the American Society of Composers, Authors and Publishers (ASCAP), provide copyright tracking services for their members, so as to reduce the losses due to piracy and infringement, which to some extent increases the costs of copyright owners. However, in the current environment of China, due to the imperfect copyright protection system of music market and the complicated interest relationship between various rights subjects, domestic copyright protection companies are not effective in protecting music copyright.

Block chain technology is not easy to tamper, after generating relevant data information on the blockchain platform, the copyright owner can see a complete transaction record of a music work through the blockchain, and track music copyright transactions quickly, reduce the difficulty of obtaining evidence. As for the distribution of revenue in the process of the use of music copyright, we can quickly search the copyright using record through the blockchain technology, so as to obtain the corresponding royalty. After uploading their music works to the blockchain platform, once their music works are downloaded or streamed by individuals, the income generated can be automatically distributed among stakeholders through intelligent contracts through the smart contract, effectively solving the problem of off-site interest distribution of music copyright owners.

Innovate the Business Model of Music Copyright Operation

Online-platform of music can build a direct trading platform between consumers and music authors through blockchain technology, eliminating the *intermediary* in the traditional music industry chain, thus reducing the transaction cost. With blockchain technology, music rights holders can issue their music works like shares, buying and selling them on the market. The copyright owners get the copyright proceeds in advance by issuing music shares, while fans and investors gain profits through music stock price difference and music works copyright proceeds dividend.

For the copyright owners, on the one hand, issuing music shares and cooperating with the transaction to improve the liquidity of long-term income from song royalties, they can obtain the expected royalty income and shorten the time for the copyright owners to make profits and collect funds. On the other hand, if music stocks want to be recognized by market investors, they must improve the quality and personal influence of music works. For investors, in order to get more copyright dividends, they will call on people to resist piracy. In the whole business model, the consumers and the copyright owners promote the virtuous circle of music property right protection in the continuous market game.

Conclusion

This paper mainly analyzes the piracy and infringement problems existing in the copyright protection of music in China. By making use of the characteristics of the decentralization, non-tampering and de-trust of the blockchain technology, this paper changes the way of music copyright transaction and then innovates the way of music copyright protection. Specifically, it makes it easier for copyright holders to obtain about music copyright ownership, transparency, and subsequent changes of traceability information for all copyright owners, reasonable royalty, and through technical means has the absolute sovereignty of music copyright, can effectively motivate their creative enthusiasm. A set of standardized and automatically executed smart contracts based on blockchain technology simplifies the process of copyright authorization and profit distribution, helps reduce the transaction cost between music copyright owners and users, and protects copyright owners from copyright infringement. Innovate the business model of music copyright, through reasonable and effective copyright operation mechanism, promote the development of music market, and play a role in protecting music copyright.

However, as the blockchain technology is not yet mature, there are still two problems to be solved in its application process: firstly, as the data in the blockchain exists in numerous "cell blocks", with the expansion of future data, the storage of data content is a problem that cannot be ignored. Secondly, due to the decentralization of blockchain, the infringer can hide his real identity with the help of digital encryption technology, which makes it impossible to hold the specific infringer accountable. Therefore, the supervision of the third party should be strengthened in the application process.

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