Research On Copyright Registration Based On Blockchain Technology

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Abstract: Copyright registration is the preliminary evidence of copyright ownership and protection, and the starting point of copyright transactions. The copyright registration based on the blockchain technology can effectively solve the ills of the high cost and long term of traditional copyright registration, and can achieve the purposes of identifying the author's identity, increasing the credibility of the registration, and ensuring the security of registration data through a technical aspect. Blockchain copyright registration also has certain limitations. In addition to its own technical problems that are difficult to overcome, it also cannot solve the "originality" problem of works and the legal effect of registration. Of course, the improvement of the blockchain copyright trading market is both an opportunity and a challenge. Therefore, we should look at the application of blockchain technology in the field of network copyright registration with an inclusive mentality and dialectical thinking.

1. Introduction

In the Gutenberg era, content information often only depended on certain tangible objects, and could not be separated from the real objects for large-scale circulation. After a book is sold, the recirculation is generally only directed to the collector and the waste market, and some secondary references to the content of the work often fall into the category of reasonable use. In this case, the rights of the copyright itself and the transaction requirements are low. However, after the Internet era, convenient and efficient data technology can allow people to obtain text, pictures, music, and video content they need anytime, anywhere, especially with the explosive growth from the media, greatly increasing the occurrence of copyright infringement. Probability. In the network environment, direct forwarding of unauthorized works or re-dissemination after slight modification are extremely common, and the ownership information is lost or deliberately erased during the dissemination of a large number of works, which also causes a large number of orphan works. produce.

Among many copyright issues, copyright registration is the starting point of copyright confirmation, copyright transaction, and copyright protection. The occurrence and resolution of many issues are closely related to copyright registration. If the issue of copyright registration can be handled properly, it will increase the credibility of copyright transactions, reduce ownership disputes, and provide credible evidence for rights protection. However, traditional copyright registration has problems such as high cost, low efficiency, and cumbersome procedures. It runs counter to the need for fast and effective rights confirmation under the current digital background. It is urgent to use new forms of technical means to reform the copyright registration method to respond to the Internet era The challenge of copyright protection.

As the core supporting technology of Bitcoin, in recent years, the academic community has discussed the development and application of Blockchain very enthusiastically. It is considered to be another milestone progress after the Internet. The field brings profound change.

2. The Advantages Of Blockchain Technology In Copyright Registration

With the rapid development of network technology, the creation and dissemination of works have gradually developed in the direction of "decentralization" and "property ownership", and the blockchain that has already demonstrated its strength in the financial industry is considered to be the most capable A new generation of Internet technology that reflects "decentralization". [1] Blockchain is born out of the underlying technology of Bitcoin digital structure. Through the use of distributed networks, encryption algorithms, time stamps, consensus and reward mechanisms, a secure network based on decentralized credit is built. Its decentralization, data encryption, time series data, collective maintenance and other features make the blockchain the first choice to improve the current copyright registration . [2]

2.1. Decentralization: reduce registration costs

Decentralization is the most prominent feature of the blockchain. It uses a peer-to-peer (P2P) peer-to-peer network to connect nodes. In the process of data entry, transmission, storage, and verification, the nodes are equal in status. A purely mathematical consensus mechanism is used to establish each The trust relationship between nodes, thus forming a distributed system without any special central node. [3]

The introduction of blockchain technology into copyright registration to achieve decentralization of the registration process will be much lower than the cost incurred by traditional copyright registration models today. First of all, the blockchain is program code that runs automatically. It can even achieve real-time recording based on preset algorithms, which will greatly reduce the time cost of copyright registration. Secondly, decentralization can enable copyright holders to register works copyright directly on the blockchain, and the cost is extremely low. According to estimates, the copyright registration based on the main chain can be as low as RMB 0.4 per piece, and the registration cost based on the side chain is even lower. [4] And at present, for the needs of commercial marketing, many blockchain platforms are registering for free when providing copyright registration services.

2.2. Data Encryption: Identification of Author

The blockchain adopts asymmetric encryption technology to meet its needs for security and ownership verification. Compared with common encryption methods, in the process of encryption or decryption, asymmetric encryption usually has two different keys, namely the private key and the public key. After using one of the keys to encrypt the information, only the corresponding other key can be unlocked. The biggest difference between the two keys is that the public key is made public, while the private key needs to be kept secret. The public key can be generated through the private key, but others cannot calculate the corresponding private key based on the public key to ensure its security. [5] And the blockchain does not directly store the originality content information, but only stores the hash function value after it has passed 2 SHA256 hash operations. Through asymmetric encryption and SHA256, the blockchain simultaneously achieves the disclosure of records and the confidentiality of content.

Blockchains that use asymmetric encryption and SHA256 can embed hexadecimal passwords for the originality works in a cryptographic way from the beginning and store them in the blockchain system. This method can take into account the privacy of the author's personal privacy and the disclosure of the registration records. It can also change the traditional model of separating the work from the author to a certain extent, thereby preventing the creation of "orphan works" from the root. [6] And the blockchain technology can stamp a credible time stamp on each block to prove the formation information of the work and the copyright ownership.

2.3. Time series data: improve the credibility of the platform

The timestamp technology makes the data on the blockchain time series. The birth of the time stamp technology predates the blockchain, and it is not complicated in itself, but its application in the blockchain makes 1 + 1 far greater than 2, which is a significant innovation. In practice, legally

valid timestamps can be stamped on block data as proof of the existence of its content to form a database that cannot be forged and tampered with, thus being time-sensitive areas such as notarization and intellectual property registration The reference to the blockchain has made a technical foundation. In addition, the time stamp adds a time dimension to the data content of various application methods based on the blockchain, making it possible to trace the data through the blockchain.

Copyright registration based on blockchain technology provides a new decentralized copyright registration model that can effectively improve the credibility of online copyright registration. In the blockchain network of copyright registration, the registration node will put the root value of the hash tree of the copyright ownership registration information received in a certain period of time into a block stamped with a trusted time stamp, and then other registrations The node will verify the block. If more than half of the nodes consider it to be a valid registration block, the entire network will synchronize data and add the block to the main chain. Compared with traditional copyright registration, the basic reason why blockchain copyright registration is technically more credible is that it can provide unique certification for copyright registration at a specific point in time, and there are more nodes in the blockchain network that can Support it. The immutability of time ensures that the registration data in the historical block cannot be tampered with and deleted, and the credibility of the copyright registration platform is maximized. [7]

2.4. Collective Maintenance: Ensuring Data Security

The blockchain uses a network of distributed nodes. There is no special central node in the design. The status of each node is completely equal. They jointly undertake data storage and verification information and collectively maintain the entire blockchain system. The traditional copyright registration system is structured with a central server as the core. All copyright registration data is stored centrally, and the security of the data is completely based on the central server. In real life, data tampering or leakage is almost always caused by hackers' attacks on the central server.

The copyright registration system based on blockchain technology is built on a decentralized model. The most important data that supports blockchain copyright registration, namely the timestamp and the root value of the hash tree, are stored in the nodes of multiple servers. In China, even if a hacker invades several blocks in the network, they will be rejected because they cannot pass the verification of other honest block nodes, which will not affect the operation of the entire copyright registration system. In addition, the registered data information in the blockchain is encrypted and transmitted and stored by the private key, thereby ensuring the confidentiality of the data. Such a data security verification and prevention mechanism effectively avoids attacks against the copyright registration database. [8]

3. Problems with Blockchain Technology in Copyright Registration

There is no one-size-fits-all technical measure. Moreover, the blockchain is still in the initial stage of development, and it naturally has its limitations in the application of copyright registration. In addition to the shortcomings of the technology itself, some of the problems existing in traditional copyright registration still cannot be solved, and in the actual implementation process, it also faces some other obstacles that restrict its development.

3.1. Technical Issues Related to Blockchain Copyright Registration

First, no technology is absolutely secure, as is blockchain technology. Asymmetric encryption technology is the support for the security of the blockchain. The stronger the shield, the more profitable it is. With the rapid development of countermeasures such as computer algorithms and cryptography, the security mechanism that the blockchain depends on will face huge adjustments. The blockchain copyright registration system relies on the public key + private key to issue a unique digital copyright certificate to the creator, but the existence of the public key address is likely to become a breakthrough for hackers.

Second, the efficiency of the blockchain is limited by the capacity of the block. If OP_RETURN is used to encrypt the digital production ID and store it in the blockchain, according to the Bitcoin protocol, its maximum capacity is 40 bytes. With the storage of massive copyright registration data, the requirements for storage space will increase. This also directly affects the application of large-scale copyright registration.

Third, the high energy consumption of blockchain technology cannot be underestimated. The asymmetric encryption and hash derivation of blockchain technology requires the support of computing power. [9] Under this premise, the consensus mechanism based on PoW (Proof of work, Proof of Work) will cause a huge waste of computing power. In addition, whether the blockchain copyright registration platform is willing to bear the corresponding power resource consumption is also a question that must be considered.

3.2. "Originality" of Registered Works

In copyright law, "Originality" is an important condition for measuring whether a creative work can be called a work. Its understanding can be divided into two parts: "independence" and "creation". "Independence" means that the creative result is the product of the author's "independent conception", and its creation must be distinguishable from existing works; "Creation" does not require that the creative result has a high literary or aesthetic value, but it must also have Minimal "intelligence creation", not just "sweating on the forehead". Therefore, only when the creative achievements satisfy both "independent conception" and "intelligent creation" can they be registered works recognized by the Copyright Law.

The application of blockchain technology in the field of copyright registration, one of the most important means is to make each successfully registered work have a corresponding and unique hash value. Some creative achievements have only made minor changes to other works. Due to the lack of differentiation from the originality work and the requirement of "independent conception" of the work, the copyright registration cannot be performed. [10] In the blockchain registration system, because of the "randomness" of the hash value (the input hash value will be completely different even if the input content is only one byte apart), the two are in the blockchain registration system It is impossible to distinguish, and in this case, erroneous registration is bound to occur. originally, blockchain copyright registration has a more proving advantage than traditional copyright registration, but in fact, two works with little difference have obtained two completely different hash values. The advantages of blockchain copyright registration in "security" instead become its own disadvantage in "credibility".

3.3. Legal effects of copyright registration

Even if the registration of a work is not a necessary condition for obtaining copyright, the copyright registration has the presumptive effect of ownership, prompting creators to register many valuable works at registration agencies. Most countries in the world authorize an institution to handle copyright registration through legislation, and the authorized institutions have gained the credibility of the country. In China, according to the Trial Measures for Voluntary Registration of Works and the Measures for the Registration of Copyright Pledges, local copyright bureaus are responsible for the work registration of relevant rights holders in their jurisdictions, and the National Copyright Administration is responsible for the registration of copyright pledges. In practice, the National Copyright Administration transferred the registration work to its direct institution, the China Copyright Protection Center.

Currently, private registration organizations are mainly engaged in blockchain copyright registration. Compared with traditional copyright registration agencies, institutions engaged in blockchain copyright registration have only technical advantages. The power of traditional centralized copyright registration agencies to engage in business activities comes from the direct provisions of the law, and the registration certificates they issue rely on the public power of the state. The traditional copyright registration agency has a strong administrative color, and the copyright registration made by the government has the credibility of the government, which is one of the main obstacles that the current private block chain copyright registration agency can hardly look at. In the

judicial practice of copyright disputes, the judge must consider the source of evidence, the identity background of the evidence provider, the process of evidence collection, etc. The legal effect of blockchain copyright registration does not have any advantages over traditional copyright registration.

Conclusion

Regarding the application of block chain technology in the field of copyright confirmation, we should adhere to the cold thinking under hot technology, and recognize the huge opportunities it brings, we must also explore its existing problems and analyze the feasibility in practical applications. To find the path most suitable for its development. As a typical technical self-help method, the back of the block chain represents skepticism of centralized power and yearning for the free market, but a technical self-help method that is completely out of the system may cause chaos in the market order. In the current situation, in addition to solving the technical problems of blockchain in the application of copyright registration, it is more important to improve the rules from the institutional level so that the law can effectively adapt to and control the opportunities and challenges brought by new technologies, so that Block chain serves the development of the copyright industry more effectively.

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