A Study on the Application of Blockchain Technology in Converged Media Platforms: Postprint

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Abstract

Blockchain possesses characteristics such as immutability, traceability, rights confirmability, and relative fairness. With the gradual maturation of the blockchain industry and the rapid development of the Internet and mobile smart device markets, the media industry is becoming increasingly intelligent, transparent, diversified, and personalized under the technological transformation of blockchain. Based on technologies such as blockchain, artificial intelligence, big data, and cloud computing, the on-chain rights confirmation of content information represents a new form of media convergence business development in the blockchain era. This paper primarily proposes the application of blockchain technology in digital copyright protection, content review, and content traceability on media convergence platforms. After analyzing issues such as the inadequate digital copyright protection, complex content review, and difficult content traceability in traditional media convergence, it combines blockchain technology with media convergence platforms to propose relevant solutions.

Full Text

Preamble

Exploration of Blockchain Technology Applications in Integrated Media Platforms

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Abstract: Blockchain technology possesses characteristics of immutability, traceability, rights confirmation, and relative fairness. As the blockchain industry matures and the market for internet and mobile smart devices develops rapidly, the media industry is becoming increasingly intelligent, transparent, diversified, and personalized under this technological transformation. Based

on blockchain, artificial intelligence, big data, cloud computing, and other technologies, on-chain rights confirmation for content information represents a new form of integrated media business development in the blockchain era. This paper proposes applications of blockchain technology in integrated media platforms for digital copyright protection, content review, and content traceability. After analyzing problems such as inadequate digital copyright protection, complex content review, and difficult content traceability in traditional integrated media, we propose relevant solutions by combining blockchain technology with integrated media platforms.

Keywords: blockchain; digital copyright protection; content review; content traceability; on-chain rights confirmation

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1. Current Status and Pain Points of the Integrated Media Industry

With the development of internet technology, particularly the emergence of 5G, digital works on integrated media platforms are becoming increasingly rich in form. However, current DRM technology is gradually becoming obsolete, suffering from non-uniform technical standards and incompatible development platforms, making it unable to meet the copyright protection needs of digital works. Moreover, existing digital copyright protection technologies only offer simple control over illegal copying and distribution, which falls significantly short of today' s comprehensive requirements for digital work protection that should cover content identification, dissemination monitoring, infringement evidence preservation, and transaction protection.

The integrated media industry faces three major challenges. First, content is difficult to trace. The spread of fake news and rumors exploits the convenience of integrated media platforms and internet technology. Once information circulates on network platforms, it becomes nearly impossible to track across various disseminators and platforms. Many news platforms pursue sensationalist "clickbait" headlines, manufacturing fake news or exaggerating content to attract traffic. For instance, Sohu once misquoted a *Legal Evening News* report about multiple students in Beijing taking sick leave due to nosebleeds, publishing an article titled "Multiple Elementary School Students in Beijing's Xicheng District Had Nosebleeds on the Same Day with Abnormal White Blood Cell Counts." Sohu deliberately added content to the headline and inserted false information inconsistent with the original report, misleading the public and creating a severely

negative social impact.

Second, copyright is difficult to establish and protect. In the emerging internet era, both content production and publication channels have become extremely accessible. Massive amounts of digital content circulate freely online, making it nearly impossible for media organizations to protect digital work copyrights in this sea of data, leading to rampant copyright infringement and difficult rights protection.

Third, content is difficult to identify. Current network platform content review faces several technical pain points: pure manual review is inefficient and requires enormous investment of time and resources. While platforms have explored using big data and artificial intelligence for content review, these technologies suffer from low accuracy and poor generalizability, making them unable to completely replace human review. The main constraints are twofold. On one hand, audio-visual content is constrained by its diverse attributes. Multiple elements have different identification standards and algorithm models, each facing certain technical bottlenecks when solved individually, leaving considerable room for improvement in comprehensively addressing multi-element content review. On the other hand, review scope faces uncertainty. While requirements for reviewing illegal content involving pornography, politics, drugs, and terrorism remain constant, determining what specifically constitutes harmful content involves uncertainty that cannot be simply addressed by updating keywords or images to ensure content safety.

2. Blockchain Triggers Transformation in the Media Industry

As new IT technologies develop, the media industry has entered an era supported by blockchain, cloud computing, big data, and other technologies, extending into multiple industries. Applying blockchain technology in the media field can largely solve many problems encountered in industry development, improving the credibility and integrity of content presentation through multi-channel content creation and dissemination.

First, for the media industry, blockchain can preserve the authenticity, integrity, utility, and reliability of data information because blockchain records are distributed for verification and storage, protected through cryptography. If produced content receives verification from multiple nodes and is published online, its content becomes traceable and permanently recorded, increasing reliability in the content production process.

Second, blockchain technology facilitates rights confirmation, circulation, and traceability in the media industry, greatly promoting content production, dissemination, and supervision, while helping creators achieve ecological value creation and transformation more quickly and effectively. This represents a breakthrough for the entire industry.

Currently, several integrated media platforms in China have implemented the integration of blockchain technology. "People' s Copyright," launched by People.com.cn, provides copyright protection for integrated media using blockchain technology. To date, 17 district-level integrated media centers in Beijing, the Xiangshan Revolution Memorial Hall, and the Beijing Municipal Education Commission have joined the "Beijing Cloud" content sharing platform, completing copyright registration through the copyright functions authorized by "People' s Copyright."

3. Building New Integrated Media Forms in the Blockchain Era

Blockchain technology offers natural advantages in digital content copyright protection, fake news source certification, content review, and other applications for integrated media platforms. It can be combined with integrated media platforms to optimize digital copyright establishment and protection, trace information sources, and improve review technologies. Using encryption algorithms ensures digital content cannot be altered for copyright confirmation, while consensus mechanisms not only prevent media works from being modified but also achieve transparency in distributed ledgers, facilitating traceability and content review.

3.1 Blockchain and Digital Copyright

For digital copyright protection, blockchain primarily relies on digital fingerprints and asymmetric encryption to ensure the integrity of on-chain data, enabling registration, tracking, and protection of digital copyright information. Additionally, blockchain can provide unique proof for copyright content marking through timestamps, which is more conducive to digital copyright traceability.

The protection method involves introducing national regulatory agencies through alliance chains, preserving online copyright information for digital works to enable traceability. The combination of alliance chains and regulatory agencies provides strong support for rights protection evidence collection, making copyright evidence collection and digital work rights establishment more convenient.

Individuals and content institutions upload their creative content information to the chain through nodes, with blockchain recording copyright ownership information, work hashes, confirmation time, and work content features. Content works generate unique feature values through hash algorithms, serving as "digital fingerprints" for various audio-visual copyright creations for blockchain deposit. These unique feature values are shared with judicial institutions through blockchain. Simultaneously, work files are submitted offline to the copyright bureau for review, and after passing review, electronic copyright certificates are uploaded to the chain and copyright certificates are issued to complete the rights confirmation process, as shown in [Figure 1: see original paper].

3.2 Blockchain and Content Review

Content review involves establishing a content review platform alliance chain using blockchain technology, providing interactive interfaces for "review result submission," "review result authorization," and "content re-review" for content on the chain. After platforms conduct routine content reviews, they upload review method, content hash value, content provider hash value, review results, and reviewer information to the chain, while synchronously recording the contribution value of relevant participants to the platform on the chain. When other platforms need to review the same content, they can query whether review records exist on the blockchain content review platform through content indexing, cataloging, or summary information, and directly obtain the review result information on the chain through the authorization interface if available, as shown in [Figure 2: see original paper].

By building an alliance chain with blockchain technology, user identity information can be hashed and uploaded to the chain along with corresponding content provider reputation values. Within the alliance chain, user identity hash information is aggregated, and each platform can then map it with its own membership system to obtain the reputation value of corresponding real-name users across the entire alliance. By standardizing the self-discipline and self-inspection mechanisms of integrated media UGC content providers and establishing a content publisher reputation evaluation system, a healthy content production ecosystem can be promoted.

Currently, multiple integrated media platforms and other media platforms use blockchain technology for content review. The Shaanxi Integrated Media Platform leverages blockchain' s characteristics of openness, transparency, traceability, and immutability to implement content review functions. Additionally, iQiyi combines its self-developed AI-based video content review system, conducting machine + manual review before blockchain rights confirmation, only uploading relevant information to the chain after passing review to ensure content quality.

3.3 Blockchain and Content Traceability

Blockchain's distributed ledger is publicly transparent and easy to trace, capable of recording media content, thus solving problems such as difficult tracking of fake content during media review and enabling traceability of media content.

3.3.1 Establishing Content Identification Through Cryptography Every aspect of media content requires blockchain technology for quality control, particularly in content creation and publication processes. The core cryptographic technology in blockchain features openness and immutability, marking each media creation content with a unique digital identifier that makes media digital content unique.

3.3.2 Media Content Traceability Based on Unified Content Identification Based on hash functions, any change to media content files will result in changes to the calculated hash value. Therefore, in content traceability and review applications, a unified ID identification system and specification should be established for media content. On the basis of unified identification, each legitimate change to media content files (such as re-editing, transcoding, clipping, inserting logos/ads, etc.) should have the changed file' s hash value recorded. By including all relevant legitimate content data hash values under a unified identifier, content tracking and cross-platform content review collaboration can be achieved.

Taking the Tianfu TV Blockchain Digital Copyright Protection System as an example, the media content traceability blockchain technology system consists of a blockchain underlying chain, blockchain system management, permission management, big data analysis and management, and digital identity management, providing media content blockchain traceability services, as shown in [Figure 3: see original paper].

4. Development Trends for Integrated Media Industry Applications

In the future, blockchain will gradually move from theory to practice, and the practical application of blockchain technology will no longer be out of reach. The combination of blockchain and integrated media represents significant progress for the media industry. Blockchain' s inherent technical advantages can produce unexpected changes in the media industry and bring transformations to other aspects of the media sector.

4.1 Trend 1: Industry Will Be Further Standardized

Under blockchain technological transformation, blockchain will further accelerate the production and dissemination of fragmented media works and content information, boosting content monetization. Copyright issues will be standardized, and the industry will move toward greater security and transparency, with fake news and piracy problems being resolved. In the new media ecosystem, content quality will be greatly improved, the paid content market will welcome new opportunities, and the landscape of user subscriptions and digital copyright management will be fundamentally transformed.

4.2 Trend 2: New IT Technologies Will Drive Further Industry Upgrades

In addition to blockchain, new technologies such as artificial intelligence and big data are reconstructing media production processes. In the internet era, profit models centered on content payment dominate. AI writing, big data, and cloud computing will provide more possibilities for intelligent machine content

production and algorithm-based intelligent content recommendation, further enhancing the breadth and depth of content on many media platforms. Virtual reality and augmented reality user experience technologies will expand the presentation forms of media content, providing users with more diverse visual and auditory experiences. Driven by new technologies, film, television, social media, gaming, and other fields will have more diversified business models and new types of platforms, with more new intelligent platforms supported by new technology applications emerging to better match productivity and resources. The media industry will undergo further iterative upgrading driven by new technologies.

4.3 Trend 3: Original Content Value Will Be Highlighted, Knowledge Payment Will Welcome New Opportunities

As China' s economy enters a new era, shifting from high-speed growth to high-quality development, the media industry faces increasingly higher content quality requirements. The market, platforms, and users all attach greater importance to original content and copyright protection. The core of the media industry is content, and original high-quality content (especially premium content combining text, audio, images, and video) will be the greatest focus of future market competition. Collaborative creation, premium content distribution, professionalization of self-media, machine writing, IP explosion, and content e-commerce have become new industry trends. Blockchain technology further boosts the arrival of the original content and copyright protection era, and content will present a more diversified and high-quality posture. Value-oriented content production based on user needs will become an innovation focus in the media field. On this basis, a positive feedback loop will form between paying users and high-quality content, further enhancing the overall content level of the industry. Leading enterprises in various sub-fields (such as short video, live streaming, audio, etc.) will have greater motivation to invest in better content driven by the goal of attracting paying users, which is also a way to promote industry development. Knowledge payment will also welcome new development opportunities.

The decentralized, immutable, and traceable characteristics of blockchain core technology make it an ideal solution for solving traditional integrated media application problems and will further promote the development and application of blockchain technology in the media industry. We must closely track and research the current status and trends of blockchain technology development, improve the ability to apply and manage blockchain technology, and enable blockchain to play a greater role in media convergence and radio-television quality improvement. We should deeply explore integrated application scenarios of blockchain technology with radio, television, and network audio-visual industries, and from both technical and management perspectives, prepare for blockchain research, development, and application in the radio, television, and network audio-visual fields to accelerate the transformation and upgrading of the media industry.

References

[1] Ouyang Rihui. Blockchain Media: A New Media Form with a Long Way to Go [J]. News and Writing, 2019(7): 24-33.

[2] Wang Yue. Research on the Impact of Blockchain Technology on Media Ecosystems [D]. Jinan: Shandong University, 2019.

[3] Wang Desheng, Zhang Zongmin. Transformation and Reconstruction: Construction of a Media Micro-Ecosystem Driven by Blockchain Technology [J]. China Publishing, 2020(14): 43-48.

[4] Wan Ke, Yang Shilong, Zhang Jianwei. How Blockchain Technology Will Disrupt Journalism—Taking the American CIVIL Media Company as an Example [J]. Chinese Journalist, 2020(2).

[5] Zhang Weiyi. Research on the Review Mechanism of Media Platforms Using UGC (User-Generated Content) [D]. Jinan: Shandong Normal University, 2019.

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Note: Figure translations are in progress. See original paper for figures.