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Copyright Protection Using Block chain

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Abstract:*Everyone in today's world can enjoy music, videos, and art through a range of Digital platforms. This increases consumption but also creates new problems. There are two major problems: The protection of the author's copyright and calculating the artist's income. This paper proposes to build an application to protect content copyright using Blockchain and Ethereum's Smart Contracts written in Solidity. The paper focuses on music files. The technology secures the copyright of authors and removes the third-party commissions completely. The author receives direct royalty for every consumer who listens to the music. The system is completely decentralized and uses an Interplanetary file system (IPFS) for storing files and every transaction is secure, private, and efficient. The proposed system permits only copyrighted music to be uploaded with the help of Selenium along with Metamask used for handling payments.*

Key Word :*Copyright, Blockchain, Ethereum, Music, selenium, metamask.*

I.INTRODUCTION

"Blockchain[1] is a distributed, decentralized, and inflexible digital tally technology that uses cryptographic algorithms to secure and corroborate deals, creating a transparent and tamper-evidence record of information that can be penetrated and participated across a network of computers without the need for a central authority." This description highlights some of the core features of blockchain technology, including its distributed nature, the use of cryptography for security, and the invariability of the tally. It also emphasizes the implicit benefits of blockchain, similar to translucency, security, and the elimination of interposers in certain operations.

The advent of new technology has significantly impacted the production and distribution of digital media[2][3]. With the advent of the internet, people all around the world can enjoy various forms of digital content, such as music[2], videos, and artwork, on a massive scale. This has given rise to new challenges concerning how to safeguard the copyright of creators and ensure that artists receive fair compensation in the internet age. The foremost issue is copyright infringement, where a few individuals can purchase and download music or videos from the internet, and then share them with others without paying the creators, thus violating their copyright[6]. Additionally, accurately determining an artist's earnings is another issue.

Having only copyrighted material[4][5] distributed over the internet is not just enough. We also need a system where people cannot access someone's work until they are ready to provide some benefit directly or indirectly to the owner or creator. So this is the whole backbone of our work. To provide a robust system where artists and creators can upload their works, protected by copyright protection, and be certain that their work will not be copied or tampered with and sold or distributed elsewhere. To build this architecture, we use Blockchain technology, smart contracts, and decentralized storage architecture. Combining the key elements of all these services will contribute to building this system.

Hence, we need the end product that will be a decentralized file-sharing and viewing system. The objective should be proposing a decentralized file-sharing marketplace is to provide due credit to the original content creator, which is a major concern for the artists and creators who share their content over the internet. Thus using the potential of blockchain we can put the power back in the hands of artists.

Protection of copyright[7] in the online world is still not implemented widely. People often choose pirated media or content over original content because of lower prices, even if the quality of content is drastically low. We believe that work needs to be done to solve this issue efficiently, both in terms of complexity and financially. The architecture we plan to implement consists of Ethereum's smart contracts written in Solidity, an IPFS file storage system for storing files, and a Blockchain for maintaining a ledger that ensures no tampering or modifications are made without the permission of the owner of the content[7][8].

II.PROPOSED SYSTEM

The proposed technique comprises two major roles of creator and consumer. Thus, the approach explains their interactions and alignment together. The creator is the one who is the author of the music and uploads it to the system by paying a small token amount. The consumer is the one who pays royalties in order to enjoy the music. The proposed approach comprises the following main stages:

A. Authentication

Each successful registration by a user will add a new block. Once the user provides their credentials, such as their

email address and password, the system verifies their authenticity by cross-referencing them with the existing data. If the credentials are confirmed to be valid, a new block is added to the blockchain and broadcast across the network. This allows the nodes to maintain and attach the block to the blockchain, providing direct access to the network. The authentication process follows a similar approach, where the user's data is compared to previous registration hash values. Access is granted if a match is found. However, if there is a discrepancy, login is denied and the user can make another attempt. If the details of the user do not match the data in the database, login is revoked and again an attempt is made.

B. Storing data

In this architecture, the data and hashes are stored with the Interplanetary file system (IPFS), a decentralized peer-to-peer hypermedia distribution protocol. IPFS stores the files and returns a hash value, which we store in the smart contract assigned to a publisher and register it in the blockchain[1]. After storing the data in the blockchain, we are sure that the data cannot be tampered with and is secure. Whenever the same publisher adds a new file with copyright protection we update the hash values we get from IPFS.

C. Retrieving Data

Publishers can quickly grant access to specific users through the IPFS Access Network once the required money has been received via a smart contract. A smart contract is a program designed to enforce the conditions of an agreement between multiple parties by automatically executing the terms outlined in the code. Deployed on a decentralized blockchain network, a smart contract is publicly visible and unalterable, providing transparency and reliability to all involved parties. The smart contract is designed to trigger its execution based on specific events or conditions, such as a particular date or the satisfaction of certain criteria[2][4]. Smart contracts have the potential to revolutionize industries by enabling the creation of self-executing contracts that are faster, cheaper, and more secure than traditional contracts. Thus, once this condition is fulfilled, a transaction is generated and transmitted to the blockchain node.

Assuming the copyright owner has granted permission, a node can request and retrieve the relevant data chunks for a music file. IPFS then identifies the network nodes holding these data chunks and establishes connections with them to obtain the necessary pieces and reconstruct the file.

The content and after that certain period the file won't be available to the user. Hence, it adds a feature that avoids permanent access of the file to the user.

III.ARCHITECTURE

Fig. 1.depicts that as a customer, the user can use smart contracts to buy music rights on an operator-provided application, and the user who buys the rights can make use of the services offered by various operators.

The architecture is designed in such a way that the application is completely user-friendly and easy to use.

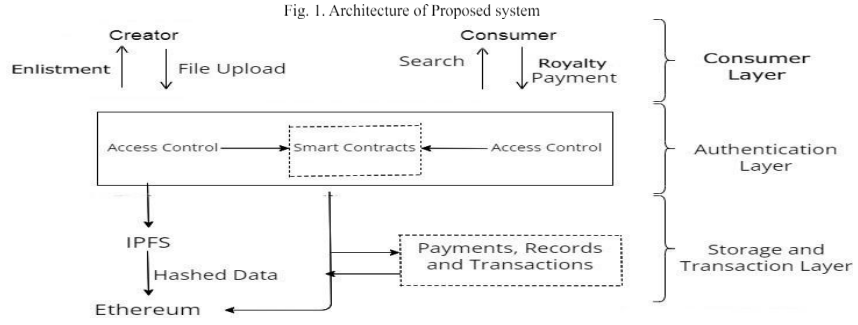
The responsibility for preserving copyright data on the Blockchain and establishing incentives in smart contracts falls under the jurisdiction of the copyright owner, who also doubles as the copyright manager. Most of the content on the online music system is provided by creators, who can upload their creations and earn revenue based on the sales generated. User Layer

The data layer of the music rights operation management system consists of the Ethereum network and music data, with the Ethereum platform as the basic framework for the data layer. As a public Blockchain platform, Ethereum offers a decentralized accounting mechanism via its exclusive cryptocurrency, while also facilitating interaction with smart contracts. Authentication Layer

Smart contracts are used in the middle layer to standardize transactions and other processes.Smart contracts and web APIs comprise the intermediary layer of the system. Web APIs provide a standard interface for communication between different software systems over the internet. All the REST APIs are integrated with the ReactJS frontend application. Smart contracts are deployed as a protocol on Ethereum and once deployed, contracts cannot be modified. These contracts guarantee uniformity in operations across various roles within the system.[2]. Storage and transaction Layer 2.

The application layer offers copyright owners, operators, and authors a visual operational service. Based on distinct business scenarios, the application layer is bifurcated into two subsystems: the copyright management system and the operator-copyright owner system.

Fig. 1. Architecture of Proposed system



IV.RESULT

We have designed a model that uses these technologies and provides a solution to this significant problem. Following the flow ofthe application, Fig. 2.depicts two fields of ROC number and Diary number. The tuple is filled by the user, specifically the author,and along with it, there comes the option of "Upload" which is shown after the successful verification which is depicted in Fig. 3.and is achieved by using an automation script written in selenium. In case the verification is not successful, that is, the tuple is notcorrect, the "Upload" option is not shown and instead an alert is popped up. To complete the process of uploading the music fileinto the system, the author needs to pay a small token amount using Metamask (in our case, we have Ganache for local Ethereum).The interface of Metamask is shown in Fig. 4. Similarly, on the consumer side, the consumer is required to pay the royalty amounttoaccessthemusicfile.Fig.5.showsthemusicplayeroncetheconsumergetstheaccess.

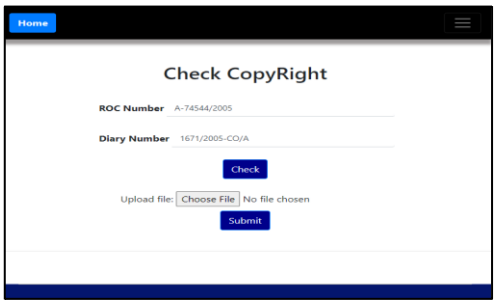
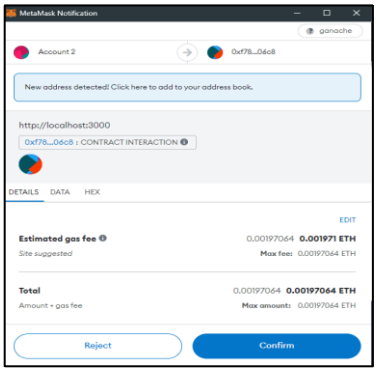


Fig.2 Success copyright check for the tuple given by the author

Fig.3 Automation scripting using selenium



Fig,4 Payment using metamask

Fig.5.Access to music After successful payment

Comparing to existing systems that deal with the protection of copyright using blockchain. A novel music format known as .bc ordotBCisgeneratedbyasinglesystemcurrentlyavailable.Insteadofaconventionalaudiofile,a.bcfileiscreatedwhenanartistorri ghts holder publishes their musical work on this platform. However, due to its exclusive decoding mechanism, the format canonly be played on a specific music player, making it impractical for widespread use. In contrast, our application can accommodateanyfileformat,unliketheaforementionedsystemwhichsupportsonlyone.

V.DISCUSSION

Advantages of using Block chain and Ethereum's Smart Contracts

1. Decentralization and removal of inter mediariesin copyright protection
2. Increased security and privacy intransactions
3. Directory all type payments to authors without third-party commissions

Technical features of the proposed application

1. Usage of Interplanetary filesystem(IPFS)for storing files
2. Selenium and Meta mask integration for handling payments
3. Solidity programming language for smart contract development

Focus on music files

1. Unique challenges in music copyright protection
2. How the proposed application addresses these challenges

Key stages of the proposed approach

1. Authentication of users and files
2. Storing and retrieving data on the Block chain
3. Granting access to users through IPFS Access Network

Implications for the music industry

1. Potential for increased revenue for authors and creators
2. Reduced costs for publishers and music platforms
3. Improved transparency and fairness in royalty distribution

VI.CONCLUSION

To protect the work and content of different artists, content creators, photographers, etc. from serious digital copyright protection issues, requires enhanced ways of copyright protection over the internet. Thus we conclude that block chain-based solutions along with the use of IPFS decentralized storage architecture and different encrypting techniques can be an effective solution to this problem[10].

Our system consists of the Ethereum block chain's consensus mechanism and achieves the goals of using smart contracts in asecured manner and also using the security provided by IPFS's decentralized storage system which is achieved to be used to safelyshareandviewthecontentuploadedbydifferentcontentcreatorsonoursystem.Wedonotburdentheblockchainbystoringallthe data in the original form on the chain, instead, we only store the hash value that we get whenever we upload a file on the IPFSfile storagesystem.Thishelps us to keep the processing of the blocks fast and the ensures well functioning of the blockchain.Apart from this, the checking of copyright is completely automated, accurate, and speedy which is done using Selenium, whichmakestheapplicationveryreliableandconvenienttouse.

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