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"DOCUMENTS VERIFICATION SYSTEM BASED ON ETHEREUM BLOCKCHAIN"

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Abstract: We all know that in today's digital world, the verification of document plays the crucial role in establishing trust and authenticity. However, there is challenges in traditional method such as document forgery, security risk, lack of transparency and inefficiencies. This abstract proposes a modern solution using Ethereum blockchain to ensure disruptive and secure platform and to address this issue. The documents verification system leverages Ethereum's blockchain for its unique feature which includes immutability, transparency and decentralization. The smart contract capabilities and cryptographic security inherent in Ethereum blockchain form the foundation of this transformative system.

Keywords: - Blockchain, IPFS, Smart Contract, Hash Function, Certificate Generation.

I. INTRODUCTION

In India, the basic structure of student studies starts with taking admission in kinder garden then after taking admission in primary school and after secondary. Now after completing the secondary school students, need to get admission in junior college. For graduation there is a need of changing college. So, this is the basic cycle of the student studying cycle. After this some student pursue higher studies. So, the problem with this cycle is that the student needs to produce certification in all stages for validation. This process poses the risk of losing and damaging the document. And it is very risk process for document verification.

The adoption of digital solution, including blockchain for its decentralized and temper – resistant characteristics and reliability of the verification ecosystem. The prevalence of mobile technology and QR code integrating facilities swift and electronic verification for both individuals and organizations. As the evolution continues it becomes paramount for stakeholder, government bodies and individuals to stay abreast of technological advancement and regulatory changes. By embracing the benefits of modern technologies, India is poised to further strengthen its document verification process.

Objectives

The primary objective of the project is to automate the document verification process through smart contract on the Ethereum Blockchain to reduce the need of manual involvement for fast and efficient verification process. The project also keep record by storing the document hash on the Ethereum Blockchain once the document is verified so the document cannot be tempered.

II. LITERATURE SURVEY

The project aims to develop a robust and immutable certificate generation and validation system by drawing inspiration from prior research in the releams of Blockchain technology such as advanced Storage system and digital certificate validations. The literature survey explores various previously published papers and works by researchers and experts in these field.

Paper 1:- Our first paper was titled, "A survey on Blockchain Technology and Security" from this paper we have studied various aspects of Blockchain such as consensus algorithms, cryptography techniques. This paper also delves into the security aspects of blockchain, conducting risk analysis, identifying security categories and discussing security measures. This paper concludes by outing challenges and research directions for enhancing the scalability and security of blockchain system to make it easy to use on the large area or to a great extent.

Paper 2:- Moving on to the next paper, "An Innovative IPFS-Based Storage Model for Blockchain" from this we understood that the blockchain has high demand for storage space and bandwidth to synchronize data with the network. This paper proposes an IPFS based blockchain data storage model to solve this problem. In this paper the miners do transaction in the IPFS network and return the IPFS hash of transaction into the block.

Paper 3:- The third paper titled was, "An Overview of Smart Contract: Architecture, Applications and Future Trends" from this we get to know about the comprehensive overview of the blockchain powered smart contract. We get the systematic introduction for smart contract that consist basic framework, operating mechanism, platforms and programming languages. This paper also presents the recent advances of smart contract and present its future development trends.

Paper 4:- A Blockchain-Based Identity Verification Mechanism was presented in the final article. They conducted research on how to create private permissions within a blockchain network. Their system also includes an issuing authority that creates the document, a hashing algorithm that processes it, and a storage mechanism for the value.

III. WORKFLOW

User –

1. Upload the raw document with the user address to the react app.
2. The user connects the wallet and view verified document that include the data from the blockchain.

Issuer -

1. The Workflow begins when the issuer uploads the raw document and users blockchain address to the react app. Then it is send to the node server.
2. In the node server the UUID and QR code is generated and append the QR code and UUID to the document.
3. From the node server the document is uploaded to the IPFS. The react app receive the IPFS link and the hash value from the node server.
4. The user address, issuer address, IPFS link and the hash value is stored in the Blockchain and return the response to the issuer.

Verifier –

1. The verifier finds the authentic address of the issuer and enters the document to the react app with the OR code, UUID, user address and issuer address. Then pass the document to the node server.
2. The node server computes the hash value of the document entered by the verifier and return it to react app.
3. Then all the provided detail is send to the blockchain for verification. Return the result of verification by matching the provided details with the verifier's provided details to the react app.

IV. SOFTWARE REQUIREMENTS

Visual Studio Code –
Visual Studio Code is a code editor for redesigning and optimizing for creating and debugging contemporary web and cloud applications.

Hardhat –
Hardhat is a developing environment for Ethereum Smart Contract. It helps to manage and automate the recurring tasks for developing smart contract and DAPPs.

IPFS Desktop –
The Interplanetary File System is a decentralized file system for building the next generation of internet and many Web3 projects are build.

V. Methodology

1. **Blockchain: -** Blockchain can be understood as an immutable database and laid the foundation of the whole project. It is a peer-to-peer network that sites on top of the internet. Blockchain is a technology that has desirable feature of decentralization, tolerance and transparency.
2. **Ethereum: -** Ethereum is a major blockchain-based platform for smart contracts that turns complete program in a decentralized network.
3. **IPFS: -** The InterPlanatery File System is a peer-to-peer disturbed file system that seeks to connect all computing devices with the same system of files. It combines disturbed hash tables and a self-certifying namespace.
4. **Smart Contract: -** Smart contract are the key features of Blockchain technology. The contractual terms of an agreement to be enforced automatically without intervention of the third party. A smart contracts are written in many programming languages but the high-level language is Solidity.
5. **Solidity: -** Solidity is an object-oriented programming language for writing smart contract. Smart contracts are embedded procedure stored with the data they are act upon.
6. Hash Function: - It is a mathematical function that takes an input and produced the string. The string is of the fixed size. Hash Function are very useful building block to solve the security problems in computer network.
7. **MetaMask: -** To access Ethereum distributed applications or “Dapps” in your browser, use the MetaMask addon. In order, for Dapps to read the blockchain, the applications inject the Ethereum Web3API into the JavaScript context.
8. **Node JS: -** Node JS is use to write the backends and is responsible for serving the frontends pages, assets and managing user authentication.
9. **React: -** React is used to write the frontends and serves a purpose of providing a better user experience in the frontend for end user as it provides the functionality like no page reload on page switch and fast loading of the sites. Keeping securities in mind we have add Next.js which compiles and saves html pages in the backend and provides fast user experience.

VI. FUTURE SCOPE

The future scope for a document verification is tremendous and energic. So, their potential for world wide selection is tall. Potential future developments could focus on integrating with varied blockchain systems. Integration with the more advanced technology such as Artificial intelligent, Fake Brilliantly and Machine learning could further enhance upgrading the capabilities of document verification framework.

VII. CONCLUSION

The development of documents verification system represents a ground breaking achievement in the realm of secure and transparent document validation. This innovative project has successfully harnessed the power of blockchain technology to address the critical challenges inherent in traditional document verification methods. The automation of certificate and document generation streamline process, reducing the need for manual inventions and enhancing efficiency. Immutable ledger creation is one of the key benefits of blockchain technology. This behavior helps us to achieve the system in which all process is transparent and uncharged. The integration of addition hashing algorithm adds an extra layer of security.

VIII. REFERENCES

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