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Academic Certificate Verification Using Blockchain

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ABSTRACT: The issue of document forgery is a growing concern, particularly with the rise of fraudulent reproduction of certificates in recent years. This problem can have significant effects on industries, especially the IT sector which hires a large number of people. Depending on the type of hire, different procedures are in place for background verification. Permanent hires are typically the responsibility of the client to verify, while temporary staff undergoes stringent verification through associates. However, these verification processes can be time-consuming and often involve third-party verification.

To address this issue, this paper proposes the development of a DApp on a decentralized network supported by a blockchain distributed ledger. By using blockchain, the DApp can process data through distributed networks and execute transactions, allowing for more efficient verification processes. Academic certificate verification is a routine process for employers when offering employment, but verifying the originality of certificates can take significant time. To streamline this process, blockchain provides a verifiable distributed ledger with cryptographic mechanisms to prevent academic certificate counterfeiting. It also offers a common sharing platform for storing and accessing documents, which can help reduce the overall time for verification.

KEYWORDS: Blockchain, certificate verification, web 3.0, smart contracts, QR code.

I. INTRODUCTION

The forgery of documents is a growing problem that demands the utmost attention. The fraudulent reproduction of certificates has increased significantly in recent years, leading to the misrepresentation of facts and affecting the industry, especially the IT sector which recruits people in large numbers. Depending on whether the hiring is permanent or contractual, there are various procedures for background verification. For permanent hires, the client undertakes the responsibility of background checks, whereas, in the case of temporary staff, companies conduct stringent verification through associates. This process is time-consuming and often involves third-party verification.

To address this problem, this paper proposes a DApp built on a decentralized network that is supported by a blockchain distributed ledger. The use of blockchain enables the DApp to process data through distributed networks and execute transactions, with the added benefits of security, immutability, and transparency. Smart contracts, which are self-executing agreements with the terms of the agreement directly written into code, can also be utilized within the blockchain to automate various verification processes, such as academic certificate verification. This could potentially speed up the hiring process and reduce the overall time for verification.

Academic certificate verification is a routine process for employers when offering employment, but verifying the originality of certificates can take significant time. To streamline this process, blockchain provides a verifiable distributed ledger with cryptographic mechanisms to prevent academic certificate counterfeiting. By utilizing smart contracts within the blockchain, employers can automate the verification process and authenticate certificates without the need for third-party verification. This can reduce the overall time for verification and increase the efficiency of the hiring process.

II. RELATED WORK

During reasearch, we were able to find some of the works done which were related to our field. Following are some of the findings:

In [2], The system under consideration involves certificates being signed by a Certificate Authority (CA), with the status of revoked certificates being made public by the issuing CA. Public logs are used to monitor the

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operations of the CAs. However, it has been observed that while this system provides a sense of trust, the validation of certificates can be delayed, and there may be a false sense of security.

In [3], The proposed system involves the extraction of text data from certificates during the verification process, followed by hashing of the extracted data. The resulting hash value is then compared with the existing blocks in the Ethereum network consortium, and the search results are displayed accordingly. An IoT-based camera is utilized in this project, with red and green lights serving as indicators. The red light indicates that OCR extraction has failed to locate the hash (indicating a forged certificate), while the green light indicates that the OCR has successfully identified the hash (confirming the certificate's authenticity).

In [4], In a paper published in 2020, it was suggested that the hash number generated during the creation of a block can be used as a unique identifier for corresponding original document. The verifier can use this hash key to retrieve the original document from the Blockchain.

In [5], The proposed system involves storing certificate data on a secure and permissioned network, allowing students to request their certificates and employers to verify them using the corresponding hash. To enhance the security of this peer-to-peer model.

In [6], The Smart Certainty system has been developed to ensure thecredibilityof educational credentials on a blockchain and to prevent the problem of fake certificates. This system uses cryptographic signatures of academic certificates to provide transparency in the case of recruitment. Students can share the hash with potential employers to verify the certificate. However, in the case of a hash or digitally signed certificate, it can be difficult for a legitimate user to gain access as the computer accessing this information can be attacked by an unauthorized person. Furthermore, cryptography does not guarantee data security, and therefore, basic security measures must be implemented to protect against threats. Additionally, cryptographically secured certificates in Smart Certainty do not allow the certificates to be easily faked.

III. EXISTING SYSTEM

The existing system lacks a digitalized way to verify certificates. Although some universities store certificates in digital form, they are still on a centralized network, which increases the chances of tampering with certificates. This may increase the cases of fraud since there is no means of security and integrity of the data in both manual and digital forms. The main reasons behind this problem are the lack of a timestamp facility and the method of storing data at central storage. Employers often verify students' credentials using third-party verification, which is both time-consuming and expensive.

IV. PROPOSED SYSTEM

In this proposed system, we provide a platform to store and verify student credentials using blockchain technology. The addition of a QR code feature allows organizations to scan the QR code to view the student's details easily.

The modules of the system are college, student, and company. The main features of the project are enrolling the student and uploading the certificate onto the blockchain, both of which are done by college authorities. When a student registers, the admin can check the details and accept or reject the request of the student.

Students can also apply or send a request to a company, which can then access their details, which have been verified by the admin. Students can view their certificates by logging into their accounts. Companies can view the certificates by scanning the QR code or logging into their account.

In conclusion, this paper proposes a DApp built on a decentralized network that offers a secure and efficient way to verify student credentials using blockchain technology. The addition of the QR code feature allows organizations to access the student's details easily, improving the efficiency and security of the verification process.

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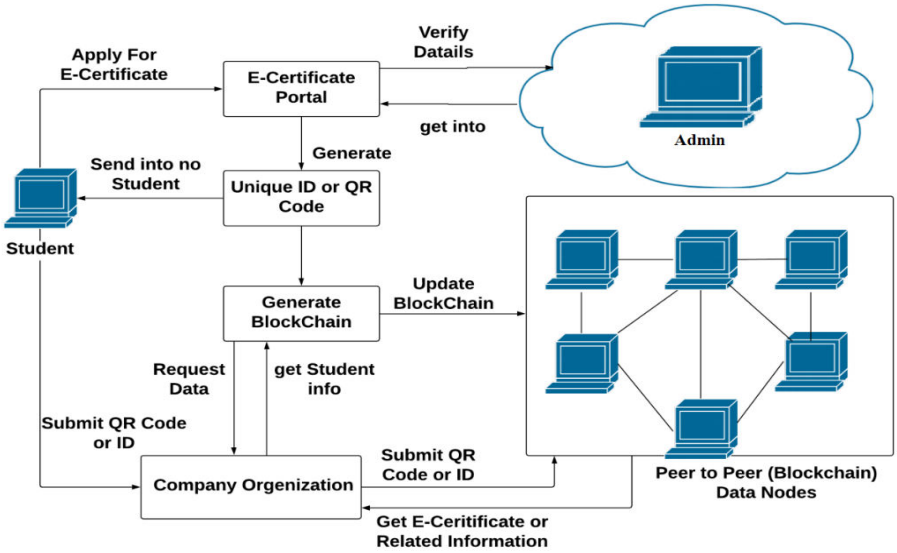
V. SYSTEM ARCHITECTURE



VI. CONCLUSIONS

In this, we have developed a system to automate the process of document verification using smart contracts and blockchain technology. By decentralizing the verification process, we have significantly reduced the time it takes to verify a certificate, which traditionally can takehours to multiple days.

Our proposed approach has proven successful in accelerating the document verification process, while also eliminating the need for both entities (company and institute) to be involved in the verification process. Furthermore, our approach maintains simplicity, minimalism, and cost-effectiveness without compromising scalability and latency. Overall, we have demonstrated the potential for blockchain technology to transform traditional systems using centralized architecture in decentralized applications, and we believe this approach could have far-reaching implications for a wide range of industries.

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