Decentralized Secure Student Achievements Platform using Blockchain

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Abstract: *In an increasingly digital world, managing, verifying, and sharing student achievements is critical for academic institutions, employers, and students themselves. Traditional methods of managing student portfolios, such as paper certificates or centralized databases, are prone to issues like forgery, loss, and inefficiency. This project proposes a blockchain-based solution for managing student achievement portfolios that enhances security, transparency, and verifiability.*

Certificates play a crucial role in validating an individual's skills and knowledge, especially in academic and professional settings. However, the credibility of certificates in a college environment is often undermined by issues such as counterfeiting, misuse, and improper storage. To address these challenges, a blockchain-based document verification system can be implemented. Blockchain's immutability ensures the authenticity and integrity of certificates, making it an ideal solution for secure verification and issuance. Additionally, the system will allow students to register for extracurricular activities such as upcoming events, exhibitions, seminars, hakethon, and competitions, and automatically generate certificates upon completion.

This enhances both student engagement and the credibility of certifications, providing a robust and secure platform for managing and verifying academic and extracurricular achievements.

Keywords: Blockchain, verification, issuance, digital certificate, extracurricular activities, events, student registration

I. INTRODUCTION

Today's competitive academic and professional landscape, certificates serve as vital credentials that validate an individual's skills, knowledge, and achievements. They play a crucial role in enhancing employability, facilitating further education, and providing a sense of accomplishment. However, the integrity of these certificates is frequently compromised by issues such as counterfeiting, improper storage, and misuse, leading to skepticism regarding their authenticity. Traditional methods of certificate issuance and verification are often inefficient, cumbersome, and vulnerable to fraud, which can have far-reaching consequences for both individuals and institutions.

To address these challenges, innovative solutions are needed that can enhance the credibility and security of the certification process. A blockchain-based document verification system offers a transformative approach to tackling these issues by leveraging the immutable and transparent nature of blockchain technology. This system not only ensures the authenticity and integrity of certificates but also provides a centralized platform where students can securely store and verify their credentials. Additionally, it allows for seamless registration of extracurricular activities, automatically generating certificates upon completion, thereby enriching student engagement and recognition of achievements.

By implementing such a system, educational institutions can streamline the certification process, reduce the risk of forgery, and foster a more trustworthy environment for students and employers alike. This introduction sets the stage for a comprehensive exploration of a blockchain-based document verification system designed to revolutionize the management and validation of academic and extracurricular achievements.

II. EXISTING SYSTEM

The current process for issuing certificates is manual and inefficient, often leading to errors and extended completion times. The absence of digitized versions complicates the verification of certificate authenticity, as the process requires

ongoing communication with the issuing authority. This creates opportunities for manipulation, undermining the credibility of certificates at the college level. The traditional system lacks the necessary security and reliability, posing challenges for both issuers and recipients. Furthermore, physical certificates are difficult to manage, as they are prone to loss or damage. Overall, the existing certificate issuance and verification system has substantial limitations, failing to provide the level of security, efficiency, and reliability required.

III. LITERATURE SURVEY

In the paper titled "Blockchain Based Framework for Document Verification,"Latha S. S., Priya N., Anusha Shetter in 2022 [1] the authors focus on developing a secure and efficient framework for document verification utilizing blockchain technology. The framework employs smart contracts to automate and streamline the verification process, enhancing both security and reliability. This approach aims to eliminate the need for intermediaries and reduce the risk of document fraud, while also providing a traceable, immutable record of document verification actions on the blockchain.

The paper "Doc-Chain: A University Document Verification Blockchain" R. Shinde, S. Chorghe, K. Dhanani, A. Salunke in 2022 explores a blockchain-based solution specifically tailored for university document verification. The authors propose using blockchain to secure and manage academic records, ensuring authenticity and enabling real-time verification of certificates and transcripts. The "Doc-Chain" system aims to address common challenges in academic document verification, such as forgery and delays, by providing a transparent, decentralized platform that verifies university records without the need for a centralized authority.[2]

In the paper titled "Blockchain Based Sensitive Document Storage to Mitigate Corruptions," J. Mahlabe, A. K. Mishra, D. Puthal, P. K. Sharma [3] the authors propose a blockchain based system designed to securely store sensitive documents. This system emphasizes the prevention of data tampering and corruption through blockchain's inherent immutability.

IV. OBJECTIVES

1. To automate the issuance of digital certificates for academic and extracurricular achievements, ensuring efficiency and accuracy.
2. To ensure the authenticity and prevent forgery of certificates by securely storing them on a blockchain ledger.
3. To provide a decentralized and instant verification system for certificates, accessible to employers, institutions, and other stakeholders.
4. To create a user-friendly interface for students to securely manage, store, and access their certificates for various applications.
5. To facilitate the registration and management of extracurricular activities and automate the issuance of participation certificates
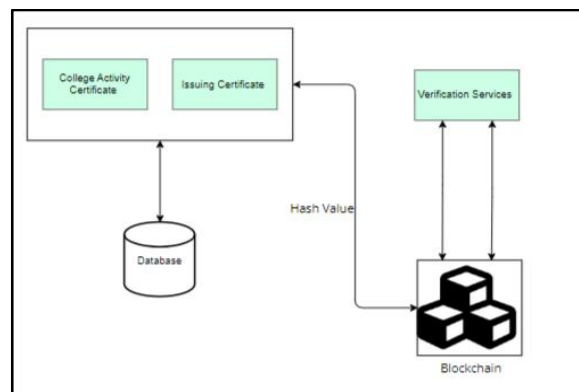
V. SYSTEM ARCHITECTURE

Fig.1 System architecture

Functional Requirements

1. Allow administrators to verify student achievements.
2. Allow students to submit achievements for verification.
3. Notify users upon verification or update of portfolio records.
4. Enable secure login with OTP verification.
5. View and manage blockchain records in the achievement portfolio.

Non-Functional Requirements

1. Ensure data transparency and user accountability.
2. Provide robust data security and prevent unauthorized access.
3. Guarantee system scalability to accommodate increasing data.
4. Maintain high availability of services with minimal downtime.

VI. CONCLUSION

In conclusion, a blockchain-based document verification system offers a robust solution to the challenges of counterfeiting, misuse, and improper storage of certificates in academic settings. By leveraging the immutability of blockchain, this system ensures the authenticity and integrity of certificates, making them more secure and credible. With a user-friendly interface, students can not only store and verify their certificates but also register for extracurricular activities, automatically receiving certificates upon completion. This system enhances both the management of academic credentials and student engagement, providing a comprehensive and secure platform for verifying academic and extracurricular achievements. Ultimately, this approach modernizes the certificate issuance process, promoting trust and efficiency in credential verification.

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