

Document Verification Based on Blockchain Technology – EduSecure

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Abstract- Based on statistics provided by the Indian Ministry of Education, it is evident that approximately one million graduates enter the job market or pursue higher education each year. Some individuals will pursue further education at high schools or university institutions, while others will be equipped to seek employment opportunities. Students who possess performance records, grade transcripts, and diplomas will play a pivotal role in securing admission to new institutions or employment opportunities upon completing their studies. Schools include only the names of students and schools when creating various prizes or diplomas. People often notice when graduation certificates are faked because there is no good way to prevent it. We recommend using a digital document system based on blockchain to stop fake documents. In this system, issuing digital documents is done in the manner listed below. Create an electronic version of a paper document and add it to the database, along with any relevant data. Meanwhile, it is necessary to determine the hash value of the electronic file. This hash value must then be appended to the block within the chain system. To link the digital document to the paper one, the system will create a QR code and a special code you can scan. It will enable the demand unit to check the validity of the paper document using website searches or mobile phone scanning. This technology does not just make paper documents more real; it also makes it less likely you will lose them because of how blockchain works.

Keywords: Blockchain, Information Retrieval, Cloud-Based Data Protection, Virtual Key Generation.

I. INTRODUCTION

In today's fast-paced and interconnected world, the need for secure and efficient document verification processes has become paramount. Educational institutions, businesses, and organizations frequently require a reliable means of verifying the credentials and information of individuals, such as present pupils. However, the traditional centralized methods of document verification are susceptible to a myriad of network attacks, including SQL injection, collusion, and brute force attempts, which can compromise the security and integrity of the verification process.

To address these challenges, there is a growing interest in exploring decentralized solutions, particularly leveraging blockchain technology. Blockchain, known for its robust security features and tamper-proof nature, has emerged as a promising approach to enhance document verification.

This study focuses on the development of a system designed to create dynamic, secure electronic documents using the power of smart contracts within a blockchain environment. The blockchain technology used in this context not only enhances security but also introduces transparency and immutability to the document verification process. Additionally, this work explores the creation of an open-source blockchain with a unique mining method and smart contract implementation.

The aim of this research is to demonstrate the practicality and efficiency of this innovative approach in document verification, as well as to assess system performance through consensus algorithms. By implementing a decentralized blockchain-based system for document verification, we strive to offer a more secure and reliable means of verifying information, ultimately contributing to the enhancement of data security in a networked world.

II. LITERATURE SURVEY

Garima Sethia et al [1] the author describes use of blockchain technology, specifically Hyperledger Fabric, to address the problem of certificate tampering and fake academic certificates. The proposed system would maintain a tamper-proof and transparent database of academic certificates awarded by a university. These certificates are recorded as transactions on the Hyperledger Fabric, and other organizations within the network can use this information to verify the authenticity of certificates provided by students. The system aims to enhance trust and security by providing end-to-end encryption for certificate sharing and verification.

A. Gayathiri al [2] the author is focused on digitizing and securing educational certificates using blockchain technology. In this digital world, SSLC, HSC, and academic certificates are transformed into digital format and stored on a blockchain. The process involves generating hash codes for certificate validation. This initiative aims to make certificate management easier for students and streamline the verification process for educational institutions, enhancing the security and efficiency of digital certificate validation.

Pavitra Haveri al [3] the author discusses the application of blockchain technology, specifically using the Ethereum framework, to address the issue of document forgery in the context of student data. It highlights the limitations of traditional document issuance methods and proposes the use of a multi-node private blockchain network combined with off-chain storage using the Interplanetary File System (IPFS) to enhance document security. The paper also assesses the performance of the Ethereum blockchain under various conditions, including difficulty level, network size, and consensus algorithms.

Padmavati E al [4] the author discusses the issues associated with counterfeiting certificates and introduces a solution using blockchain technology. The platform leverages blockchain to create a decentralized system for storing certificates in blocks and generating unique hashes for students. This ensures the certificates cannot be tampered with or altered, enhancing trust in employee qualifications. The paper provides an overview of the platform and its functions.

Avni Rustemi al [5] the author describes in recent years, there has been significant progress in the application of blockchain technology to the education sector. This technology has the potential to transform learning methods, certificate issuance, and verification processes. While there is growing interest in this area, research on blockchain's adoption in academic credential verification is still in its early stages. This paper presents a systematic literature review, summarizing 34 relevant studies out of 1744 published between 2018 and 2022. The review identifies six major research themes and highlights research gaps. It concludes with recommendations for future research and practical applications to benefit researchers, policymakers, and practitioners in the field of blockchain-based education systems.

Devdoot Maji al [6] the author describes in the context of Indian higher education, where millions of students generate various certificates, the manual tracking and validation of these documents can be burdensome and prone to forgery. To address this issue and enhance data security, a Blockchain-based system is proposed. The system involves a Certificate issuer creating certificates, which are then validated by an internal panel before being delivered to the student. Each certificate is assigned a unique hash key for easy validation by any organization via a portal. This approach ensures confidentiality, reliability, and availability of educational documents, reducing the risk of loss or damage and simplifying the validation process.

Yogita Dharmik al [7] the author describes that the proposed work aims to address the growing concern of document forgery in the digital age. With most documents now being in digital formats, it has become easier for individuals to edit and manipulate them, posing a threat to the authenticity of important information. To combat this issue, the authors suggest using Blockchain technology, known for its data integrity preservation through cryptographic hash algorithms. They propose a method that deploys Blockchain at the document's creation point, with a unique QR code assigned to each document. Even if the QR codes are compromised, the server-side system can detect any alterations in the documents, making it difficult for cybercriminals to manipulate them. This solution combines smartphone-based preliminary forgery detection with server-side verification to enhance document security.

Latha S S al [8] the author describes that the proposed system suggests leveraging blockchain technology, specifically the Ropsten Ethereum Network, to create a decentralized and secure document verification platform. This system aims to address the increasing challenge of document verification, benefiting governments, organizations, employers, and individuals. Through a network of "Nodes" or "Blocks," documents are added to the blockchain, and complex calculations generate unique hashes for each document, ensuring their immutability and authenticity. This system offers a simple and reliable way to verify various types of records, including birth certificates, academic credentials, and attendance records, while ensuring the documents remain unaltered since their creation.

Jashuva Peyyala [9] the author discusses the application is a document verification model designed to address issues related to the duplication of educational certificates and organizational documents. Its primary goal is to enhance the security, efficiency, and cost-effectiveness of the document verification process. The model achieves these objectives by implementing blockchain technology, known for its security and transparency, as the underlying infrastructure. Additionally, it utilizes the Inter Planetary File System (IPFS) to store documents in a decentralized manner, enhancing security and privacy. Unlike centralized systems, this model ensures that users maintain ownership and control over their data. In summary, Secure Doc Verifier combines blockchain and IPFS to create a secure, transparent, and decentralized solution for document verification while mitigating issues related to data duplication, time consumption, and third-party verification services.

P. Visalakshi [10] the author discusses in our country, a centralized financial system requires customers to repeatedly undergo document verification as part of the Know Your Customer (KYC) process for various institutions and transactions, leading to increased costs and the involvement of middlemen. To address these issues, your solution advocates for a one-time document verification using blockchain technology. This innovative approach aims to create a distributed and secure environment, offering user transparency and eliminating external interference in accessing and sharing

KYC information for various purposes across different institutions.

III. METHODOLOGY

System Modules:

1. Administration (Educational Institutions: Schools, Colleges, and Universities):

This module is responsible for the administrative functions within educational institutions such as schools, colleges, and universities. It likely involves managing and overseeing the verification and issuance of academic documents to students.

2. Learner:

The student module is designed for individuals seeking to verify and share their academic documents. Students can use the system to obtain a unique instrument ID or QR code, which represents their verified academic records.

3. Organization:

This module caters to organizations or companies that need to verify the academic credentials of individuals, such as job applicants or prospective students. They can submit the provided QR code or instrument ID to the system for document verification.

Our system uses a special blockchain setup to create documents in a new and creative way. The web gateway serves as a trusted third-party entity responsible for verifying documents from universities, academies, and various institutions. Once the verification process is successfully completed by the university, academy, or other relevant entities, the data is securely stored within the blockchain, simultaneously generating a unique instrument ID or QR code. This unique identifier is then provided to the user.[7] People, like students, can choose to show a QR code or an instrument ID instead of giving real paper documents when organizations ask for them. Company can show the QR code or unique ID to our portal, allowing them to access and verify documents associated with individual pupils.[7] This entire process is executed within the blockchain framework, with the assistance of smart contracts that we have specifically designed and implemented.

IV. PROPOSED SYSTEM

Checking the authenticity of educational documents can be a tedious also taking more time than usual process in the society.[6] However, it is quite straightforward that create digital records of your academic achievements, simplifying the entire verification procedure. The proposed approach involves generating QR codes that can change or update and individualized papers for every student. The information integrity is safeguarded through secure storage on a blockchain, which significantly enhances security. Thanks to

the utilization of smart contracts, the entire blockchain can be kept up-to-date.[7] This research suggests the establishment of a one of a kind blockchain on a platform that is available for anyone to use.

- Creating a Unique Blockchain:

We employ a dynamic algorithm for generating a unique code for certificates. This algorithm accommodates input of various sizes and consistently produces fixed-size outputs. To initiate the verification process, the same initial parameters and conditions are employed to yield identical results. Once the certificate is uploaded, a distinctive code is generated for it. Chaotic code functions, in contrast to SHA-1, offer robust resistance to collision.[2]

- Blockchain-Based Validation of Digital Certificates:

This process validates digital certificates that are stored on the blockchain by comparing their unique codes. Ensuring the authenticity of the certificate's code helps prevent any unauthorized alterations. Employers or verifiers can access the system using their credentials, select the certificate type they wish to authenticate, and click the "Validate" button. In the case of an original certificate, the result will indicate " Certification confirmed" and " Achievement" However, if the documents are the fake or has been tampered with, an error message will be displayed. I have attempted to preserve the essence of the original paragraph while using different wording and phrases. Additionally, I have simplified the technical jargon to make the content more understandable for a broader audience.[2]

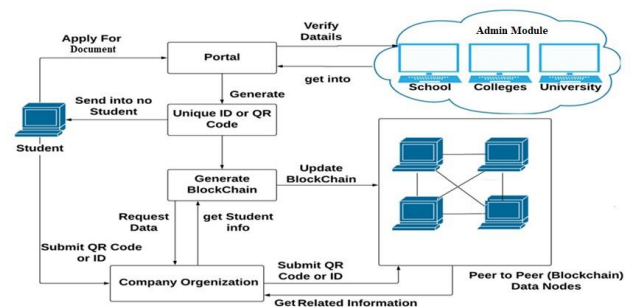


Figure 1: System Architecture

- The proposed system introduces an innovative approach to dynamic document generation using a custom blockchain.
- The process begins when a student applies for document verification through a web portal, where they upload all their educational documents.
- To ensure the authenticity of these documents, a web gate serves as a trusted third party, responsible for validating the documents with educational institutions such as universities, academies, and other relevant entities.

- Once the validation process is successfully completed by these educational institutions, the verified data is securely stored on the blockchain. Simultaneously, a unique document ID or QR code is generated and provided to the student.
- This QR code or document ID serves as a digital representation of the verified documents, which can be submitted to organizations in lieu of hard copy.
- When organizations need to verify the authenticity of a student's documents, they can simply input the QR code or document ID into the portal.
- The system then pools the document verification process for the respective student and conducts the validation, making the entire process transparent and efficient.

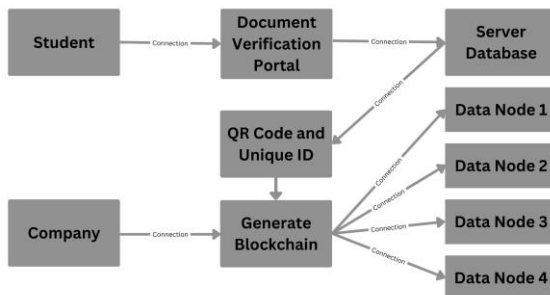


Figure 2: Deployment Diagram

V. RESULTS

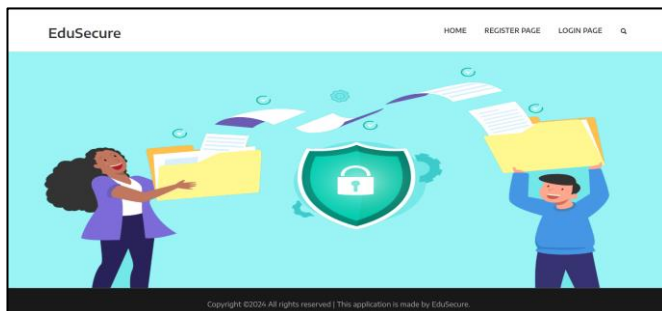


Figure 3: Home Page



Figure 4: Upload Details(User)

EduSecure							
				Home	Data Show	Student Data Show	Loginout
View Information							
Email ID	10th (%)	SeatNo (10th)	12th/Diploma (%)	SeatNo (12th/Diploma)	BE (%)	SeatNo (BE)	Action
shiv@gmail.com	90.60%	C123098	92.17%	A769823	83%	L971219	Accept Reject View

Figure 5: Student Data Action (Admin)

EduSecure							
				Home	Data Show	Student Data Show	Loginout
View Information							
Email ID	10th (%)	SeatNo (10th)	12th/Diploma (%)	SeatNo (12th/Diploma)	BE (%)	SeatNo (BE)	Action
om@gmail.com	78%	A1234567891	80%	A1234567890	90%	A1234567890	Accept
jitu@gmail.com	78%	A1234567891	50%	A1234567890	90%	A1234567890	Accept
deepak@gmail.com	78%	A1234567891	50%	A1234567890	90%	A1234567890	Accept
dinesh@gmail.com	78%	A1234567891	80%	A1234567890	90%	A1234567890	Accept
shiv@gmail.com	90.60%	C123098	92.17%	A769823	83%	L971219	Reject

Figure 6: Student Data Status (Admin)

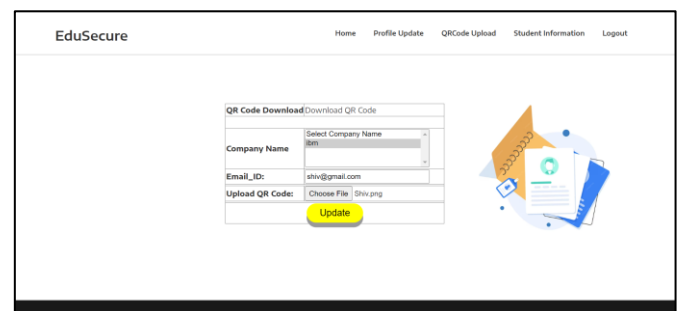


Figure 7: Download and Upload QR (User)

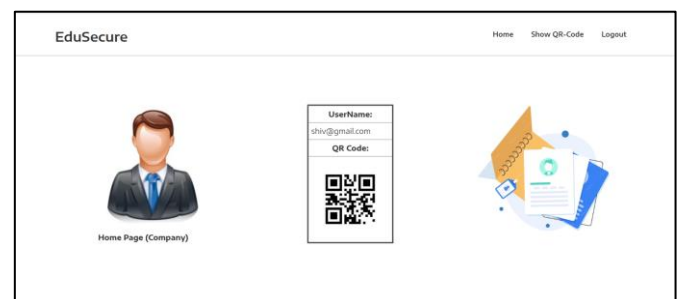
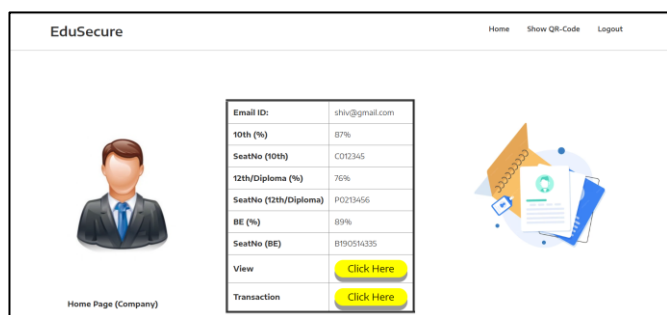


Figure 8: Student QR (Company)



The screenshot shows a web application interface for 'EduSecure'. On the left, there is a profile picture of a man in a suit. To the right of the profile picture is a table containing student details. Below the table are two buttons labeled 'Click Here'.

Email ID:	shiv@gmail.com
10th (%)	87%
SeatNo (10th)	C012345
12th/Diploma (%)	76%
SeatNo (12th/Diploma)	P0219456
BE (%)	89%
SeatNo (BE)	B190514335
View	Click Here
Transaction	Click Here

Figure 9: Student Details (Company)

VI. CONCLUSION

The Document Verification Process Transaction industry presents various challenges and complexities, including data sharing and communication difficulties. Blockchain technology has the potential to revolutionize this sector, offering improved security and confidentiality. However, extensive research is essential to determine the most effective applications of blockchain while ensuring the integrity of document verification processes. This research should encompass not only the development of decentralized applications but also the evaluation of performance and cost-effectiveness in comparison to existing systems. Such efforts will be crucial in informing software development and driving innovation in the Document Verification Process Transaction field.

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