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Blockchain Based Document Verification System

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ABSTRACT: In today's digital world, fake academic certificates and documents have become a serious problem during job recruitment and admissions. Many organizations find it difficult to verify whether the submitted certificates are real or fake. The traditional verification process is manual, slow, and not fully secure. It also requires contacting colleges or universities directly, which takes time and effort. Because of this, there is a need for a secure and automatic system that can verify documents quickly and accurately. This project proposes a Blockchain-Based Document Verification System developed as a web-based application using Java. The system uses custom blockchain technology to securely store certificate details in blocks. Each block contains document information and is connected with previous blocks using cryptographic hash values. Once the certificate data is stored in the blockchain, it cannot be changed or deleted, which ensures data security and trust. Educational institutions can upload and verify certificates, and recruiters can easily check whether a certificate is valid or fake using the system. The proposed system improves security, transparency, and reliability in document verification. It reduces manual work, prevents certificate fraud, and provides faster verification results. This system helps students, educational institutions, and recruiters by providing a trusted platform for certificate verification using blockchain technology.

KEYWORDS: Blockchain, Document Verification, Certificate Verification, Java Web Application, Blockchain Security, Academic Certificates, Fraud Detection, Cryptography, Digital Verification System, Web-Based System, etc.

I. INTRODUCTION

In today's digital era, academic certificates are widely used for job recruitment, higher education, and professional verification. However, the increasing number of fake and modified certificates has created serious challenges for organizations and institutions. Traditional certificate verification methods are mostly manual, time-consuming, and less secure, as they require direct communication with universities or colleges. To overcome these issues, this project presents a Blockchain-Based Document Verification System developed using Java as a web-based application. Blockchain technology provides a secure, decentralized, and tamper-proof platform for storing certificate data. Once the information is stored on the blockchain, it cannot be altered or deleted, ensuring data integrity and transparency. Educational institutions can upload and manage certificate records securely, while recruiters and organizations can verify documents quickly and accurately. The system helps reduce fraud, improve security, and make the verification process more efficient and reliable.

II. LITERATURE REVIEW

In recent years, blockchain-based systems such as Blockcerts and Hyperledger Fabric have been widely used for secure and transparent document verification. These systems use cryptographic hashing and smart contracts to ensure tamper-proof storage and automated verification of digital documents. Technologies like SHA-256 generate unique document hashes that help detect any modification in the uploaded files.

However, existing systems often face challenges such as high implementation complexity, scalability issues, transaction cost, and lack of user-friendly interfaces. Many solutions are difficult for smaller institutions and non-technical users to adopt. To overcome these limitations, the proposed blockchain-based document verification system provides a lightweight, web-based, and easy-to-use solution. The system combines admin verification, blockchain storage, and QR code-based authentication to ensure secure, fast, and reliable document verification while maintaining data integrity and transparency.



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Ref. No.	Title of Paper	Methodology Used	Outcomes	Future Scope
1	Blockchain Based Certificate Verification System	Blockchain-based certificate revocation and verification using Bloom Filters and X509 certificate extension	Improved certificate verification security, reduced verification time, and decentralized revocation management	Enhance scalability and reduce false positive rates in Bloom Filters
2	Immutable Ubiquitous Digital Certificate Authentication Using Blockchain Protocol	Blockchain protocol for digital certificate authentication	Secure and tamper-proof digital certificate verification	Integration with large-scale educational and enterprise systems
3	Academic Certificate Fraud Detection System Framework Using Blockchain Technology	SHA-256 hashing with blockchain-based certificate storage	Detection of fake and modified academic certificates	Multi-institution verification support
4	Blockchain For Education Purpose: Essential Topology	Blockchain architecture for educational data management	Transparent and decentralized academic record management	Cloud and AI integration for smart education systems
5	Utilization of Blockchain Technology for Management E-Certificate Open Journal System	Blockchain implementation for e-certificate validation	Secure digital certificate issuance and verification	Real-time verification and automation
6	Security Level Significance in DApps Blockchain-Based Document Authentication	Decentralized application (DApp) based document authentication	Enhanced document security and immutability	Improved user accessibility and lower transaction cost
7	Utilization of Blockchain Technology Revolution in Electronic ID Card Data Integrity	Blockchain for secure identity data storage	Increased integrity and transparency of digital identity records	National-level secure identity systems
8	Blockchain-Based Educational Record Management	Decentralized blockchain storage for academic records	Secure and transparent student record management	Integration with university ERP systems
9	Smart Contract Enabled Document Verification	Ethereum smart contracts for automated verification	Reduced manual verification and faster processing	Low-cost and scalable blockchain deployment
10	QR Code Integrated Certificate Verification System	QR code generation with blockchain hash validation	Quick and easy certificate authentication	Mobile-based verification and enhanced accessibility

III. METHODOLOGY OF PROPOSED SURVEY

The methodology explains how the Blockchain-Based Document Verification System is designed and implemented step by step. In this project, we develop a web-based application using Java and custom blockchain technology to securely store and verify academic certificates. First, the system provides login access to different users such as Admin (Institution), Student, and Recruiter. The Admin manages the overall system, upload and issue certificates, Students upload their certificates, and Recruiters verify certificates. This ensures proper user management and security. Next, when an institution uploads a student certificate, the system creates a block that contains certificate details such as student name, certificate ID, institution name, and a unique hash value. This block is added to the blockchain. Each block is



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connected with the previous block using hash values, which makes the chain secure and prevents data modification. When a student uploads a certificate for verification, the system compares the certificate details with the blockchain records. If the details match with the stored block, the certificate is verified as genuine. If the details do not match, the certificate is marked as fake or invalid. This process ensures accurate and fast verification. The system uses cryptographic hashing to protect data and ensure that no one can change the certificate information once it is stored in the blockchain. This makes the system secure, transparent, and reliable. The methodology of this project is divided into several steps:

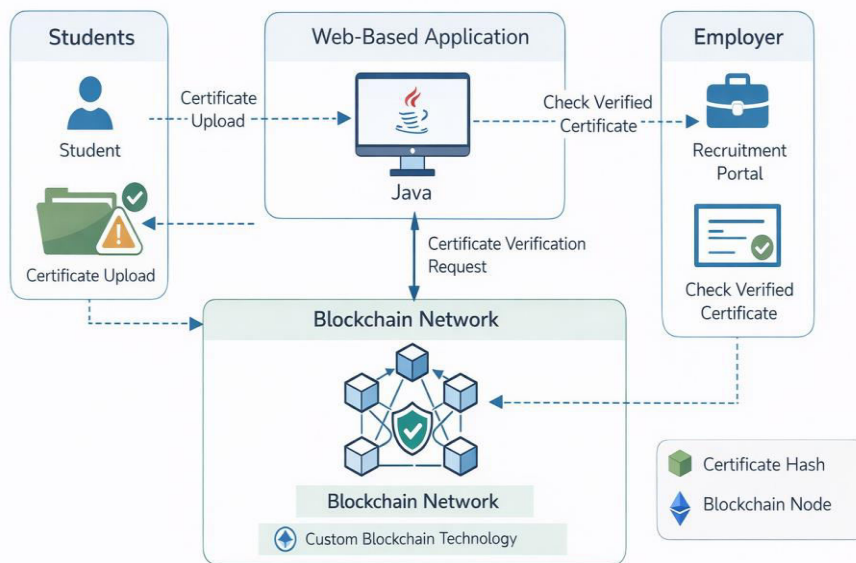


Fig 1: Proposed Methodology of Blockchain Based Document Verification System

Requirement Analysis

In this step, the system requirements are identified. The main goal is to create a secure system that can verify academic certificates using blockchain. Different users such as Admin (Institution), Student, and Recruiter are identified. Their roles and functions are defined clearly.

System Design

In this step, the overall system architecture is designed. The web-based interface, database structure, blockchain structure, and user modules are planned. The blockchain structure includes blocks, hash values, and block linking. UML diagrams and system flow diagrams are also designed.

Blockchain Creation

In this step, a custom blockchain is created using Java. Each block contains certificate details, timestamp, previous hash, and current hash. The hash value is generated using cryptographic algorithms like SHA-256. Each block is connected with the previous block to maintain security.

Certificate Upload and Block Creation

When an institution uploads a certificate, the system converts the certificate data into a block. This block contains: Student details, Certificate ID, Institution details, Timestamp, Hash value. The block is then added to the blockchain.

Certificate Verification Process

When a recruiter uploads or checks a certificate, the the blockchain. The system compares the certificate details with stored blockchain records. If a match is found, the certificate is marked as valid. Otherwise, it is marked as fake or invalid.



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Web Application Development

The front-end and back-end of the system are developed using Java technologies such as JSP, Servlet, and MySQL. The system provides login, upload, and verification features.

Testing and Validation

The system is tested using different certificate data. Both valid and fake certificates are tested. The system successfully identifies valid and fake certificates.

IV. CONCLUSION AND FUTURE WORK

The proposed Blockchain-Based Document Verification System provides a secure, transparent, and efficient platform for verifying academic certificates using blockchain technology and SHA-256 hashing. The system successfully reduces document fraud, minimizes manual verification effort, and enables fast verification through QR code authentication. It ensures data integrity, reliability, and improved trust among institutions, students, and recruiters.

In the future, the system can be enhanced by integrating it with universities, government databases, and job portals for real-time verification. Mobile application support, cloud storage, advanced encryption techniques, and Artificial Intelligence-based fraud detection can also be added to improve scalability, accessibility, and overall system security.

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