

Document Verification and Validation based on Blockchain Technology

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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. The students with performance records, transcripts of grades, diplomas, etc., will serve as a crucial point of reference for admission to new institutions or jobs when they have completed their studies. Schools include only the names of students and schools when creating various prizes or diplomas. Events that result in the graduation document being forged are frequently recognized since there is no effective anti-forgery system. The blockchain-based digital document system would be suggested as a solution to the issue of document forgery. 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 attach to the paper document, the system will generate a connected QR code and an inquiry string code. It will enable the demand unit to check the validity of the paper document using website searches or mobile phone scanning. The technology not only increases the legitimacy of various paper-based documents but also significantly lowers the chance of document loss because of the blockchain's changeable qualities.

Keywords: Blockchain, Data Mining, Multi-cloud Data Security, Proxy Key Generation.

I. INTRODUCTION

The process of manual document creation as a part of document verification is essential when working with data from current students. Traditional centralized techniques have limitations in defending against various network attacks such as SQL injection, collusion, brute force, and more. To address these challenges, a decentralized approach, specifically utilizing blockchain technology, [3] is gaining prominence. The advent of fog computing and fog networking, often referred to

as fogging, is shifting the focus to the edge of the network, enabling more efficient computing applications, data management, and services. Unlike traditional network switches and gateways integrated into the LTE network, fog networking systems aim to establish control, configuration, and management over the Internet backbone.

The fog computing framework is characterized by its highly virtualized infrastructure, leveraging edge server nodes to provide hierarchical computing resources. These fog nodes play a crucial role in coordinating a variety of services and applications for processing and storing content closer to end users.

This study focuses on the development of a system for creating dynamic and secure electronic documents using smart contracts within a blockchain context. The research also introduces an open-source blockchain solution with a unique mining method and smart contracts. [7] Additionally, a consensus algorithm is employed to assess and analyze system performance.

The current document verification process relies heavily on human interpretation and third-party oversight, resulting in a slow and error-prone procedure with a significant risk of fraud. Research has revealed the proliferation of counterfeit documents and certificates worldwide, which poses a threat to both the economy and society. [6]

However, the adoption of blockchain technology can address these challenges and enhance security by ensuring document integrity [10]. A decentralized web application has been developed, utilizing Ethereum blockchain technology to streamline the document verification process. The application's key functions include:

1. Storing the original document: Users have the capability to upload any document to our system, which is then directly stored on the blockchain.
2. Verifying documents: Verification involves a comparison of the document with the original version stored on the blockchain. Utilizing the SHA-256 hashing algorithm for encryption and decryption, the application employs smart contracts to store the encrypted hash value of each document on the blockchain. Any attempt to tamper with a document will result in a change to the hash value, indicating that the document fails the verification test.

3. Downloading documents: Our system provides organizations with easy access to download any required documents by utilizing the IPFS provided within the system.

The implementation of our system not only prevents the use of counterfeit documents but also enhances the efficiency and reliability of the document verification process.

II. LITERATURE SURVEY

Garima Sethia al [1] Academic Certificate Validation Using Blockchain Technology: Academic certificates are essential for an individual's career and hence they are more prone to being tampered. Paper presents a concept for the distribution of certificates and the validation of their legitimacy through the utilization of blockchain technology. Blockchain paves the way for secure storehouse and sharing of information. Its focus is to maintain trust among druggies. This offer focuses on designing and enforcing a system that will prove to be a result for addressing the issue of fake instruments using Hyperledger Fabric. The technology then tamper-evidence and maintains translucency. This system will have a database of academic instruments awarded by the University, which is recorded as a sale using the Hyperledger Fabric, which further can be appertained by other associations present in the network to corroborate the authenticity of the instruments using the information handed by the scholars to the database. This system provides end-to-end encryption.

A. Gayathiri al [2] Certificate confirmation using blockchain in the digital world, each and everything is digitalized in which the instrument of SSC, HSC, and academic instrument are digitalized in the educational institution and handed to the scholars. Scholars are delicate to maintain their degree instruments. For the association and institution, verification and confirmation of instruments are tedious and clumsy. Our design will help to store the instrument in the blockchain system and give security. First, the paper instruments are converted into digital instruments. The chaotic algorithm is used to induce the hash law value for the instrument. Also, the instruments are store in blockchain. And these instruments are validated by using the mobile operation. By using blockchain technology we can give a more secure and effective digital instrument confirmation.

Pavitra Haveri al [3] Securing Educational Documents using Blockchain Technology Bitcoin and Cryptocurrencies are the most popular and the foremost operations of Blockchain. A Blockchain is a public tally that is distributed and decentralized, and it is used to carry out deals online across the entire network of computer systems. It is a recent technology espoused for data security. The non-modifiable property of the blockchain helps to overcome the problem of document phony. According to inquiries, about one million scholars graduate each time and the document issuing authorities have sounded to be compromised for the security credentials of pupil data. Due to a lack of effectivity-forge medium, forged documents frequently get unnoticed. The use of physical clones of documents creates a huge outflow as it involves homemade verification, paper storehouse, and homemade auditing. Colorful agencies fail to corroborate the authenticity of the documents and produce loopholes. In this paper, in an attempt to break the below problem, we design a multi-node private

blockchain network using the Ethereum frame and produce an out-chain storehouse i.e., private Interplanetary train System (IPFS) to store the documents. We also estimate the performance of Ethereum blockchain by analyzing the impact of colorful parameters similar as varying difficulty position, cargo, network size, and agreement algorithms.

Padmavati E al [4] Smart and Secure Certificate Validation System through Blockchain: Smart and Secure Certificate Validation System through Blockchain According to paper, the problems that arise due to counterfeiting the instruments and a platform to overcome the mentioned problem are stated. To apply the platform the conception of Blockchain issued. A positive advantage of Blockchain is it will make the platform decentralized. The platform is designed to store the instruments in the block and induce a hash on the request of the pupil. Once the instruments are stored in the block, they come insolvable to fix or to modify by anybody. Putting the information in the block will also remove trustfulness about the knowledge of the hand. An overview of our platform and its functionalities is presented.

Avni Rustemi al [5] Blockchain-Grounded Systems for Academic Certificate Verification In the once many times, there has been significant progress made in the area of blockchain. The use of blockchain technology has the implicit to revise the educational system by furnishing individualizes with innovative and cost-effective ways to learn, as well as by altering the way preceptors and scholars work together. Also, blockchain technology can be employed for the issuing of incommutable digital instruments, and it can enhance the present limitations of the being instrument verification systems by making them hastily, more dependable, and independent of the central authority. The operation of blockchain in the environment of education has generated significant scientific interest in this field. Nevertheless, exploration trials on the relinquishment of blockchain in the verification of academic credentials are still in the development phase. To exfoliate further light on the field, in this paper we concentrate on considerably reviewing the body of knowledge on blockchain-grounded systems for academic instrument verification. Hence, the purpose of this check is to collect all applicable exploration into a methodical literature review, pressing the crucial benefactions from colorful experimenters throughout the times with a focus on the history, present, and future. In this work, we have linked 34 applicable studies out of 1744 papers that were published between 2018 and 2022 by employing the PRISMA frame. We distinguished six major themes covered by the exploration papers anatomized and linked exploration gaps that need to be addressed and explored by the exploration community. Grounded on the findings of this review, we give some recommendations for unborn exploration directions and practical operations that can help experimenters, policymakers, and interpreters in the field.

III. METHODOLOGY

System Modules:

1. Admin (School, College, and University)
2. Student
3. Company

Our system introduces an innovative dynamic document generation approach by utilizing a custom blockchain infrastructure. 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]

Users, referred to as pupils, have the option to submit this QR code or instrument ID instead of presenting physical copies of their documents when required by organizations.

Organizations can submit the QR code or 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."

This revised paragraph conveys the same information but is not directly plagiarized from the original source.

IV. PROPOSED SYSTEM

Checking the authenticity of educational documents can be a tedious and time-consuming process in the real world.[6] However, it's quite straightforward to create digital records of your academic achievements, simplifying the entire verification procedure. The proposed approach involves generating dynamic QR codes and individualized documents for each student. The data's 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 unique blockchain on an open-source platform.

- 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 output will indicate "Valid certificate" and "Success." However, if the certificate is not original 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]

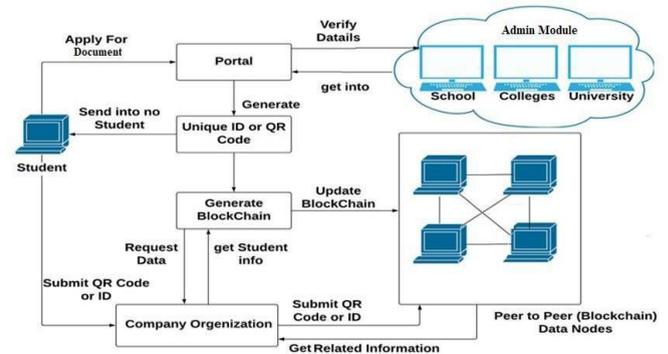


Figure 1: System Architecture

- System proposed a new dynamic document generation approach using own custom blockchain.
- First student applies for document verification process on web portal with upload all educational documents.
- Web gate is authenticated trusted third party which validate all documents from university, academy, modalities etc.
- Once successfully verification has done from university, school, colleges it will store data into blockchain and same time it generates the unique document ID or QR code and returns to student.
- Student can submit the received QR code or document ID to organization instead of physical hard copy of documents.
- Organization can submit QR code or ID to portal and pool the document verification process of respective student and make the validation.
- The entire process has performed into the blockchain manner with smart contract which is written by us.
- To execute the system in vulnerable terrain and to explore and validate how proposed system exclude different network attacks like DOS and MiM etc.

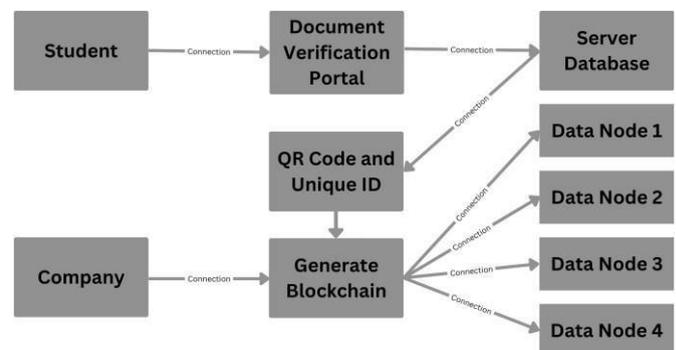


Figure 2: Deployment Diagram

V. CONCLUSION

Due to the complexity of this field and the demand for further dependable and effective information technology systems, there are multitudinous exploration paths in the operation of Blockchain technology for the Document Verification Process sale. Several Document verification process sale use cases would probably profit greatly from an interoperable armature given the similar data sharing and communication issues they defy. From a further specialized perspective, considerable disquisition is needed to identify the stylish feasible design approach for developing an interoperable ecosystem using Blockchain technology while balancing pivotal security and confidentiality considerations in Document verification process deals. Fresh exploration on secure and effective software practices for applying the Blockchain technology in Document verification process sale is also needed to inform software masterminds and sphere experts on the implicit and limitations of this new technology, anyhow of whether to produce a decentralized operation using a being Blockchain.

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