A NEW CERTISECURE: SECURE MARKSHEET GENERATOR AND VALIDATOR

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ABSTRACT

Educational institutions generate a large volume of marksheets and certificates every year, which serve as essential documents for students in pursuing higher education and employment opportunities. However, the traditional system of marksheet generation—whether manual or partially digitized—faces several limitations, including vulnerability to forgery, data manipulation, duplication, and time- consuming verification processes.One of the major challenges in the current system is the increasing number of fake or tampered marksheets being used for fraudulent purposes.To overcome these issues, the project *CertiSecure: Secure Marksheet Generator and Validator* is designed as an advanced digital solution that integrates security, automation, and ease of use. The primary aim of this system is to provide a tamper-proof platform for generating academic marksheets and enabling instant verification through modern technologies. CertiSecure allows authorized administrators to securely input student details and marks, and generate digital marksheets embedded with unique identification numbers and QR codes. These QR codes act as a quick verification tool, linking each marksheet to its original record stored in a secure database. Additionally, encryption techniques are used to protect sensitive data, ensuring that the marksheet cannot be altered or duplicated without authorization. The system includes a dedicated validation module that enables users such as employers, educational institutions, or verification agencies to instantly verify the authenticity of a marksheet. By scanning the QR code or entering a unique verification ID, users can access the original data and confirm its validity.

KEYWORDS:Educational,Marksheets,Employment,Manipulation,Certisecure,Encryption,Authenticity.

1. INTRODUCTION:

In today's rapidly evolving digital environment, the need for secure, reliable, and efficient management of academic records has become more critical than ever. Educational institutions generate a large volume of marksheets and certificates every year, which serve as essential documents for students in pursuing higher education and employment opportunities. However, the traditional system of marksheet generation—whether manual or partially digitized—faces several limitations, including vulnerability to forgery, data manipulation, duplication, and time-consuming verification processes.One of the major challenges in the current system is the increasing number of fake or tampered marksheets being used for fraudulent purposes. Since many institutions still rely on paper- based certificates or unsecured digital formats, it becomes difficult to ensure authenticity. Verification often requires manual cross-checking with the issuing institution, which is inefficient, time-consuming, and prone to human error. This lack of a reliable verification mechanism reduces trust among employers, universities, and other stakeholders.To overcome these issues, the project *CertiSecure: Secure Marksheet Generator and Validator* is designed as an advanced digital solution that integrates security, automation, and ease of use. The primary aim of this system is to provide a tamper-proof platform for generating academic marksheets and enabling instant verification through modern technologies. CertiSecure allows authorized administrators to securely input student details and marks, and generate digital marksheets embedded with unique identification numbers and QR codes. These QR codes act as a quick verification tool, linking each marksheet to its original record stored in a secure database. Additionally, encryption techniques are used to protect sensitive data, ensuring that the marksheet cannot be altered or duplicated without authorization. The system includes a dedicated validation module that enables users such as employers, educational institutions, or verification agencies to instantly verify the authenticity of a marksheet. By scanning the QR code or entering a

unique verification ID, users can access the original data and confirm its validity. This significantly reduces the need for manual verification and minimizes the chances of fraud.Another key feature of CertiSecure is its role-based access control, which ensures that only authorized personnel can generate or modify records. The system is designed with a user- friendly interface, making it accessible even to users with minimal technical knowledge. It also ensures efficient data management by storing records in a structured and centralized database, allowing easy retrieval and maintenance.

2. LITARATURE REVIEW

With the rapid digitization of academic records, the security and authenticity of marksheets and certificates have become major concerns in educational institutions. Traditional paper-based marksheet generation systems are vulnerable to forgery, duplication, and manual verification delays. To address these challenges, several researchers have proposed secure digital certificate generation and validation systems using modern technologies such as blockchain, QR codes, cryptographic hashing, and decentralized storage.

A foundational work in this area is the study “Proposing a Reliable Method of Securing and Verifying the Credentials of Graduates through Blockchain”. The authors proposed a blockchain-based framework for secure academic credential issuance and verification. The study demonstrated that blockchain’s immutable ledger structure helps prevent unauthorized modifications and ensures tamper-proof validation of academic documents. Another significant contribution is “Certificate Verification using Blockchain and Generation of Transcript”, which focuses on both transcript generation and certificate validation. In this system, each certificate is assigned a unique hash key, and verification is performed through a secure portal by comparing the stored and generated hashes. This directly supports the concept of secure marksheet generation and validation in the proposed CERTISECURE system. Recent research titled “Verification and Validation of Certificate Using Blockchain” emphasizes the use of blockchain and smart contracts for academic document authentication. The work highlights the importance of immutability, transparency, and decentralized validation, reducing the risk of fake marksheets and forged academic records.

Another relevant work is "CertiSafe: A Blockchain Based Certificate Validation and Safety System", where researchers integrated secure certificate issuance with verification mechanisms using blockchain technology. The system improves trust between institutions, students, and employers by enabling instant authenticity checks.

The study "Certificate Generation and Verification System Using Blockchain Technology and Quick Response Code" introduced QR-code-based verification. Each generated certificate contains a QR code that links to a secure validation portal. This method significantly reduces manual verification time and improves ease of access for employers and institutions.

More recent work such as "Blockchain Based Certificate Generator and Validation" (2025) further extends this idea by combining certificate generation, validation, and secure storage using blockchain-backed systems. This study is particularly relevant to your title because it focuses on the complete lifecycle of certificate creation and authentication.

Research on Verifi-Chain also explores the integration of IPFS (InterPlanetary File System) with blockchain for storing large academic documents such as marksheets and transcripts. Instead of storing the entire file on the blockchain, only the document hash is stored on-chain, making the system scalable and cost-effective.

3. EXISITING METHOD:

This process is time-consuming, inefficient, and depends heavily on manual effort. In some cases, verification is not performed at all due to the complexity involved, increasing the chances of fraud going undetected. Additionally, the existing system lacks a centralized and secure database for storing academic records. Data is often stored in local systems or scattered across different departments, making it difficult to manage, retrieve, or update records efficiently. This can lead to data inconsistency, loss of information, and reduced reliability.Another limitation is the absence of real-time validation mechanisms. There is no instant way to check whether a marksheet is genuine or tampered with. The lack of automation and security features results in low transparency and reduced trust among stakeholders.

3.1 DIS-ADVANTAGES:

1. High risk of marksheet forgery and duplication
2. No secure mechanism to prevent data tampering
3. Time-consuming manual verification process

4. Lack of centralized data management.
5. No real-time or instant validation facility.
6. Prone to human errors and data inconsistencies
7. Limited security features in digital formats.

4.PROPOSED METHOD

The proposed system also includes a validation module that enables users such as employers, institutions, and verification authorities to instantly verify the authenticity of a marksheet. By scanning the QR code or entering the unique ID, users can access the original data and confirm whether the marksheet is valid or altered. This significantly reduces the need for manual verification and ensures quick and reliable authentication.Additionally, the system incorporates role-based access control to restrict unauthorized access and maintain data confidentiality. It is designed with a user-friendly interface to facilitate easy operation and efficient data management. Overall, the proposed system enhances transparency, improves security, and provides a reliable platform for marksheet generation and validation in modern academic environments.In this system, authorized administrators can securely generate digital marksheets by entering student details and academic scores. Each generated marksheet is assigned a unique identification number and embedded with a QR code, which acts as a verification key. The QR code links the marksheet to its original record stored in a secure database, making it tamper- proof and resistant to duplication or forgery.

4.1 ADVANTAGES:

1. This system, authorized administrators can securely generate digital marksheets by entering student details and academic scores.
2. Each generated marksheet is assigned a unique identification number and embedded with a QR code, which acts as a verification key.
3. The QR code links the marksheet to its original record stored in a secure database, making it tamper-proof and resistant to duplication or forgery.

5.SYSTEM ARCHITECTURE

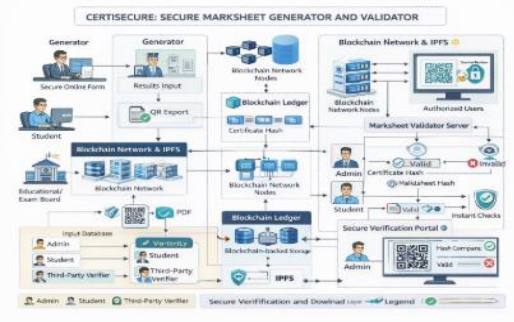

FIG 2.0:System Architecture

6. RELATED WORK:

The rapid increase in forged academic documents has led researchers to develop secure digital certificate and marksheet validation systems. Traditional marksheet generation methods rely on centralized databases and manual verification, which are vulnerable to tampering, duplication, and unauthorized access.A significant work in this area is blockchain-based certificate verification systems, where academic records are stored as cryptographic hashes on a distributed ledger. This ensures that once a marksheet is generated, its contents cannot be modified without detection. Studies have shown that blockchain provides immutability, transparency, and tamper-proof verification for educational credentials.Another important study is certificate verification using blockchain and transcript generation, which focuses on secure generation of academic transcripts and their validation through hash comparison. In this approach, the generated marksheet PDF is assigned a unique hash value, and the verifier compares the uploaded document hash with the blockchain-stored hash to confirm authenticity. This concept is highly relevant to the generator and validator modules of the proposed system.Recent works such as CertiSafe and CertiChain propose frameworks specifically for educational certificate safety and validation. These systems use smart contracts, QR code verification, and decentralized storage to prevent document forgery and allow instant verification by institutions and employers.

Several commercial and research platforms now support QR-code-based validation, where every marksheet contains a unique QR code linked to a secure verification portal. When scanned, the system fetches the original record and validates the marksheet details in real time. This method reduces manual verification time and improves trust in digital academic records.

7. RESULTS:

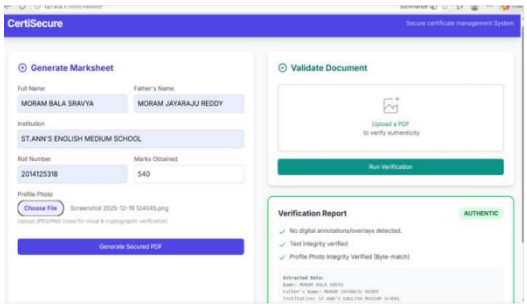

FIG 2.1: This screen displays the login functionality.

FIG2.2 : This output shows the generation of a digital certificate.

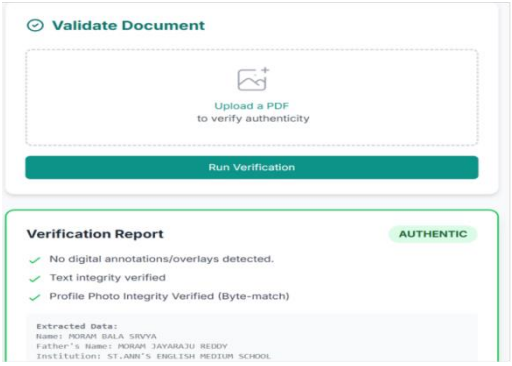

FIG 2.3 : This screen demonstrates the verification feature.The user uploads or enters certificate details.The system validates authenticity using stored data.

8. CONCLUSION:

The system ensures data integrity and security by incorporating validation techniques that prevent forgery and unauthorized modifications. Through modules such as user authentication, marksheet generation, and certificate verification, the application demonstrates a complete and functional workflow. The use of **Python** for development and **VisualStudio Code** for implementation enabled efficient coding, testing, and debugging of the system.Extensive testing was conducted to ensure that all components operate correctly under various conditions. The results confirm that the system performs reliably, providing accurate outputs and maintaining security standards. The user-friendly interface further enhances usability, making the system accessible to both administrators and end users. In conclusion, CertiSecure provides a practical and scalable solution for secure marksheet generation and validation. It reduces the risk of certificate fraud, minimizes manual verification efforts, and improves overall efficiency in academic record management.These future enhancements will significantly improve the CertiSecure system by making it more secure, scalable, and user-friendly. Implementing these features will help the system evolve into a comprehensive digital certificate management solution suitable for large-scale deployment.

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