



# Blockchain-Based Academic Certificate Verifier

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**ABSTRACT:** Academic certificate forgery has become a major challenge for educational institutions and employers worldwide. Traditional verification systems rely on centralized databases and manual validation processes that are time-consuming and vulnerable to manipulation. To address this issue, this research proposes a Blockchain-Based Academic Certificate Verification System that ensures secure and tamper-proof certificate validation.

The proposed system uses blockchain technology to store certificate data as cryptographic hashes, ensuring immutability and transparency. Each certificate is associated with a QR code that allows employers or institutions to instantly verify the authenticity of the certificate. When a QR code is scanned, the system retrieves certificate information and compares the stored blockchain hash with the certificate hash to determine validity.

The proposed approach significantly improves security, reduces verification time, and eliminates manual certificate verification processes. The system demonstrates how blockchain technology can be effectively utilized to create a reliable and transparent academic credential verification platform.

**KEYWORDS:** Blockchain, Certificate Verification, Smart Contracts, QR Code Verification, Digital Credentials, Cybersecurity

## I. INTRODUCTION

Academic certificates play a crucial role in validating a student's educational qualifications. Universities issue certificates as proof of successful completion of academic programs. These certificates are commonly required for employment, higher education, and professional certifications.

However, with the increasing availability of digital editing tools, the creation of fake academic certificates has become easier. Many organizations face difficulties in verifying the authenticity of submitted certificates. Traditional verification methods involve manual communication between employers and educational institutions, which is inefficient and time-consuming.

Blockchain technology offers a decentralized and tamper-proof solution for secure data storage. Once information is recorded on the blockchain, it cannot be modified or deleted without consensus from the network. This makes blockchain a suitable technology for managing digital academic credentials.

The proposed system leverages blockchain technology and QR code verification to create a secure academic certificate verification platform. Additionally, a simple AI-based chatbot assistant is integrated into the website to help users with queries related to certificate verification and system navigation, improving overall user experience.

## II. LITERATURE SURVEY

Several digital certificate verification systems have been proposed to address certificate fraud. Some systems rely on centralized databases where institutions upload certificate information. Although these systems improve accessibility, they remain vulnerable to data manipulation and cyber attacks. Cloud-based credential management systems allow institutions to store certificate data on cloud servers. However, such systems depend heavily on third-party service providers and centralized storage infrastructure. Recent studies have explored the use of blockchain technology for document verification. Blockchain provides decentralization, transparency, and immutability, which makes it suitable for academic certificate verification.

Researchers have demonstrated that storing certificate hashes on blockchain networks can prevent certificate tampering and provide instant verification capabilities.

Despite these advancements, many existing systems lack integration with QR-based verification mechanisms, which can significantly simplify the verification process

### III. METHODOLOGY

The proposed system introduces a blockchain-based solution for secure academic certificate verification.

When a university issues a certificate, the certificate data is processed by the system to generate a **cryptographic hash**. This hash uniquely represents the certificate information

The generated hash is then stored on a **blockchain network using smart contracts**, ensuring that the certificate record is immutable.

The system generates a **QR code** for each certificate. The QR code contains a reference to the blockchain record.

When an employer scans the QR code, the system retrieves the certificate data and computes its hash. The generated hash is compared with the blockchain hash stored earlier. If both hashes match, the certificate is verified as authentic. This methodology ensures a secure and transparent verification process.

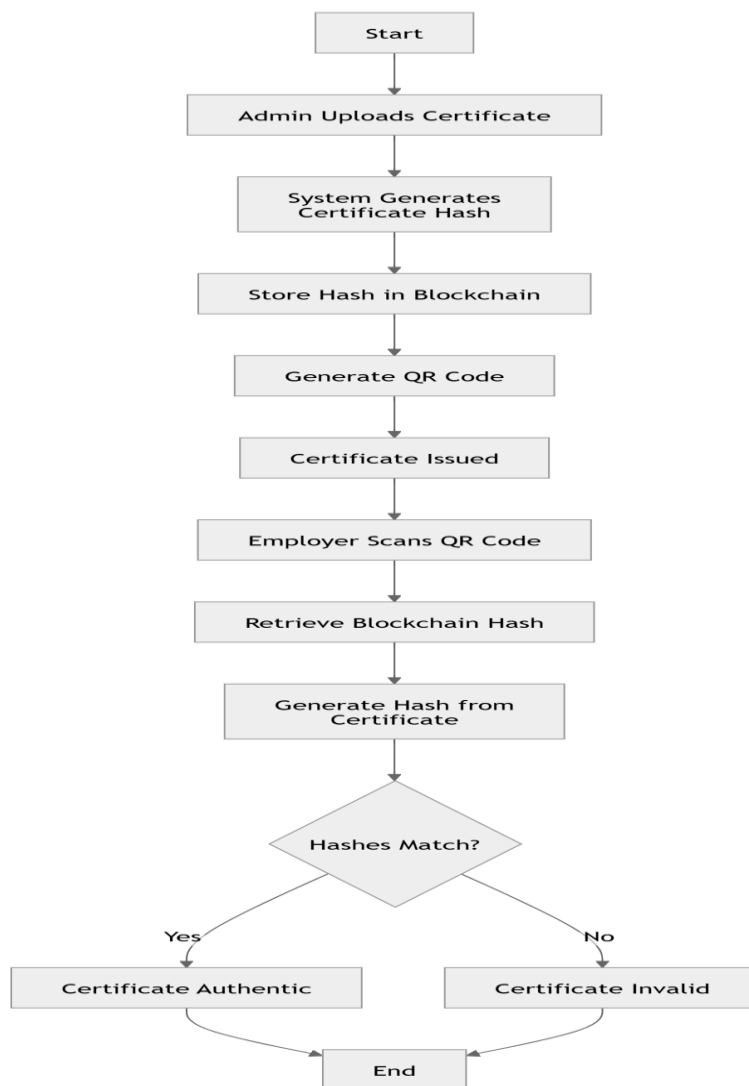


Fig 3.1 Methodology Workflow of the Blockchain-Based Certificate Verification System

**IV. SYSTEM ARCHITECTURE**

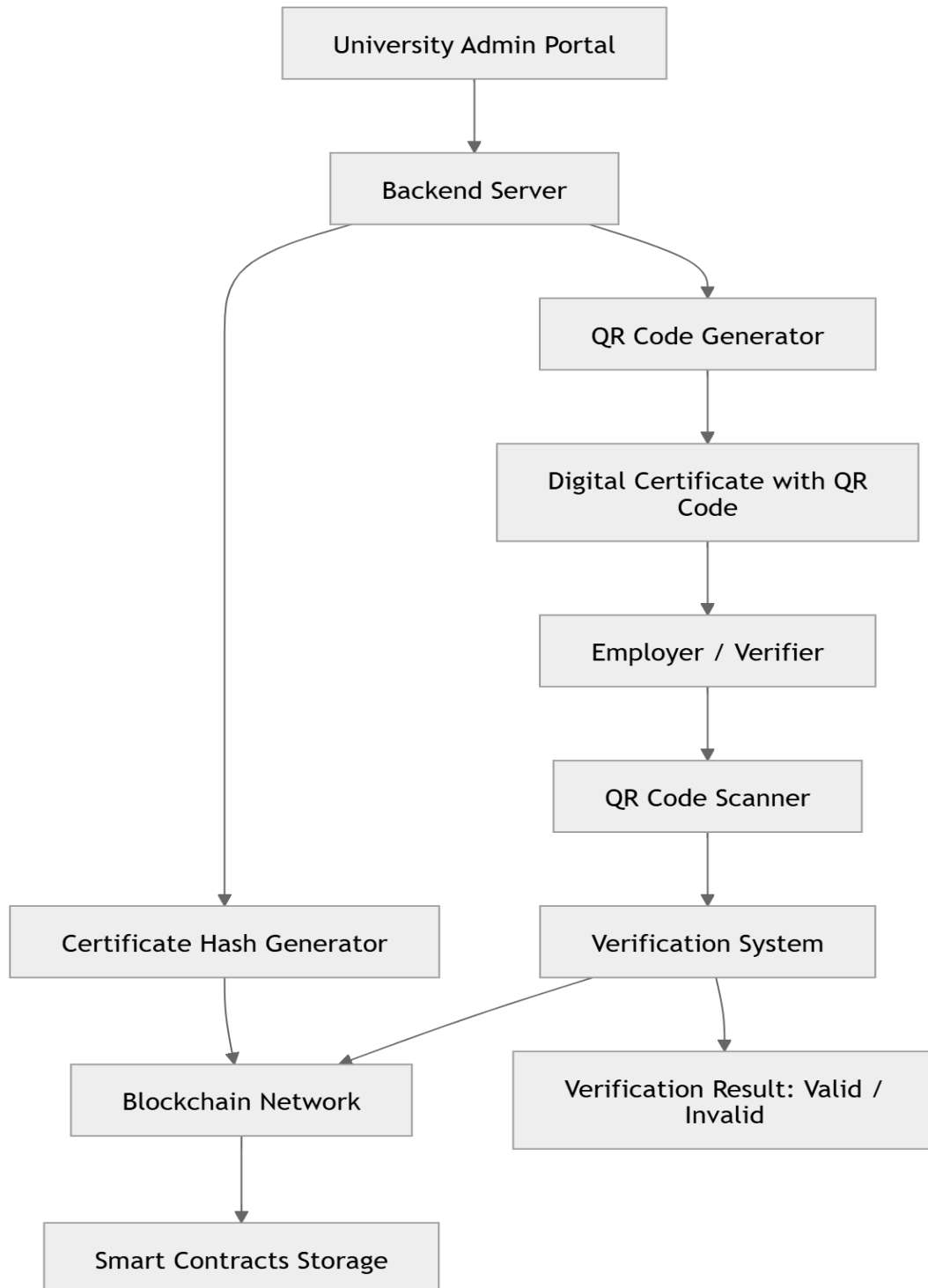


Fig 4.1 System Architecture

### V. OUTPUT SCREENS

The implementation of the proposed Blockchain-Based Academic Certificate Verification System demonstrates the practical working of the platform. Initially, the university administrator uploads certificate details through the certificate upload interface, where the system processes the information and generates a unique cryptographic hash. After processing the data, a QR code is generated for the certificate, which can be attached to the digital or printed certificate for verification purposes. When an employer or authorized user scans the QR code or accesses the verification page, the system retrieves the stored certificate hash from the blockchain network and compares it with the hash generated from the provided certificate details. Based on this comparison, the system displays the verification result indicating whether the certificate is authentic or invalid. Additionally, a basic AI chatbot is integrated into the website to assist users by answering queries related to certificate verification and system navigation, thereby improving the overall usability of the platform.

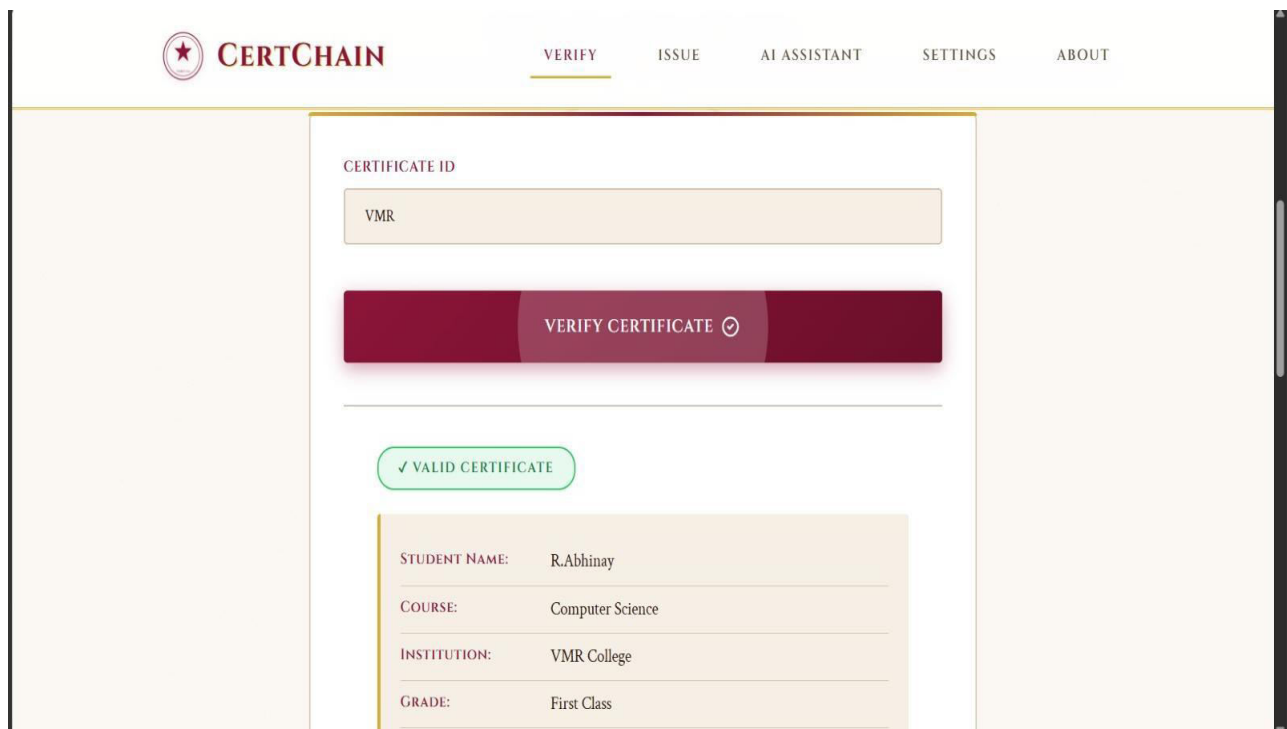
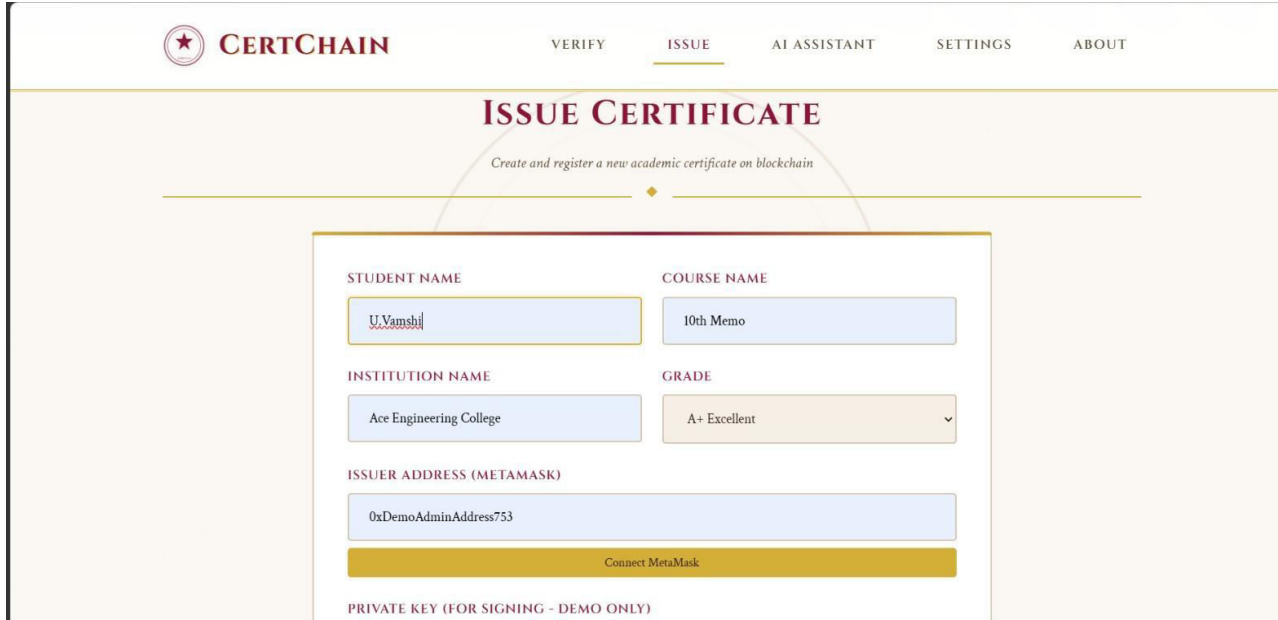


Fig 5.1 Certificate Verification Page



**CERTCHAIN**    VERIFY    ISSUE    AI ASSISTANT    SETTINGS    ABOUT

## ISSUE CERTIFICATE

*Create and register a new academic certificate on blockchain*

STUDENT NAME: U.Vamshu    COURSE NAME: 10th Memo

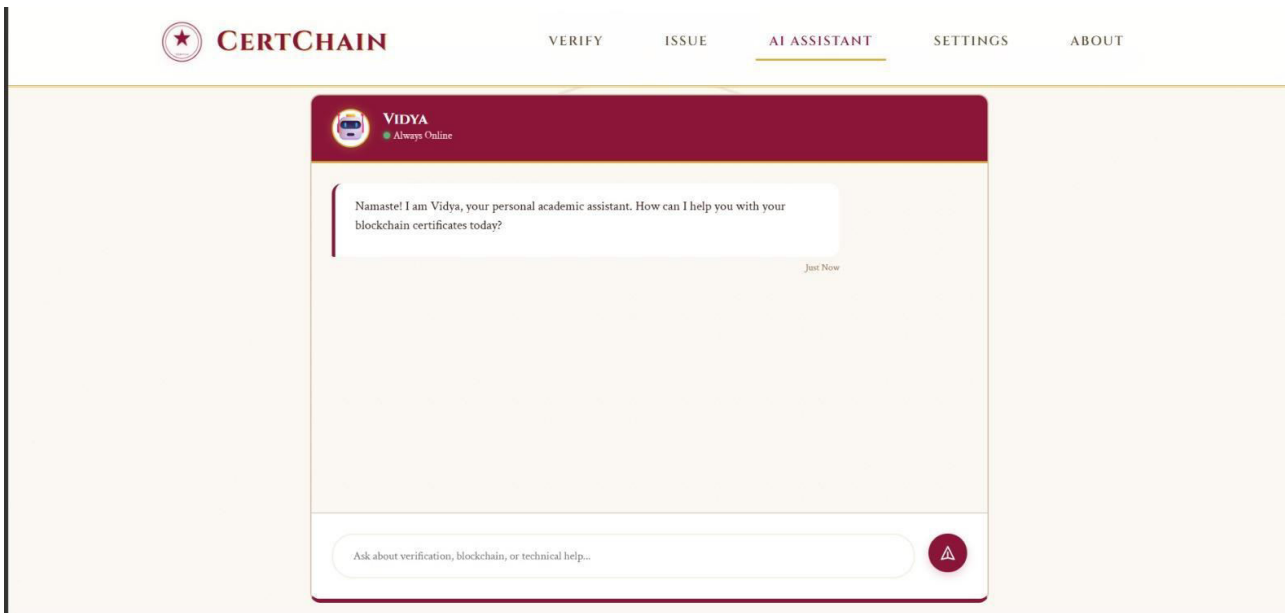
INSTITUTION NAME: Ace Engineering College    GRADE: A+ Excellent

ISSUER ADDRESS (METAMASK): 0xDemoAdminAddress753

[Connect MetaMask](#)

PRIVATE KEY (FOR SIGNING - DEMO ONLY)

Fig 5.2 Certificate Issue Page



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**VIDYA**  
Always Online

Namaste! I am Vidya, your personal academic assistant. How can I help you with your blockchain certificates today?

Just Now

Ask about verification, blockchain, or technical help...

Fig 5.3 AI Assistant Page

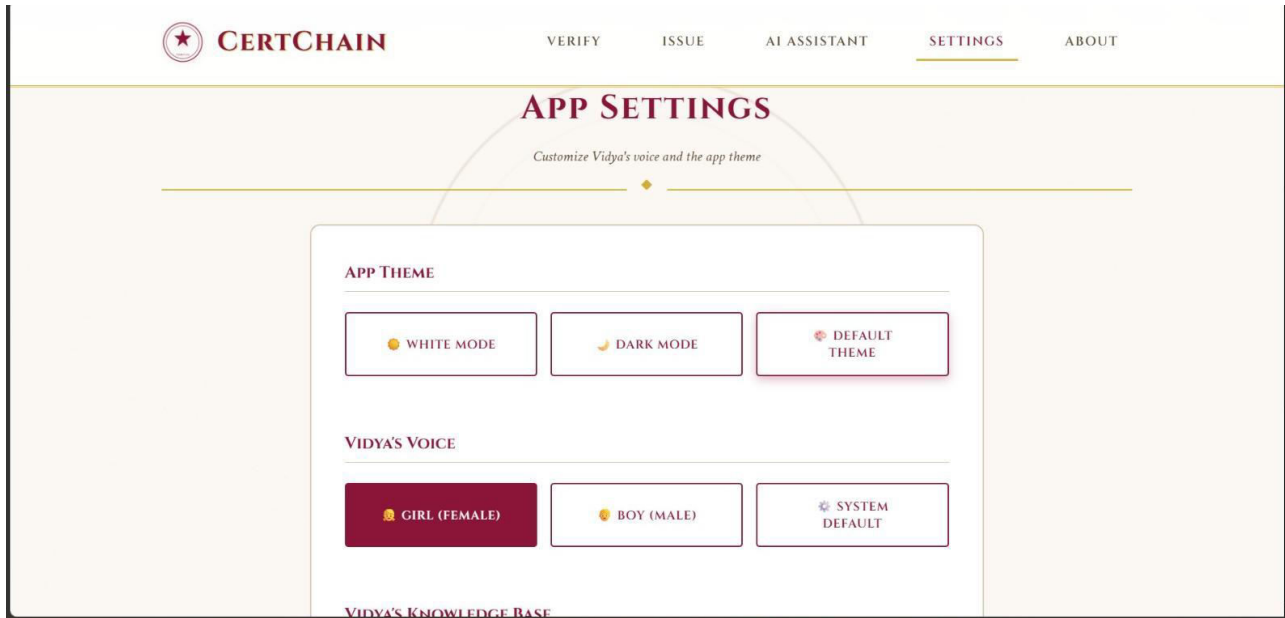


Fig 5.4 App Settings Page

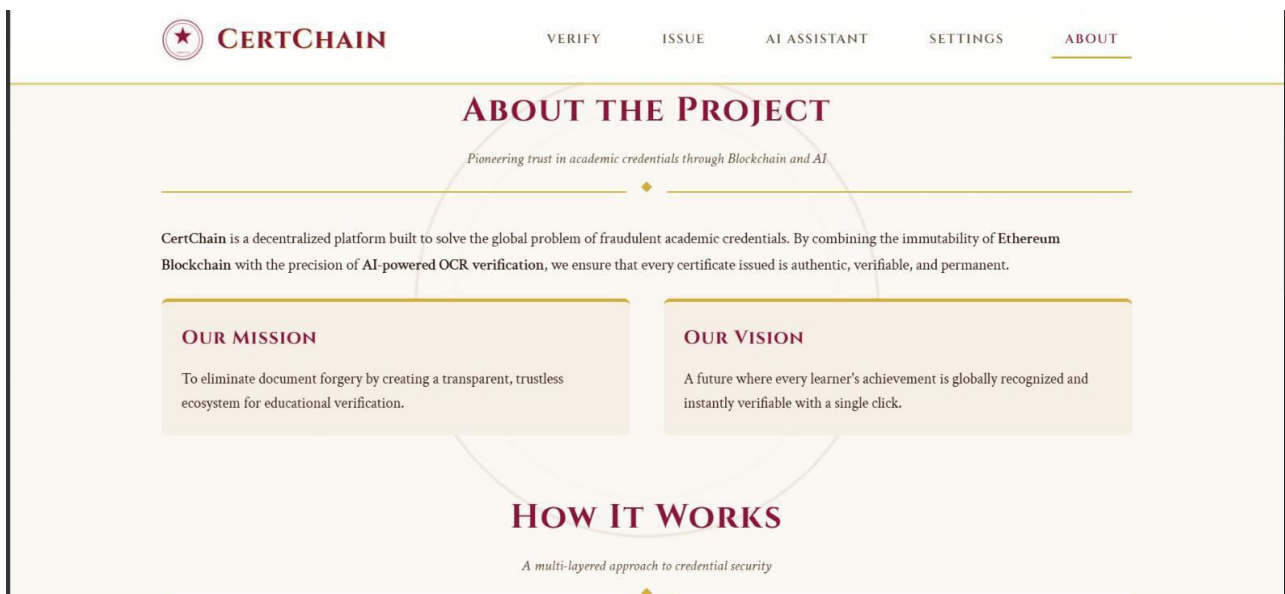


Fig 5.5 About Page

## VI. CONCLUSION

The proposed Blockchain-Based Academic Certificate Verification System provides a secure and reliable method for verifying academic credentials. By utilizing blockchain technology, the system ensures that certificate records are immutable, transparent, and protected from unauthorized modification. The integration of QR code-based verification enables employers and institutions to instantly validate the authenticity of certificates without relying on manual verification processes. This approach significantly reduces the risk of certificate fraud while improving efficiency in credential verification. The implementation results demonstrate that the system can effectively store certificate hashes

on the blockchain and perform quick verification through a user-friendly interface. Overall, the proposed system enhances trust, security, and transparency in academic certificate management.

## VII. FUTURE SCOPE

Although the proposed system successfully demonstrates secure certificate verification, several enhancements can be implemented in the future. The platform can be integrated with national academic databases and multiple universities to create a unified certificate verification ecosystem. Mobile applications can also be developed to allow users and employers to verify certificates easily using smartphones. Additionally, advanced security mechanisms and scalability improvements can be introduced to support large-scale deployments. Future research may also explore the integration of artificial intelligence techniques for automated fraud detection and advanced analytics within certificate verification systems.

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