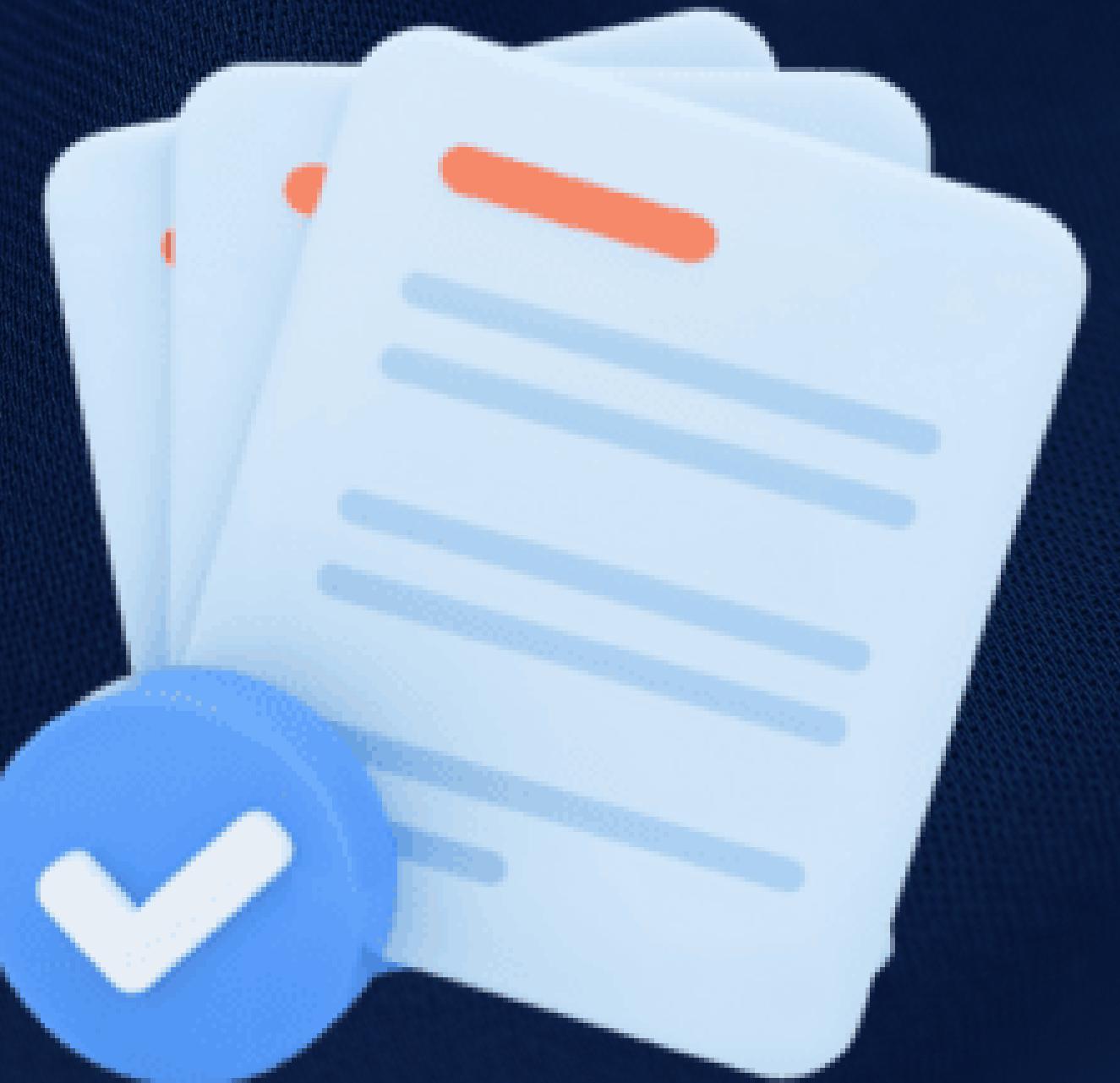




# AI AND BLOCKCHAIN-BASED CERTIFICATE VERIFICATION SYSTEM

Presented by  
Muhammad Nouman Riaz  
BSCS51F21R003  
BSCS 7<sup>th</sup> SS1



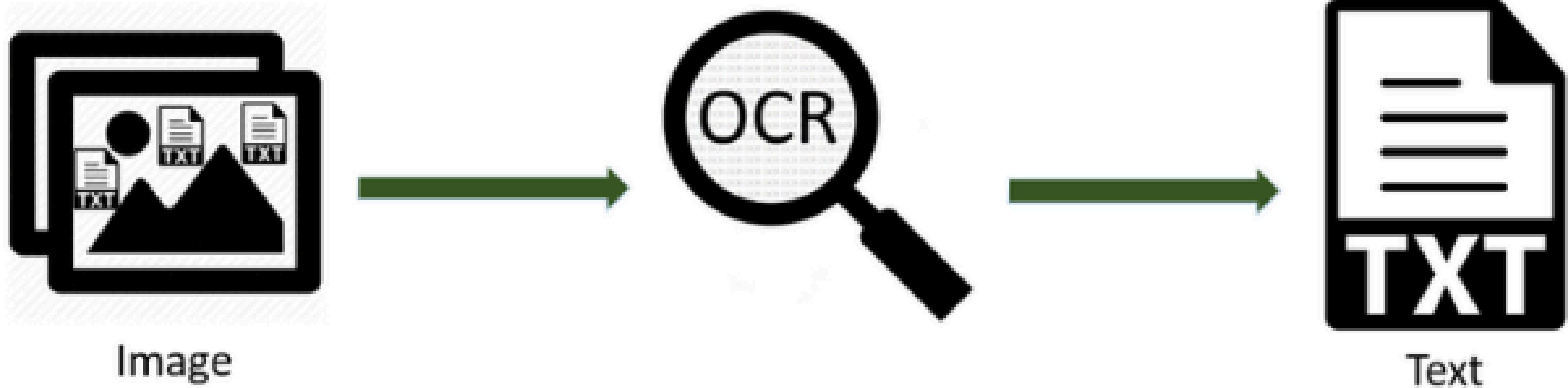
# PROBLEM STATEMENT

## What We Faced

Fake academic certificates are a growing problem, and current manual verification systems are slow, costly, and unreliable.

Studies show that up to 30–40% of resumes contain fake or exaggerated academic claims, increasing fraud risk.





## PROPOSED SOLUTION

We propose an AI and Blockchain-Based Certificate Verification System that uses AI-based OCR to automatically extract certificate data.

A SHA-256 hash is generated and stored on the Ethereum blockchain, making records tamper-proof.

During verification, the system compares hashes to instantly confirm authenticity.

This approach reduces verification time from days to seconds and significantly lowers fraud.

# PROJECT OBJECTIVES



Secure certificate  
verification



Automated data  
extraction



Tamper-proof  
blockchain storage

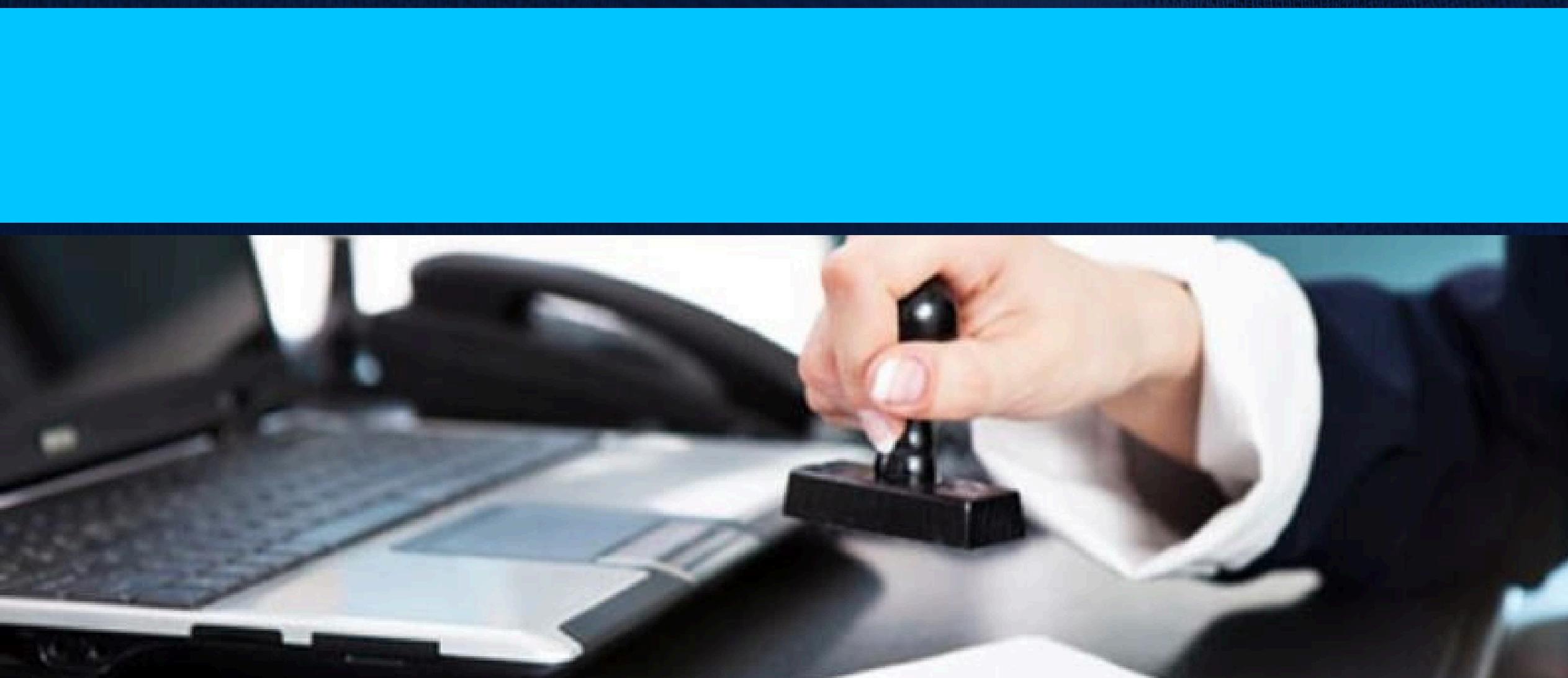


Fast authentication  
process

# PROJECT FEATURES

## Little Preview About The Project

- Secure user authentication with role-based access.
- AI-based OCR for automatic certificate data extraction.
- Blockchain storage of certificate hashes for tamper-proof security.
- Instant certificate verification using hash comparison.
- Clear verification results with transaction ID transparency.



# TECHNOLOGY STACK

- Frontend:  
HTML, CSS, JavaScript
- Backend:  
Python (Flask)
- AI / OCR:  
Tesseract OCR
- Blockchain:  
Ethereum Test Network
- Database:  
SQLite / MongoDB
- Security:  
SHA-256 hashing, JWT authentication, HTTPS encryption.

# SECURITY & PRIVACY MEASURES

## Strategies We Use

- **Secure Authentication:**

User login is protected using encrypted passwords and JWT-based authentication.

- **Data Hashing:**

Certificates are converted into SHA-256 hashes, ensuring original data cannot be altered.

- **Blockchain-Immutability:**

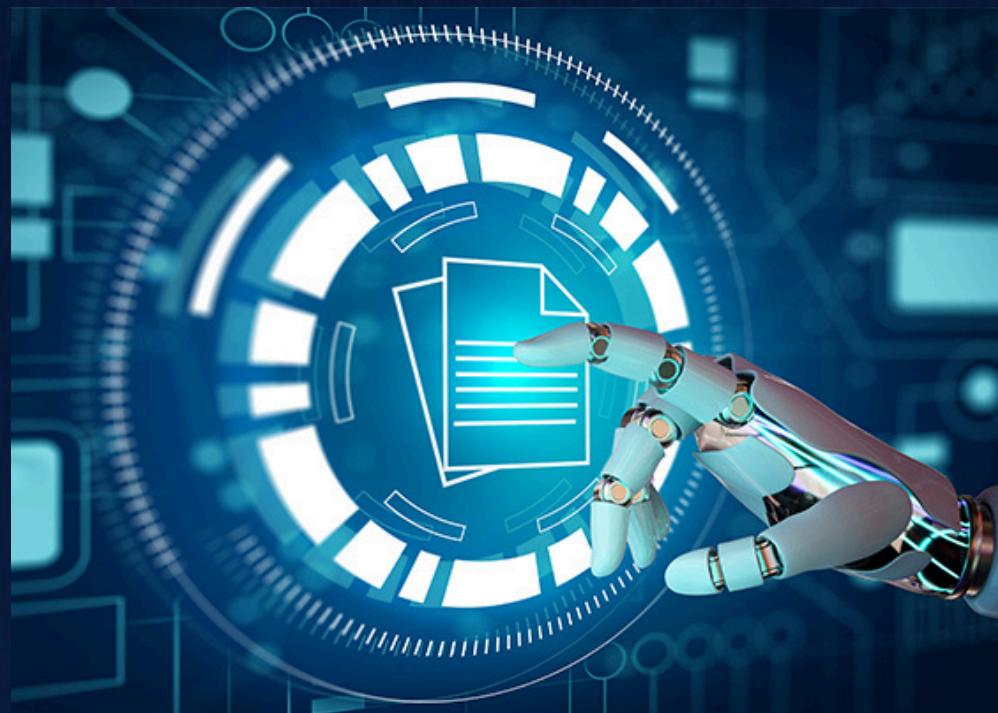
Certificate hashes stored on blockchain cannot be modified or deleted.

- **Data-Privacy:**

No personal or sensitive information is stored on the blockchain—only hash values.

- **Secure Communication:**

All data transfer is protected using HTTPS encryption.



# EXPECTED OUTCOMES

- The system enables fast and automated certificate verification within seconds.
- Fake or tampered certificates are detected through blockchain-based immutable records.
- AI-powered OCR ensures accurate text extraction and reduces human errors.
- Institutions save time and effort by eliminating manual verification processes.
- Users gain a secure, transparent, and easy-to-use web platform for verification.
- Overall, the system increases trust and reliability in academic and professional documentation.

# IMPLEMENTATION CHALLENGES & SOLUTIONS

- **OCR inaccuracy due to low-quality images** → solved with preprocessing and rejecting unclear uploads.
- **Blockchain network delays** → handled through asynchronous processing and background status polling.
- **Incorrect data cannot be edited on blockchain** → solved by allowing corrected re-uploads with new hashes.
- **Testnet instability** → managed through a configurable blockchain integration layer.
- **Server limitations for OCR/blockchain** → solved using modular and separate processing components.
- **File upload and security risks** → controlled by file-type restrictions and auto-deletion after hashing.



# CONCLUSIONS

- **Secure and reliable platform** for verifying certificates using AI and blockchain.
- **AI-powered OCR** extracts certificate data accurately for processing.
- **Blockchain** ensures records are tamper-proof and authentic.
- Reduces **manual effort** and **prevents fraud** in verification.
- **Web-based** and **user-friendly** for institutions, employers, and individuals.

