



# International Journal of Innovative Research in Computer and Communication Engineering

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# Digital Certificate Validator

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**ABSTRACT:** The issuance and verification of educational certificates pose significant challenges due to the prevalence of counterfeiting, which undermines the credibility of both certificate holders and issuing authorities. The project proposes a solution leveraging blockchain technology to address the issue of certificate forgery. By implementing a digital certificate system based on blockchain, certificates can be endowed with properties that make them resistant to tampering and easily verifiable. The proposed system involves the conversion of paper certificates into electronic files, along with associated data, which are then hashed and stored in blocks on a blockchain. This process ensures the integrity and immutability of certificates, making them inherently resistant to counterfeiting. Additionally, the system generates QR codes and inquiry string codes to be affixed to paper certificates, enabling verification through mobile scanning or online inquiries. The proposed system aims to enhance the trust and reliability of educational certificates, ultimately safeguarding the integrity of academic credentials.

**KEYWORDS:** Generate QR, Block chain Certificates, Verification and Validation

### I.INTRODUCTION

Maharashtra went through a few vacillations last year as for the retail cost of onions. The cost expanded from Rs. 26 for each kilo in the primary portion of the year to an incredible Rs. 50 for every kilo in August. Noticing the shoot in the value, a considerable lot of the ranchers in the state chose to develop onions on their homestead, in the expectation of making Advances in information technology, the wide availability of the Internet, and common usage of mobile devices have changed the lifestyle of human beings. Virtual currency, digital coins originally designed for use online, has begun to be extensively adopted in real life. Because of the convenience of the Internet, various virtual currencies are thriving, including the most popular—Bitcoin, Ether, and Ripple [2]—the value of which has surged recently. People are beginning to pay attention to blockchain, the backbone technology of these revolutionary currencies. Blockchain features a decentralized and incorruptible database that has high potential for a diverse range of uses. Blockchain is a distributed database that is widely used for recording distinct transactions. Once a consensus is reached among different nodes, the transaction is added to a block that already holds records of several transactions. Each block contains the hash value of its last counterpart for connection. Blockchain is a distributed database that is widely used for blockchain [1]. Data are distributed among various nodes (the distributed data storage) and are thus decentralized. Consequently, the nodes maintain the database together. Under blockchain, a block becomes validated only once it has been verified by multiple parties.

Furthermore, the data in blocks cannot be modified arbitrarily. A blockchain-based smart contract, for example, creates a reliable system because it dispels doubts about information's veracity.



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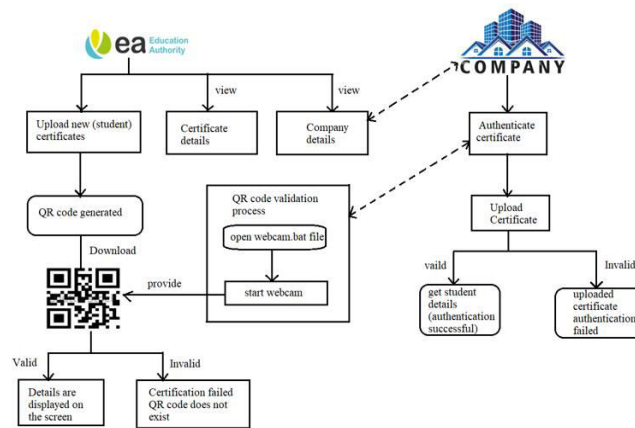


Fig1: Architecture

## II .LITERATURE SURVEY

[1] Certificate validation using blockchain: A.Gayathiri;J J.

Ayachitra;S.Matilda

LINK: [https://www.irjmets.com/uploadedfiles/paper/Issue\\_7\\_july\\_20\\_22/28889/final/fin\\_irjmets1659](https://www.irjmets.com/uploadedfiles/paper/Issue_7_july_20_22/28889/final/fin_irjmets1659)

2020:The methodology involves digitizing paper certificates generating hash codes using a chaotic algorithm and storing them in a blockchain. Implementing a blockchain based system for digitizing and validating certificates offers promising benefits in security and efficiency However challenges such as integration complexities limitations must be addressed.

[2]Certificate Validation using Blockchain and Generation of Transcript: Ravi SinghLamkoti , Devdoot

Maji, Hitesh Shetty,Prof.Bharti

Gondhalekar

LINK: <https://www.ijert.org/research/>

Certificate validation using block chain-and-generation of transcript=IJERTV10IS030260.pdf

2019 : The methodology involves implementing a blockchain-based solution for the issuing and validating certificates in Indian higher education. Implementing a blockchain based system for certificate issuance and validation in Indian higher education offers promising benefits of enhanced security reliability and accessibility.

[3] Block Chain based Certification

ValidationSystem: Mrs.R.Suganthalakshmi,

Mrs.G.ChandaRa Praba

2019Developedablockchain-basedsystemfor secure certificatesIncreasedtransparencyandauthenticityTechnicalexpertise is required for maintenance and updates. related to complexity and standardization.

[4] Framework for Secure educational Credentials: Shadab Alam Huda Abdullah Asmaa Hayawi

2018: Implemented an analysis of its appl

Cations and educations. Improved efficiency by security and privacy trust. Limited interoperability between different blockchain platforms

## III.PROPOSED METHOD

So in propose paper we are introducing Blockchain technology which store immutable data and its data cannot by modify in any manner. So while giving certificate to student, admin user will store certificate copy in Blockchain and obtained its digital signature and then generate QR code on that signature and affix that code on student certificate. This certificate can be scanned by other companies or institution to verify and extract details from Blockchain. If QR CODE exists in Blockchain then certificate validation will be successful. Using the proposed blockchain-based system reduces



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the likelihood of certificate forgery. The process of certificate application and automated certificate granting are open and transparent in the system. The proposed method for a blockchain-based digital certificate validator involves a decentralized approach to issuing, storing, and verifying certificates using blockchain technology and cryptographic mechanisms. The process begins with an authorized institution, such as a university or certification authority, generating a digital certificate for a recipient. Instead of storing the entire certificate on the blockchain, a unique cryptographic hash of the certificate is created using a hashing algorithm like SHA-256. This hash is then recorded on the blockchain via a smart contract, ensuring immutability and verifiability. The actual certificate file is stored off-chain in a decentralized storage system such as the Interplanetary File System (IPFS) or a secure cloud storage service, with the blockchain storing only the reference link. For validation, a verifier retrieves the stored hash from the blockchain and compares it with the hash of the presented certificate. If the hashes match, the certificate is confirmed as authentic; otherwise, it is flagged as altered or invalid. Smart contracts further enable automated features such as certificate revocation, renewal, and expiration management, ensuring real-time updates on the certificate's status. This approach eliminates the need for third-party verification, enhances security by preventing forgery, and allows instant, global access to verifiable credentials. By integrating blockchain and cryptographic security, the proposed method establishes a reliable, efficient, and scalable solution for digital certificate validation across various industries.

### IV .METHODOLOGY

The methodology for a digital certificate validator using blockchain technology involves leveraging blockchain's decentralized, immutable, and transparent nature to ensure the authenticity, integrity, and security of digital certificates. Traditional certificate validation methods rely on centralized authorities, which pose risks such as single points of failure, forgery, and data tampering. By utilizing blockchain, a distributed ledger records certificate-related transactions in a secure and tamper-proof manner, eliminating the need for intermediaries and enhancing trust. The process begins with the selection of an appropriate blockchain network, which can be public (such as Ethereum or Hyperledger Fabric), private, or consortium-based, depending on security and scalability needs. Smart contracts are developed to automate the issuance, storage, and validation of certificates, ensuring transparency and reducing manual intervention. When a certificate is issued by an authorized institution, a cryptographic hash (unique digital fingerprint) of the certificate is generated using hashing algorithms such as SHA-256. This hash is then recorded on the blockchain via a smart contract, making it immutable and verifiable. To optimize storage efficiency, the actual certificate file is stored off-chain using decentralized storage solutions like the Interplanetary File System (IPFS) or cloud-based services, with only the hash or reference link stored on-chain. For validation, a verifier retrieves the stored hash from the blockchain and compares it with the hash of the provided certificate. If both hashes match, the certificate is deemed authentic; otherwise, it is flagged as altered or forged. This approach eliminates reliance on third-party validation services and provides instant verification globally. Additionally, blockchain enhances security by preventing unauthorized modifications, as any attempt to alter a certificate would generate a different hash, immediately exposing tampering attempts. The methodology also supports additional features such as certificate revocation, renewal, and expiration management through smart contracts. If a certificate needs to be revoked, the issuing authority can update its status on the blockchain, ensuring real-time visibility to all stakeholders. Moreover, blockchain-based digital certificates facilitate interoperability, enabling institutions, employers, and individuals to verify credentials across different platforms without bureaucratic delays. In conclusion, blockchain technology provides a robust, transparent, and scalable framework for digital certificate validation. It enhances trust, reduces fraud, and improves efficiency by offering an immutable and decentralized verification process. As organizations increasingly adopt digital transformation, blockchain-based certificate validation represents a future-proof solution for secure and tamper-resistant credential management.

### V. RESULT

The implementation of a blockchain-based digital certificate validator significantly enhances the security, transparency, and efficiency of certificate verification processes. By leveraging blockchain's decentralized and immutable nature, the system eliminates reliance on central authorities, reducing the risks of forgery, data manipulation, and unauthorized alterations. The use of cryptographic hashing ensures that certificates remain tamper-proof, while smart contracts automate issuance, validation, and revocation, minimizing manual intervention and potential human errors. The integration of off-chain storage solutions like IPFS further optimizes data management while maintaining accessibility. As a result, verifiers can instantly authenticate certificates by comparing stored blockchain hashes with provided credentials, streamlining the verification process across industries such as education,



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healthcare, and finance. Additionally, this approach enhances trust and interoperability, enabling seamless cross-border recognition of certifications. Overall, the blockchain-based validation system not only strengthens security and reduces fraud but also establishes a more efficient, scalable, and reliable framework for managing digital credentials in a digitally evolving world..

### VI.CONCLUSION

Blockchain-based digital certificate validator provides a secure, transparent, and efficient solution for verifying credentials in a decentralized manner. By leveraging blockchain's immutability and cryptographic security, the system ensures that digital certificates remain tamper-proof and easily verifiable without reliance on centralized authorities. The use of smart contracts automates key processes such as issuance, validation, and revocation, reducing administrative overhead and minimizing the risk of fraud. Additionally, integrating off-chain storage solutions optimizes data management while maintaining accessibility and efficiency. This approach not only enhances trust among institutions, employers, and individuals but also facilitates global interoperability of credentials. As the demand for digital trust and security continues to grow, blockchain-based certificate validation represents a future-proof solution that improves reliability, reduces fraud, and streamlines verification processes across various industries. Data security is one of the major features of blockchain technology. Blockchain is a large and open-access online ledger in which each node saves and verifies the same data. Using the proposed blockchain-based system reduces the likelihood of certificate forgery. The process of certificate application and automated certificate granting are open and transparent in the system. Companies or organizations can thus inquire for information on any certificate from the system. In conclusion, the system assures information accuracy and security.

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