Educational Document Verification through Blockchain: Literature Review

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Educational Document Verification through Blockchain: Literature Review

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ABSTRACT

In this survey of the paper, we have described blockchain-based document verification. The blockchain stores the data in the form of blocks, with each block linked to another block to secure the data. Each block contains the hash value of the data. It also contains the hash value of the previous block. Document verification is a time-consuming process. This research paper represents the comparison of hash techniques, namely SHA-3, SHA256, SHA1, and MD5. We are developing a user-friendly and secure document verification system using blockchain technology and QR codes. This work is useful for colleges and universities because a lot of documents are fake and fraudulent, so they can use this system to verify documents.

Keywords: QR Code, HASH Code, Document Verification, Blockchain Technology, SHA-3, SHA256, SHA1 and MD5

I. INTRODUCTION

The degree certificate, mark sheet, and other student-related documents provided by the university or college are of prime importance in the student's life, but the production of fake certificates and document manipulation is very easy because a paper document can easily be forged with the availability of advanced printing and copying technologies. On the other side, when students apply for jobs in any industry, they will have to verify their documents through email, but sometimes institutes, colleges, and universities do not reply in time to document verification emails because they have been effectively document verification processes.[1] Hence, there is a need to adopt document verification through QR codes and publish through blockchain. This process can very easily verify and ensure the authenticity of documents. Data is stored using blockchain technology in an unchangeable format. This is done through cryptography, which involves the encryption of data using a hash function. So the data becomes unalterable. It is practically impossible to hack. In this work, we will design and develop a web-based application in PHP and MySQL using a blockchain system. [2]

A. Blockchain Technology

Blockchain technology stores data in the form of blocks. Each block contains hash value of that block and hash value of previous block. Hence it led to the formation of chronological chain of blocks. Blockchain can be used for document verification because of its immutability that is data recorded on blockchain is extremely difficult to manipulate. The data on blockchain is visible to all participants in the network. [2]

There are three types of block chain that are as follows:

Public Blockchain: public blockchain are open network where anyone can participate, view and validate transaction. [2]

Private Blockchain: Private Blockchain requires permission to access. Private Blockchain is type of blockchain used by organizations. It offers greater privacy. [2]

Consortium Blockchain: Consortium Blockchain is semi decentralized network where group of organizations governs the blockchain. Access is restricted to members. It provides balance between private and public blockchain.

B. Digital Signature

Digital Signature is cryptographic technique. This technique used to verify the authenticity and integrity of digital documents. Data is encrypted using private key and data is decrypted using public key. [3]

C. Hashing

Hashing is used in cryptography to convert data into fixed-size string characters. [3]

D. QR Code

A QR code, or Quick Response Code, is a type of two-dimensional barcode that contains encoded information. QR codes can store various types of data, including text, URLs, contact information, or other types of data. They are widely used for quickly accessing information using a Smartphone or other devices equipped with a camera and QR code scanning software. QR codes consist of black squares arranged on a white square grid, typically with a square shape. When scanned by a QR code reader, the encoded information is extracted and processed. QR codes are commonly used for marketing, advertising, ticketing, product tracking, and various other applications where quick access to digital information is required. [4]

II. LITERATURE REVIEW

Following table shows the some no of research articles based on blockchain technology for the document verification. The problems that exist in blockchain system and the various techniques developed by various research workers to solve these problems have been discussed in the following Table No 1.

TABLE I LITERATURE SURVEY OF BLOCKCHAIN TECHNOLOGY

Authors	Title/Research Article	Methods and Techniques	Conclusion
Iftekher Toufique Imam, Yamin Arafat, Kazi Saeed Alam and Shaikh AkibShahriyar	DOC-BLOCK: A Blockchain Based Authentication System for Digital Documents, IEEE, (2021)	**SHA-256, Ethereum Blockchain, Cryptographic Hash, Peer to Peer Cloud, HTML, JavaScript, Public/Private Key Cryptography, Online Storage Security, Digital**	*This research paper represents the Blockchain Based Authentication System for Digital Documents. They use a web application for peer-to-peer cloud storage and digital document*

		Signatures, Hash, IPFS Hash	*verification that is based on the Ethereum blockchain. They were also used solidity programming language.[1]*
Venkata Marella, Anoop Vijayan.	Document Verification using Blockchain for Trusted CV Information, AMCIS(2020)	**Blockchain, Hash Value, Background Verification process, AES algorithm (Advanced Encryption Standard), Hyperledger fabric.**	*This paper aims to develop a solution for the background verification process of job applicants during the hiring process using by comparing the hash value of the given document with the hash value of the document present on the blockchain.[2]*
Sthembile Mthethwa, Nelisiwe Dlamini, Dr. Graham Barbour.	Proposing a Blockchain-Based Solution to Verify the Integrity of Hardcopy Documents, IEEE(2021)	**SHA – 256, Blockchain, 2D Barcodes, Cryptographic Hashing, Integrity, Optical character recognition (OCR), Secure Hash Algorithm, Tesseract**	*This paper presented a proposed solution for the problem of document forgery. Documents were generated using a font known as Any OCR (which is designed for OCR tools) and Tesseract was used to validate the documents.[3]*
Saqib Rasool, Afshan Saleem, Muddesar Iqbal, TasosDagiuklas, Shahid Mumtaz and Zia ul Qayyum.	DOC-BLOCK: A Blockchain Based Authentication System for Digital Documents, IEEE (2018).	**Docs-Chain, Blockchain, PoE (Proof of Existence), OCR**	*This paper presents a semi-private blockchain based degree verification solution which. It also enables the verification from the photocopies of all the degrees.[4]*
Omar S. Saleh, Osman Ghazali, Muhammad Ehsan Rana.	Blockchain Based Framework for Educational Certificates Verification, Journal of Critical Reviews, 2020	**Hyperledger Fabric Framework, Blockchain**	*This research paper represents blockchain-based framework for Educational certificate verification based on Hyperledger Fabric Framework [5].*
YassynzhanShakan, GalimkairMutanov,	Verification of University Student and Graduate Data	**Blockchain, Smart Contract,**	*This project created the cutting-edge UniverCert*

ZhanlMamykova, YerlanKistaubayev.	using Blockchain Technology,(2021)		*platform, which tracks academic achievement, issues educational certificates, and guards against data forgeries. This system includes a student's registration, verification, and authenticity of educational documents.[6]*
Osman Ghazali and Omar S. Saleh	A Graduation Certificate Verification Model via Utilization of the Blockchain Technology,(JTEC)2019	**blockchain,hash-256, public/private key cryptography, digital signatures, peer to peer network, proof of work**	*This research paper given model for academic certificate issuing and verification using blockchain technology. All the information that is required to validate and authenticate the certificate is hosted on the blockchain itself. In this model one can validate document just by comparing hash value.[7]*
Abdullah Ayub Khan ,Asif Ali Laghari,Aftab Ahmed Shaikh,Sami Bourouis ,Amir Madany Mamloukand Hammam Alshazly	Educational Blockchain: A Secure Degree Attestation and Verification Traceability Architecture for Higher Education Commission, (Appl. Sci.) 2021.	**Blockchain, Hyperledger Fabric, Smart Contracts, HDLU-Ledger Architecture, Digital Signature and Cryptographic Hashing.**	*This paper represents HEDU-ledger architecture document verification. Permission private network architecture created between stakeholders for certificate record traceability. They have used digital signature and hashing.[8]*
Turkanovi, Mrdovi and Marjan Heri	A Preliminary Review of Blockchain-based Solutions in Higher Education,	**Review of Literature Based on Blockchain**	*This research paper represents how blockchain is used in higher education. How blockchain stores student achievement data and makes it available to authorized users. they have made analysis of existed solution.[9]*

Pavitra Haveri , Rashmi U , Narayan D , Nagaratna K , Shivaraj K.	EduBlock: Securing Educational Documents using Blockchain Technology, IEEE (2020).	**Blockchain, Ethereum, Interplanetary File System (IPFS), Smart Contract**	*In this research work they practically checked properties of blockchain i.e. security, traceability, and transparency and data integrity.[10]*

III.METHODOLOGY

The following figure represents the process of document verification using blockchain. In the workflow of that research, first, we create the admin login to upload certificates or details of the certificates for the view of certificate details. [5] Then we create the user login for the authenticated certificate. Then apply the techniques or modules to create QR codes and scanned signatures for scanning documents, document verification, and document validation.[6]

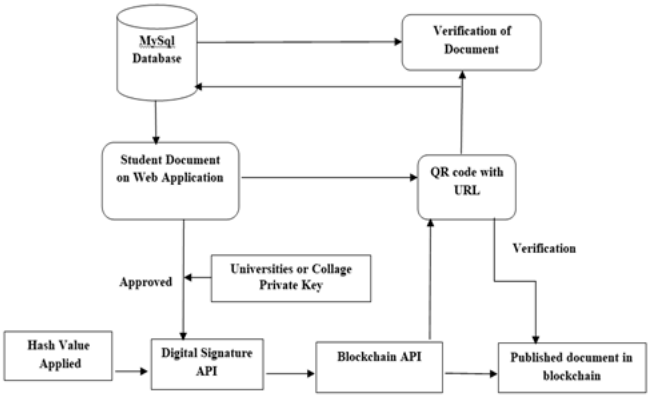

Figure1: Block Diagram of Documents Verification through QR Code

IV. CONCLUSION & FUTURE SCOPE

In this paper, we review a maximum of ten IEEE Scopus Index research papers for the blockchain study. We have observed that SHA256 is the most commonly used algorithm used for document verification using block chain technology. So for this project, we will employ the software engineering life cycle model, which includes database design and web application development, to keep student records. The web application integration and database are being created by us. Using the application's private key, we also generate a digital signature for document authentication. Include digital signatures in the online student document application. Use an API to upload documents to the blockchain. Using a hash value, the blockchain API creates a QR code that contains the document URL. Include, print, and resend the document to the blockchain with the QR code included. Post records to the blockchain. Nobody used SHA1,MD5 hash algorithms for document verification there is future scope for comparison with SHA256 algorithm. In future we will use SHA1 and MD5 algorithms for testing and comparison with SHA256 hash algorithm

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