

# Blockchain Implementation for Educational System

Vaishnavi<sup>1</sup>, Nisha S Shetty<sup>2</sup>, Akhila D.<sup>3</sup>, Rohith<sup>4</sup>  
<sup>1,2,3,4</sup> Student, Dept. of Information Science & Engineering  
 Mangalore Institute of Technology & Engineering, Moodabidri, India

Divyashree S<sup>5</sup>  
<sup>5</sup>Assistant Professor,  
 Dept. of Information Science & Engineering  
 Mangalore Institute of Technology & Engineering, Moodabidri, India

**Abstract:-** For individuals, accurate and full educational records are a valuable asset. Educational documents have been digitised in recent years. Two top concerns have been reported in the previously proposed systems and those issues have not been overcome. One is to achieve reliable and privacy-preserving storage of educational records, while the other issue is about understanding how the sharing of educational records and guarantees the process of sharing. Here, we propose a scheme for educational records based on blockchain storage and sharing, which incorporates blockchain, storage database and cryptography techniques to ensure a reliable and protected setting. This emerging technique is used in our proposal to make sure the security and reliability. The off-chain database stores the original educational records in encrypted form more specifically, while the records' hash information is stored on the blockchain. To ensure the protection of data storage, the off-chain records are regularly anchored with the hash data on the blockchain. Cryptography approaches are common to manage the encryption of documents and digital signature of messages.

**Keywords:-** *Cryptography, Security, Reliability, Decentralized, Encrypted.*

## I. INTRODUCTION

One of the most emerging technology in today's world is the Blockchain technology, just like artificial intelligence and extended reality. Blockchain is usually used for the financial and crypto currency focus, but use of blockchain in education sector has brought several changes and introduced different solutions to the problem that goes beyond the traditional ones. The process of accessing the credentials and academic records and the validation of transcripts were done by the validation of the transcripts were done by an uncertain process in the traditional education system was posing several kinds of problems in its expansion also growth. In order to solve this issue we can make use of the software called the Blockchain. Blockchains are preferred because of its decentralized storage, immutability of the information, traceability and transparency. The advancement in the field of blockchain will increase confidence in global corporate networks. The features are thought to be cutting edge, and they will improve information security and storage.

## II. LITERATURE REVIEW

[1] In a paper by Christian Deldago von, Eitzen, Luis E. Anido, Rifon, Manuel Jose Fernandes Iglezasis This section highlights the key features necessary for the education credentialing scenario. Firstly, we describe the general attributes of blockchain that numerous studies have mentioned, such as decentralization and immutability.

[2] In a paper by Ashraf Alam says that Block chain is a preliminary study of the present status of blockchain adoption in the educational sector. The aim of this study is to increase public awareness of blockchain technology whilst emphasising the advantages, risks, difficulties, and complications with its use in educational contexts.

[3] In a paper by Zoey Ziyi Li, Josephk. Liu Jiangshan Yu, Dragan Gasevic described Blockchain technology is reshaping fundamental structures in many industries. Similarly, there is an increasing interest in adopting blockchain as a new solution to addressing educational credentialing problems.

[4] In a Shankar Iyer paper, his paper's goal is to conduct a thorough literature study to evaluate the function of Blockchain technology in sustainable education. In this article, sustainability is presented as a crucial business component for managers and leaders in education-based businesses

[5] In a paper by Shankar Subramanian the purpose of his paper is to portray an integrated Education Model which proposes to be student-centric and use technologies like Blockchain technology which can offer security, authenticity, immutability, longevity, data, information, decentralization, no intermediary, reliability, and data integrity. Education Blockchain 4.0 is a part of the Industrial revolution 4.0 which is disrupting the education sector.

[6] In a paper by Viktorija Stepanova, Ingars Erins says that it may be stated that this technology is a universal technological solution that may be applied to any digital asset. Integration of blockchain in business processes allows decentralizing control, implementing safe transaction on the web, fully transforming document circulation into electronic format and automating numerous processes in any sphere of human life.

[7] Sheikh Idress and Mariusz Nowostawski wrote a paper about this. Contains thorough information on the changes brought about by blockchain technology in all significant societal sectors. - Acts as a venue for knowledge exchange with an emphasis on the future orientations of Blockchain-related models, architectures, frameworks, and policies.- Emphasises how Blockchain technology can function in conjunction with other types of current technology..

[8] In a paper by Nishant Kumar, Dr MitushiSingh,Kamal Upreti, Divya Mohan says Blockchain technology with the potential to disrupt established business processes has emerged with a different student and institution-centric applications for higher education. This study aims to investigate educated individual beliefs and behavior toward blockchain adoption in higher education.

[9] According to a report by Emanuel Estrela Bessa and Joberto S. B. Martins, the Blockchain technology was first used to deploy different cryptocurrencies. Blockchain is currently seen as a multipurpose technology with enormous potential. Applications built on blockchain technology come with features like authenticity, immutability, and consensus by default. In addition, information kept on a Blockchain ledger can be viewed from anywhere at any time. The management and upkeep of educational records has a lot of potential for blockchain technology. The educational record repository described in this work uses blockchain technology to maintain and disseminat educational resources for academic and professional audiences.

### III. PROPOSED METHOD

The approach that is being suggested will provide students absolute control over the records they request from an institution and total access to their own records while maintaining the integrity of immutable data. Using cryptographic techniques, the blockchain keeps data that has been permanently stored and encrypted into decentralized blocks. The traditional educational model had a hazy method for gaining access to credentials and academic records, which presented several difficulties or hurdles to the model's development. The approach presented here was utilized to quickly find a solution to this issue.

#### A. Working

The proposed system will allow the students to request for their required documents. Each student will be provided with a login id and password. So the student needs to fill in his credentials. Once the student will send his request, the organization/institution will receive the request sent by the student. Based on his request of the documents the requested document will be uploaded. The document sent by the institute can only be accessed by the student who has sent the request. The student can view and download the documents.

A blockchain is a decentralized, distributed, and public digital ledger that is used to record transactions across many computers so that the record cannot be changed retrospectively without requiring the adjustment of all following blocks and the consensus of the network. It allows educational institutions to secure the data of their students. They are able to take ownership of their credentials, awards, certificates, and academic identity. It builds trust and transparency between educators, management.

We offer a plan for storing and distributing educational records based on blockchain technology that combines cryptography, storage databases, and blockchain technologies to create a secure environment. In our proposal, we ensure security and dependability using blockchain technology. Smart contracts on the blockchain are used to control the storage and sharing mechanism. The off-chain database stores the original educational records in encrypted form more specifically, while the records' hash information is stored on the blockchain. To ensure the protection of data storage, the off-chain records are regularly anchored with the hash data on the blockchain. Cryptography approaches are common to manage the encryption of documents and digital signature of messages. The system includes a WebApp-based interface that allows the parties engaged in the transaction to communicate effectively, laying the groundwork for a decentralized approach. The main objective of this project is to offer a trustworthy and safe method of managing academic records. Additionally, it grants students total autonomy from the institution and creates a secure ledger of educational records that is impenetrable and tamper-proof and that only authorized parties can access and share. More over this technology will help to address challenges of existing system such as data security, privacy and accessibility. Overall, the goal of a blockchain project in the educational system is to create a reliable and protected setting for the management of educational records, which can facilitate the transition to a digital and decentralized approach in the education sector.

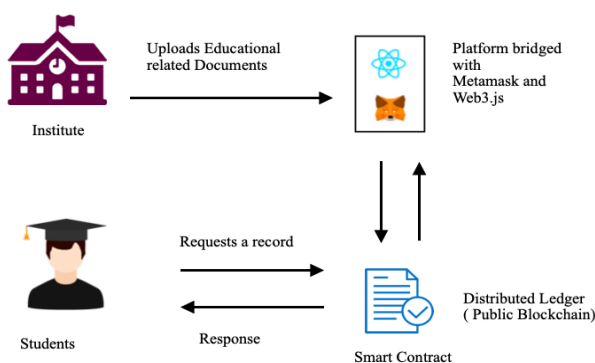


Fig. 1: Data Flow Diagram

### IV. RESULTS AND DISCUSSION

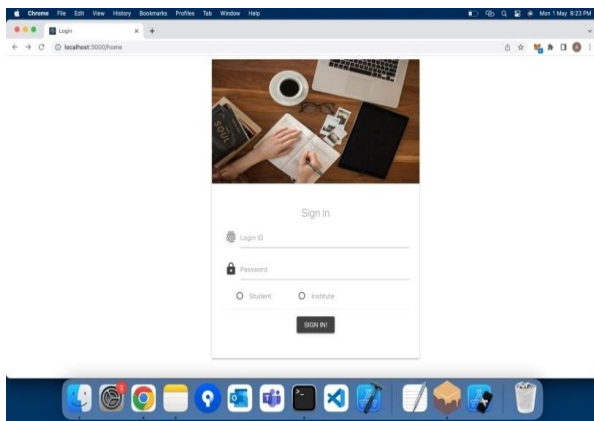


Fig. 2: Login page

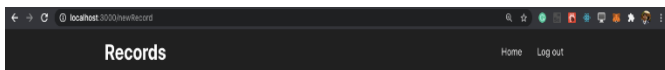


List of records

Institute ID	Record Name	Description	Created Timestamp
--------------	-------------	-------------	-------------------

No records!

Fig. 3: List of records before requesting



#### New Record

Student ID  
17117270

Institute Address  
0x47f6eD308811381a581764024F0188c12533c

2020-11-03 21:01:04

Record Name  
Certificate

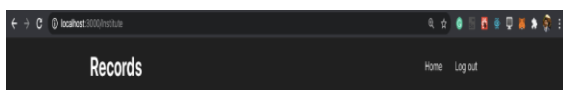
Upload to Blockchain

#### Enter Description

Required for scholarship application

Add

Fig. 4: Requesting for records



List of Records

Student ID	Record Name	Description	Created Timestamp
17117248	Certificate	jnykzn	2020-11-03 20:28:40
17117270	Certificate	Required for scholarship application	2020-11-03 21:01:04

Fig. 5: List of records

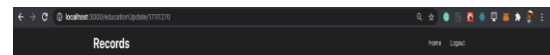
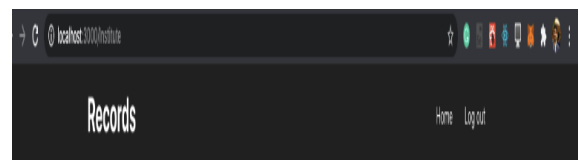


Fig. 6: Uploading requested records



List of Record Requests

Student ID	Record Name	Description	Created Timestamp
17117270	Academic Certificate	Required for scholarship application	2020-11-03 21:13:10

Fig. 7: Uploaded records

### V. CONCLUSION

The market for fake degrees (certificates) is increasing along with online learning. This is now an essential part of numerous businesses and educational institutions all around the world. In order to avoid these, the certification management issue can be easily resolved using the blockchain, where the universities can store the certificates on the blocks as immutable entries. Students may readily share these credentials using exact URLs in their email signatures, social media profiles, and resumes. Many blockchain development companies provide such certificate and identity management services. All the documents saved in the blockchain are visible and immutable because it is decentralized, making them all verifiable.

**REFERENCES**

- [1.] Christian Delgado von Eitzen, Luis E. Andio-Rifon, Manuel Jose Fernandez Iglesias. "Blockchain Application in Education: A Systematic Literature Review". (Dec 2021)
- [2.] Zoey Ziyi Li, Joseph k. Liu Jiangshan Yu, Dragan Gasevic. "Blockchain-based Solutions for Education Credentialing System: Comparison and Implications for Future Development". (Aug 2022) Review". (Dec 2021).
- [3.] Ashraf Alam. "Platform Utilising Blockchain Technology for eLearning and Online Education for Open Sharing of Academic Proficiency and Progress Records" (Aug 2022).
- [4.] Shankar Iyer, "Sustainable Education Management Blockchain: A Systematic Literature Review".(Dec 2021).
- [5.] Shankar Subramanian, "Education Blockchain 4.0-a student-centric smart system". (Dec 2021).
- [6.] Viktorija Stepanova, IngarsErins, "The Blockchain-Based Model for Professional Growth Data Processing". (Jan 2021)
- [7.] Sheik Idress Mariusz Nowostawski, "Book Transformations Through Blockchain Technology" (Mar 2022).
- [8.] Nishant Kumar, Dr Mitushi Singh, Kamal Upreti, Divya Mohan, "Blockchain Adoption Intention in Higher Education: Role of Trust, Perceived Security and Privacy in Technology Adoption Model" (Jan 2022).
- [9.] Bakri Awaiji, Ellis Solaiman, Adel Albshri, "Blockchain for Diamond Industry: Opportunities and Challenges". (Dec 2022).