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Block chain in Student Registration System

Ms.K.Maheswari[1]M.Tech., C Kavya[2] B Mohan Sai[3] P Madhusudhan[4] D Mahidhar[5].

[1]Assistant Professor, [2345]UG Student [12345]Department of Computer Science and Engineering,

[12345]Siddharth Institute Of Engineering & Technology, Tirupathi, Andhra Pradesh, India.

Abstract

Blockchain enables us to design a decentralised environment free from interference from outside parties. Every completed transaction is permanently validated and recorded in a public ledger. We suggest a global platform for managing student data and attendance based on blockchain technology. It makes up an internationally reputable, decentralised network for managing student data, attendance, and file sharing that can provide security at the level of a school or higher educational institution.

***Key words**: Block chain in student management system, student registration system.*

INTRODUCTION

The current approach for managing student data can be somewhat cumbersome, and there is a chance that the data will be compromised or stolen. The current faculty organisation is ineffective when using a standardised methodology to disseminate knowledge. The most crucial use of block chain technology is to prevent the sterilisation of student information. With the aid of features like simplicity, changelessness, and sent methods for throwing away the records, record technology or block chain technology offers a suitable foundation for the execution of SMS. Each organisation has vital information that has to be protected. Through the use of block chain technology, we may build a dedicated setup. when no other third-party organisation has any control over the transactions or other data. The public ledger is used to store and record all completed transactions, and each transaction has its own permanent and distinctive address. In order to create a student registration and management system that is trusted around the world, the proposed system can take advantage of the benefits of the block chain, which, as a redistributed design, offers security, anonymity, longevity, integrity, transparency, unchangingness, and international ecosystem simplification. Academic records are a common measurement around the globe and, from the user's point of view, are an important asset for people vying for jobs, scholarships, and general skilled and tutorial visibility. Our current academic records management systems are primarily localised physically, call for particular and complicated procedures to get information, are frequently unreliable, and lack any academic standards.

This research provides a Blockchain-based Student Registration System bearing in mind the potential of the blockchain and the citizen's global visibility perspective. It is intended to make it possible for anybody to have access to and be able to store various types of academic records with credibility on a global scale. It is a system to verify student group activity and distributed management and access to academic records with additional built-in security features like credibility and privacy. The teacher can have the group action knowledge available and up to date, and students will benefit from receiving their materials in a single, clear read.

LITERATURE

Multichain

A platform called Multichain was developed in 2015. For cryptocurrency, multichain was created. A blockchain containing private and permission kinds is called Multichain. The simulation was only performed in a university lab, but the simulation's data were actual data from the running system.

Block chain in Education

A cryptographer first discovered blockchain technology in 2008, and it wasn't until 2014 that it was combined with smart content features. Numerous earlier studies have found that blockchain technology can be used to enhance educational processes and activities, including book or library borrowing, student loans, graduation certificates, and others. According to prior study, Blockchain is useful for supporting operations in the education sector in addition to Bitcoin.

Features of block chain

The qualities of blockchain technology assist in monitoring lecture activities to reduce the occurrence of false diplomas, particularly those awarded by organisations with the ability to do so. The following are Blockchain's characteristics: Immutable means that information stored on the Blockchain cannot be changed and cannot be removed. In this instance, attendance records that come from students showing up for lectures will be kept forever and cannot be deleted.

Unchangeable, meaning that data that has been stored on a blockchain cannot ever be modified or changed. In this instance, the attendance that results from students showing up to lectures will be recorded indefinitely and cannot be modified. Secure means that all data will be stored in a secure manner using blockchain technology. Blockchain technology (multichain) in this instance uses unidirectional encryption. The hashing method is used to encrypt the transaction (absence transaction) before it is recorded. In addition, the transactions employ Merkle tree approach hashing, which applies to the entire transaction rather than just one transaction.

Transparency refers to the ability of all nodes on the registered network to view all transactions or absence transactions that have been recorded on the blockchain.

Peer-to-peer transactions, in which there is no middleman present at the moment of the transaction, take place on the Blockchain. In this instance, the university directly provides the students with attendance. The term "distribute factor" refers to the idea that all absence transaction data stored in the Blockchain will be made available to all nodes connected to the same network.

Forms of Blockchain and Frameworks

Blockchain is viewed as a means to store digital data in a specific fashion at a higher level. The information could be in the form of text, pictures, files, or transaction details describing a Bitcoin transfer between two accounts. This data is organised in a linear fashion and saved as blocks, one after the other. As a result, it forms a chain of blocks, or "blockchain," each of which serves as a data storage unit and contains information about blocks before it in addition to transactional and digital data Distribute factor refers to every omission transaction, the next block, and the timestamp at which that block was produced. Blockchain technology has applications in a number of industries, including finance, logistics, asset and supply chain management, healthcare, education, government, and data management, among others. 3 There are three types of blockchain: consortium blockchain, permissionless blockchain, and blockchain with permissions.

The term "permissioned blockchain" refers to a private, decentralised blockchain that is controlled by one or more parties that also determine who may join the network and what privileges may be granted to users. This kind of blockchain adheres to the fundamental principles of blockchain technology and keeps data in encrypted form. To ensure transparency, individual organisations might benefit from using permissioned blockchains. Permissioned blockchains come in many forms, such as "Bankchain" and others. In the event of a public blockchain, anyone can join the network and have the rights to contribute to the data generation and securely access the network's information. This blockchain uses consensus procedures, proof of work, proof of stake, miners, mining, etc. It is entirely decentralised. Blockchain instances that are quite well-known are Bitcoin and Litecoin. Another kind of blockchain is one that is developed and managed by a collection of businesses or individuals. Although it lacks a central authority, the group's members each have certain tasks and responsibilities that determine how it is managed and carried out. A variety of blockchain frameworks are emerging on the market. The most popular blockchain frameworks include MultiChain, Hyperledger, Ethereum, Litecoin, Dash, Ripple, Monero, Peercoin, and Zcash. Researchers most frequently employ the blockchain frameworks Ethereum and Hyperledger.

Cryptographic Functions:

The blockchain uses a variety of cryptographic functions, often known as hash values, to arrange the data. With the help of these cryptographic hash values, the data authenticity and integrity are preserved at several stages. The data block and the information contained within the block are frequently organised using hash functions, asymmetric keys, hash pointers, merkle trees, digital signatures, etc. In most cases, a hash function is a mathematical equation with characteristics that make it suitable for encryption. A hash function handles the task of translating a distinct binary input of any length to a fixed length key value.

One illustration of such a hash algorithm is SHA256. The private and public keys that are generated for each block in the blockchain are known as asymmetric keys. These keys are used for the digital signature and verification functions. You may get more information about how cryptography is used to organise data in blockchains.

CURRENT SYSTEM

Denso Wave created the two-dimensional matrix known as Quick Response code (QR) in 1994 in Japan. To be read by a smartphone, the QR code is laid up in rows and columns of black and white text. It is a type of 2D bar code that was once utilised to make information easily accessible. As a two-dimensional bar code, a QR code allows for more than 4000 characters. A QR code can be utilised in a variety of ways. instance as offering Wi-Fi connection while encoding basic text, URLs, phone numbers, business cards, and information about products or services. 2018b) Wikipedia As a result, when students attend FSKKP, a combination of these two technological ideas will be used. Where to record student attendance so that the ledger's data can be seen by scanning the student's QR code. So, avoiding two technical errors when dealing with a lot of data will be easier this way. Because there are fewer parties involved, the data saved in the blockchain is extremely safe.

DISABILITIES OF THE EXISTING SYSTEM

• Long procedure • No security • Limited area

PROPOSED SYSTEM

We suggest that software be created utilising the fundamental Blockchain concepts of distributed databases and the creation of cryptographic keys for each attendance BLOCK. The system was created with scalability in mind, and it can instantly mark the attendance of hundreds of courses across all of our campuses in India. Currently, class attendance is recorded in blocks that are added one after another. The system is tamper-proof because it is impossible to change data about students' past attendance. It also has a tonne of features that make it more functional and user-friendly. The plan is very original, with careful consideration and execution, It's a great time for an Indian Education Organization to be the first in developing and deploying Blockchain based campus solutions since it allows people the incredible flexibility to develop into better people who, in the end, benefit society.

Verifying certifications, credentials (credits), attendance, and other documentation like personal essays, letters of reference, project reports, dissertations, etc. is one of the hardest problems in the faculty entrance office. The traditional faculty admissions process will be impacted by blockchain in the following ways: sharing and certification validation. More efforts to verify paper certificates are desired by the third parties. By requesting that the issuance certification authority, or certification authorities, keep a long-run archive, verification can occasionally be accomplished. Sometimes, Physically producing results will take some time, making it difficult for learners to satisfy deadlines for school admissions. A student must obtain certified transcripts from their home university before applying for postgraduate programmes overseas (college of graduation). Furthermore, the students frequently had the opportunity to produce duplicate copies in sealed envelopes with signed or sealed seals/flaps. The scholar then faces additional credentials checks, which are quite problematic. Teachers are even required to maintain hard copies of the kids who attended. By replacing the paper-based approach, blockchain technology may assist in the digital transformation of certification processes. With blockchain technology, any institution's certificates or grade reports can be reliably and permanently secured. Additionally, it enables users to confirm their identity and the legitimacy of certificates before uploading them, eliminating the need for additional certificate provider verification. Hence, verifying the user credentials by colleges and institutions won't be necessary.

The intention behind creating an attendance management system is to automate the manual process of taking attendance. The software's ability to automatically generate reports at the session's end or in between sessions is another reason for its development. The quick retrieval, effective storing, and maintenance of data make the suggested system user-friendly. The suggested system has a graphical user interface, which makes it very easy for users to interact with the system. This system also offers the option for students to request a make-up lecture for those that they missed, but the teacher must have already scheduled the desired lecture. Another feature is that any teacher may delegate their lecture to another educator in the event of their unavailability. The teacher in charge of any given class also has the power to promote students from one semester to the next and to prevent discontinued students from enrolling in subsequent semesters. For security reasons, teachers who register for the system must first send their registration request to the admin for approval. Registration of students is only feasible if their roll numbers have previously been entered by the admin into the database. Teacher access to the system is contingent upon admin approval of registration request. According to figure 1, there are three actors in the system. Each admin, teacher, and student has their own login area. Teachers and students must initially register in order to utilise the system. After logging in, the admin can update the timetables and verify the teachers. Teachers' duties include recording and monitoring attendance, distributing lectures, and encouraging students. Students' duties include checking attendance and submitting requests to the teacher.

• Integration of security measures for students' attendance utilising Blockchain technology.
• Can enhance system attendance performance.

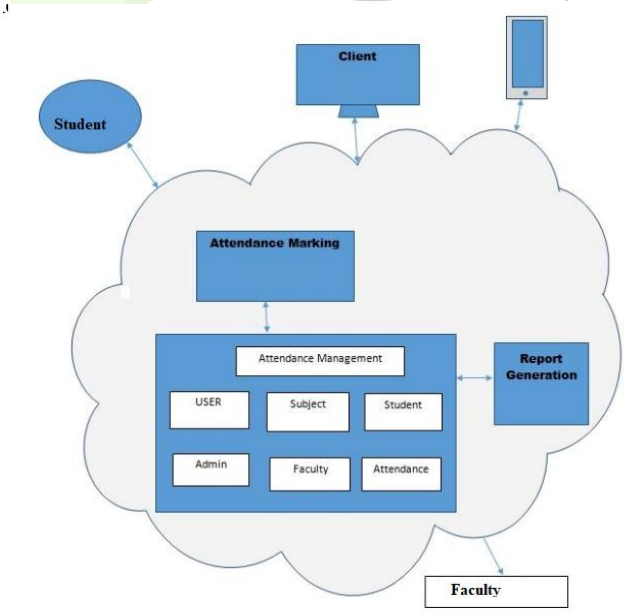


Fig 1: **Block Diagram**

PROJECT DESIGN

a) There are two users in this system: an administrator and a teacher.
1. Admin module: The admin module is responsible for the system's primary function. The only person who has the authority to add new users to the System is the administrator. All legalisation work is audited by the admin. The admin is the principal actor in the use case diagram up top. The administrative registering system can assist the teachers.

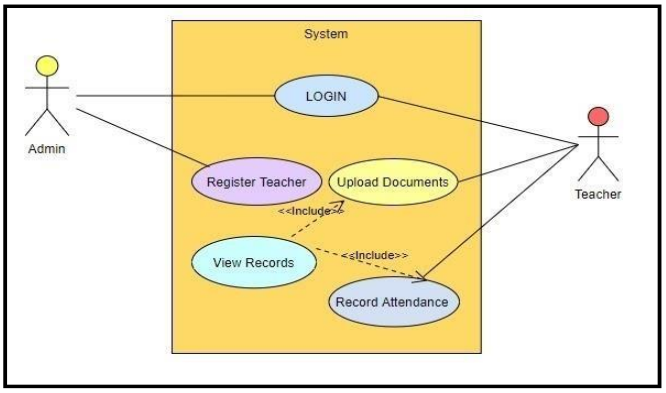


Fig 2: Use Case Diagram

2. The student activities are all contained in the teacher's module. They will each be able to upload their respective certifications and documentation.

Teachers and other staff can control student attendance in the teacher module and access it for later use. We used Python's attendance management module, which is intended for teachers to keep track of their students' attendance records. Java 2 is a template engine created in Java that we used in this. We utilised Flask as the web framework for our attendance system. Our teacher advised us to create a single button to mark present or absent in the event that every student is either in class or completely absent. We built the attendance system after taking that into account. In this section, the teachers have the ability to mark students' attendance, view it, and verify the accuracy of the data. Blockchain and IPFS cooperate to help with data storage. We store the transaction conducted during the upload of the documents when they are uploaded over IPFS utilising the ropsten network.

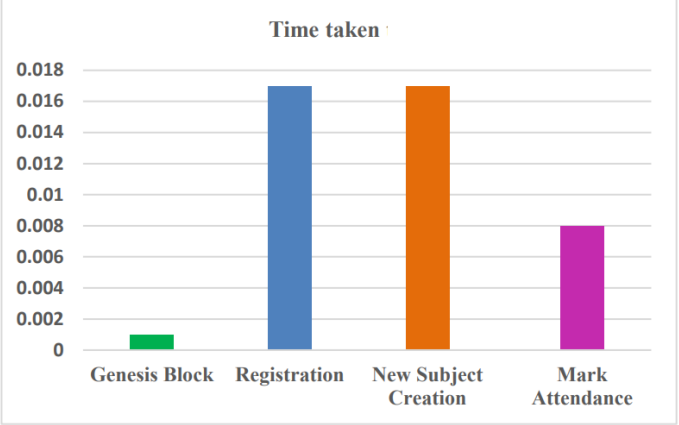
We used the Ropsten network, which is accessible on Metamask, to distribute smart contracts. Every time a file is uploaded, we receive its IPFS hash, which can be used to later retrieve it, as well as its Ethereum hash and transaction id. We had to first learn about Metamask, how it functions, and how to set up accounts on Metamask in order to complete the above processes.

Then we looked at the many networks that Metamask offers and how ether is obtained. Following the setup of the metamask accounts and the deployment of a smart contract on the ropsten network, a connection was established to our website. Participants in the blockchain are registered by the admin.

2)Teachers can preserve student attendance records by logging into the system for keeping track of attendance after registering.
3) The previously recorded attendance that is kept on the blockchain is accessible to the teachers.
4) Instructors will be able to use IPFS to upload student files and documents.
5) By doing this, it is possible to save all student files and record the transaction on the blockchain.

Results Analysis

The Graph below shows the time taken to generate the block by proposed algorithm.



CONCLUSION

This study's conclusion is that blockchain technology can alter how records are kept and maintained. Blockchain technology is a reliable invention. Blockchain aids in the decentralised and immutable maintenance of records and data. It also keeps the records accurate and transparent. It might alter the way we think about using third-party entities and relying on records. Also, it will lessen paperwork.

This study offers a plan for creating a fully functional student management and registration system that includes a system for recording attendance and storing student records.

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