Hospital Management System using Blockchain

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Abstract -Electronic health records are health information of patients that are saved digitally in a network. The information of the patient are stored in the blockchain and these details are stored in the block chain as a blocks of data. The data is encrypted by the algorithm known as AES which is used to encrypt all the data of the patients. A Blockchain network is used in the healthcare system to exchange patient data improve the performance, security, and transparency of sharing medical data in the health care system. The three main feature of blockchain techonlogy security. Decentralization Transparency make any application secure and not accessible by unauthorized parties.

***Key Words*:** Health records, Blockchain, Encryption of data, Decryption of data, Security.

1.INTRODUCTION

Blockchain is a distributed ledger technology that can be used to create secure, transparent, and tamper-proof healthcare management systems. A healthcare management system based on the blockchain can securely manage and store health information such as electronic health records, patient information, medical histories, and clinical trial data. One of the key benefits of using blockchain technology in healthcare management systems is that it can enhance the security and privacy of health data. Because blockchain is a decentralized and transparent system, it eliminates the need for intermediaries, such as third-party data aggregators and clearinghouses, that are typically used to manage health data. This helps to prevent data breaches and protect the confidentiality of patient data. Another advantage of using blockchain in healthcare management systems is that it can help to streamline administrative processes, reduce costs, and improve efficiency. For example, blockchain technology can be used to automate claims processing, manage drug supply chains, and track medical devices, among other applications. Healthcare management systems based on blockchain technology can provide significant benefits in terms of security, privacy, efficiency, and cost savings. As the healthcare industry continues to evolve, it is likely that we will see more widespread adoption of blockchain-based healthcare management systems in the years to come.

1.1 MOTIVATION

The motivation for developing a project for Better health and the welfare of society. It plays a vital role in the economic progress of the nation. I'll health, casualty, emergencies occur every day and the diseases are expected to be diagnosed and treated. A health record is a collection of clinical data related to the patient's mental and physical health, gathered from different sources. Health record consists of a patient's medical history, examination, diagnosis, treatment, results of lab investigation, scanning reports, alerts like allergic to etc. These health records can be managed both manually and digitally.

1.2 PROPOSED SYSTEM

In Proposed System there is a registration process for patient and hospital after that they login into the system. The hospital insert patient records in the system. Then records is being encrypted with AES algorithm for security purpose. Hash value will be generated for particular record and Using blockchain record stored in local database, and original records also stored. Health Record Management using Blockchain.If another hospital need records they send request to local database for access of the records. Request goes to patient and they gives access to there record. After that record is send to hospital and at time of transaction hash value get verify for particular record, that there is any changes doesn't occur in record then the record successfully send to the requested hospital Or any changes occur in blocks at the time of transaction then record goes in temper and alert message will be sent to the hospital through mail. This System will use the patient email to make authentication

II. PROBLEM STATEMENT

The healthcare industry faces numerous challenges related to data security, interoperability, and transparency. Traditional hospital management systems often struggle to adequately address these challenges due to centralized data storage and reliance on trust-based systems. Security breaches, data manipulation, and lack of transparency can compromise patient privacy and trust in healthcare institutions.

III. LITERATURE SURVEY

1. Preserving the privacy of electronic health records using blockchain" Electronic health records (EHRs) are health information of patients that are saved digitally in a network. Various opportunities to enhance patient care, performance measures in clinical practice and contribute to clinical research in the future are provided by EHRs.(Yogesh Sharma, 2020).

2."Using blockchain for electronic records" In this paper, we discuss how the blockchain technology can be used to transform the EHR systems and could be a solution of these issues. We present a framework that could be used for the implementation of blockchain technology in healthcare sector for EHR.(Ayesha shahnaz, Usman qamar, and ayesha khalid, 2019).

3."Electronic health care data record security using blockchain and smart contract" This paper presents a blockchain-based system that helps the patient's data be managed and secured into a single record held by the patient. This system was developed using the Ethereum network using Ganache, as well as programming languages, tools, and techniques such as Solidity and web3.js.(Farjana Khanam Nishi, 2022).

4."Development of an internet-of-healthcare system using blockchain" The Internet-of-Healthcare Systems is a highly distributed special emulation of the Internet of Things technology. Patient medical data sourced from the participating hospitals are integrated with a decentralized storage system using blockchain technology to provide the highest level of storage and access security possible, overcoming the security and data administration problems that may occur at the local hospital level where the patient data is stored within the hospital's central server, especially if that data is subjected to external threats.(Suparat yongjoh, 2023).

5."Healthcare management system blockchain with ML integration" A healthcare management system based on the blockchain can securely manage and store health information such as electronic health records, patient information, medical histories, and clinical trial data. One of the key benefits of using blockchain technology in healthcare management systems is that it can enhance the security and privacy of health data.(Aniket rajani, Aashutosh singh, Abhishek kumar, Chirayu bandekar, prof. S. M. Patil, 2023).

6."Emergency access control management system for personal health record based on blockchain" This paper proposes an emergency access control management system (EACMS) based on permissioned blockchain hyperledger fabric and hyperledger composer. In the proposed system, we defined some rules using the smart contracts for emergency condition and time duration for the emergency access PHR data items that patient can assign some limitations for controlling the PHR permissions.(Ahmed raza rajput , Qianmu, Milad taleby ahvanooey, and Isma masood, 2019).

7."A blockchain-based medical data sharing and protection scheme" In the paper, we propose a medical data sharing and protection scheme based on the hospital's private blockchain to improve the electronic health system of the hospital. Firstly, the scheme can satisfy various security properties such as decentralization, openness, and tamper resistance.(Hao Guo, Wanxin Li, Mark Nejad, 2019)

8."Blockchain for health management system: A survey on inter operability and security" This paper focuses on two main objectives, in the first one, it was carried out a Systematic Literature Review for exploring architectural mechanisms used to support the interoperability and security of Blockchain-based Health Management Systems.(Edgar r. Dulce villarreal, 2022)

9. "Blockchain for IOT- based healthcare : background , consensus , platforms and use cases" In this article, first, we give a brief background on blockchain. Second, popular consensus algorithms used in blockchain are discussed in the context of e-health.Third, blockchain platforms are reviewed for their appropriateness in IoTbased e-healthcare.(Partha pratim ray, Dinesh dash, Khaled salah and neeraj kumar, 2019)

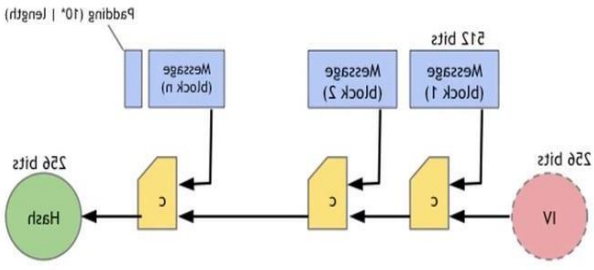
10. "Access control for electronic health records with hybrid blockchain-edge architecture"This paper proposes a hybrid architecture to facilitate access control of EHR data by using both blockchain and edge node. Within the architecture, a blockchain-based controller manages identity and access control policies and serves as a tamper-proof log of access events.(Ahmed raza rajput , Qianmu, Milad taleby ahvanooey, and Isma masood, 2019)

IV. SURVEY ON ALGORITHM

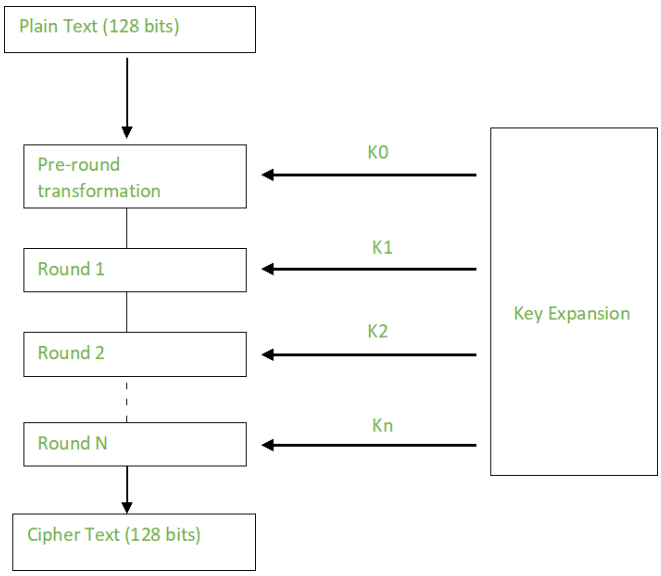
We are using SHA 256 AND AES algorithms . SHA-256 stands for Secure Hash Algorithm 256- bit and it's used for cryptographic security. Cryptographic hash algorithms produce irreversible and unique hashes. The larger the number of possible hashes, the smaller the chance that two values will create the same hash. The AES Encryption algorithm is a symmetric block cipher algorithm with a block/chunk size of 128 bits. It converts these individual blocks using keys of 128, 192, and 256 bits. Once it encrypts these blocks, it joins them together to form the ciphertext.

SHA 256 algorithm

You can divide the complete process into five different segments,
Step 1 — Initialize Hash Values (h) Now we create 8 hash values
Step 2 — Padding Bits
Step 3 — Padding Length
Step 4 — Initializing the Buffers
Step 5 — Compression Functions
Step 6 — Modify Final Values
Step 7 — Concatenate Final Hash



AES algorithm



V. OUR PROPOSED MODEL

This Proposed System of hospital management system use blockchain technology with SHA256 and AES algorithms in our suggested approach to give a better security-related solution. By utilizing this algortihm, This System introduce new capabilities that can serve as the foundation for subsequent implementations of this idea. While Blockchain technology exploits the decentralization of data to offer great security, founded on the idea that data should be centrally managed. This system model in this paper, showing how we have apply both of them for this specific application.

5.1 System Architecture

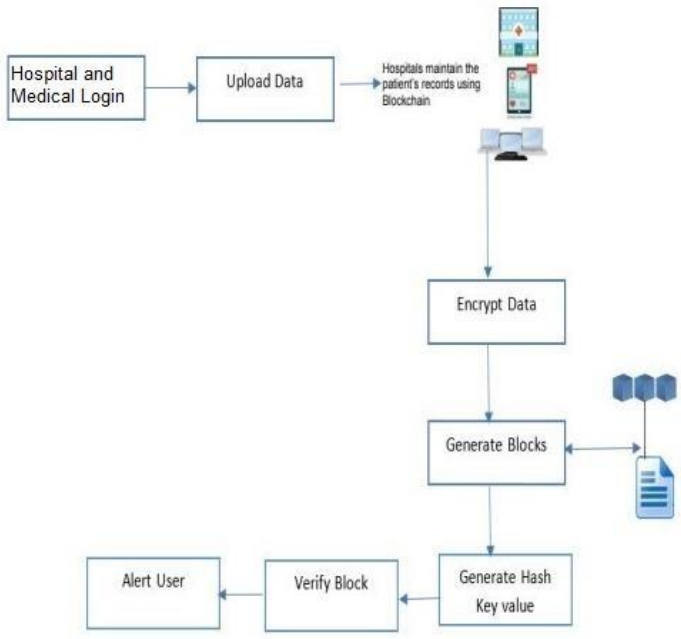
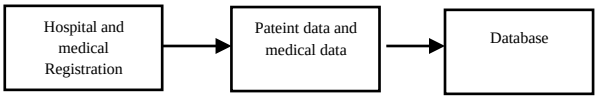
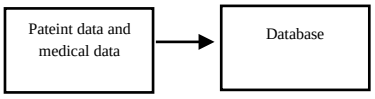


Figure 1: System Architecture

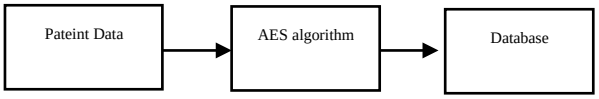
1. **Hospital and Medical Registration Module:-**Creating a hospital registration and medical registration modules within a hospital management system using blockchain involves managing patient details, identity verification, medicine records and maintaining secure records



2. **Upload Data Module:-**This Module will store the data to the database of the hospital management system



3. **Encrypt Data Module:-**This Module will take the patient data from the hospital and encrypt the patient data



4. **Generate EHR Block:-**This data should be encrypted and accessible only to authorized personnel for verification purposes.

5. **Verify Block :-**In this module the modify data will be compare with the store data in the blocks.

6. **Alert User:-**The Email will send to the doctor with patient name if data is modified.

5.2 Mathematical Model

I is Input of System
Input {I} = {Input1, Input2, input3}
Where,
Input1 = Hospital Registration
Input2 = Add Doctor Details
Input3 = Add Patient Details

Procedure {P} = {P1, P2, P3}
Where,
P1 = Hospital Registration
P2 = Doctor Registration
P3 = Patient Registration

O is Output of System
Output {O} = {Output1}
Where,
Output1 = Data is Protected by Encryption and Decryption Process to Protect Patient Data by getting Hack

NDD is Non Deterministic Data
NDD = { }
DD is Deterministic Data
DD = {I,O}

Hardware Requirement :
Windows 10
Processor: Intel P-III
Disk Space: 256 GB or more RAM

Software Requirement :
Front End: Microsoft Visual Studio 2022
Bank End: Sql Database server
Language: C#

VI. RESULTS AND DISCUSSIONS

This project illustrate the architecture to facilitate access control of EHR data by using blockchain. At first enumerate the following entities which take part in the architecture. Firstly, there is a registration process for patient hospital after that they login into the system. The hospital insert the patient records in the system. Then records is being encrypted with AES algorithm for security purpose. Hash value will be generated for the particular record and Using blockchain record stored in local database, The local databasehash value and original records also stored. If another hospital need records they send request to local databasefor access of the records using special access key. Request goes to patient and they gives access to there record. After that record is send to hospital and at time of transaction hash value get verify for particular record, that there is any changes doesn't occur in record then the record successfully send to the requested hospital Or any changes occur in blocks at the time of transaction then record goes in temper and alert message will be sent to the hospital through mail.

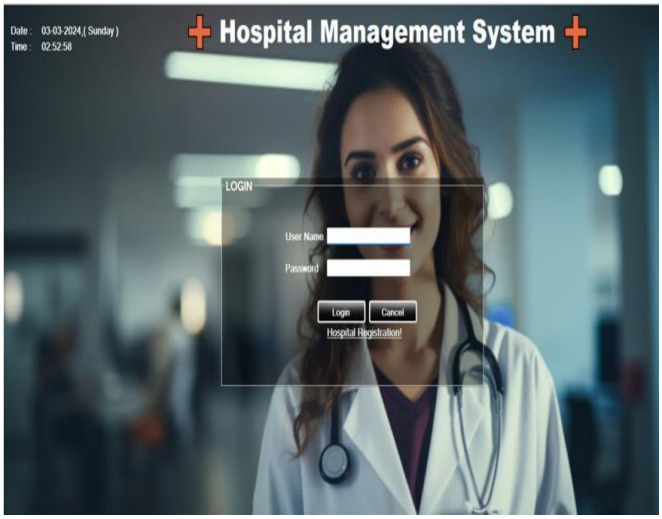


Figure 2: Login Form

Figure 3:Main Form

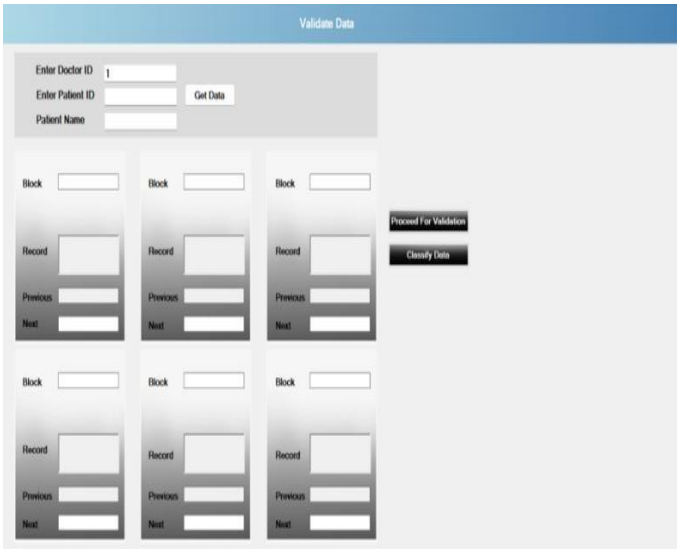


Figure 4: Data Stored Block's

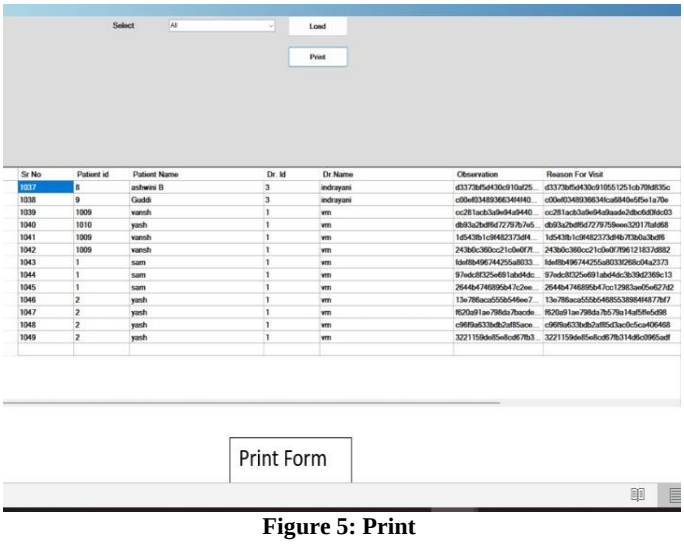


Figure 5: Print

VII. CONCLUSION

Hospital management system provide high security for patient information by removing intermediaries from the validation chain. Health record management system provide high security for patient information by removing intermediaries from the validation chain. This system enhance revolutionize how hospital use the patient record and improve healthcare services. The future of hospital management using blockchain technology holds immense potential to transform the healthcare industry by improving data security, interoperability, efficiency, and patient outcomes. However, widespread adoption will require addressing technical challenges, ensuring regulatory compliance, and overcoming potential resistance to change within healthcare organizations.

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