MEDICALCARE DATAMANAGEMENT SYSTEM BY USING CENTRALIZED BLOCKCHAIN

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ABSTRACT: **Medicalcare Data Management by using Centralized Blockchain, NFT storage and IPFS hash value involves utilizing innovative technology to securely store and manage patients' medical records and information. By using Blockchain technology, each patient's data is securely stored, reducing the risk of unauthorized access or tampering. Non-fungible tokens (NFTs) are used to represent each patient's unique medical record, providing a secure and transparent way to track and verify the authenticity of the data. The use of NFTs adds an extra layer of security and immutability to the data, ensuring its integrity and preventing data manipulation. IPFS (InterPlanetary File System) is used to store the hash value of each patient's medical record, creating a permanent and tamper-proof link to the data. The hash value serves as a digital fingerprint, allowing for easy verification and authentication of the data without compromising its security or privacy.**

Keyword : Medicalcare, Data Management, Healthcare patient records, Security ,Privacy, Transparency,

I.INTRODUCTION

In the rapidly evolving world of healthcare, the need for secure and efficient data management solutions has never been more important. Traditional methods of storing and sharing medical records are vulnerable to cybersecurity threats and breaches, putting patient privacy and data integrity at risk.Blockchain technology offers a promising solution to these challenges by providing a Centralized and immutable ledger for storing and managing medical data. By utilizing non-fungible token (NFT) storage on the blockchain, healthcare providers can ensure that patient records are secure, traceable, and tamperproof. Additionally, the Inter Planetary File System (IPFS) can be used to store the hash values of medical records, further enhancing the security and accessibility of data. With IPFS, healthcare organizations can securely store and retrieve medical information by relying on a centralized, reducing the risk of data loss or manipulation. By combining blockchain NFT storage with IPFS hash values, medical care data management can be revolutionized, providing patients and providers with a secure and efficient way to store and access critical medical information. The integration of these technologies holds great potential for improving patient in outcomes, streamlining processes, and enhancing data security in the healthcare industry.

II.LITERATURE SURVEY

In this paper"Data Privacy in Healthcare: In theArtificial Intelligence"Author name*: Neel Yadav, Saumya Pandey, Amit Gupta, Pankhuri Dudani, Somesh Gupta, Krithika Rangarajan.*Published in: 2023, The Data Privacy has increasingly become a matter of concern in the era of large public digital respositories of data. This is particularly true in healthcare where data can be misused if traced back to patients, and brings with itself a myriad of possibilities. Bring custodians of data, as well as being at the helm of disigning studies and products that can potentially benefit products, healthcare professionals often find themselves unsure about ethical and legal constraints that undelie data sharing. In this review we touch upon the concerns, leal frameworks as well as some common practices in these respects.

"Managing Security of Healthcare Data for a Modern Healthcare System" Author name: *Abdulmohsen Almalawi, Asif Irshad Khan, Fawaz Alsolami.* Published in: 2022..

The advent of Artificial Intelligence (AI) and the Internet of Things (IoT) have recently created previously unimaginable opportunities for boosting clinical and patient services, reducing costs and improving community health. Yet, a fundamental challenge that the modern healthcare management system faces is storing and securely transferring data. Therefore, this research proposes a novel Lionized remora optimization-based serpent (LRO-S) encryption method to encrypt sensitive data and reduce privacy breaches and cyber-attacks from unauthorized users and hackers. The LRO-S method is the combination of hybrid metaheuristic optimization and improved security algorithm. The fitness functions of lion and remora are combined to create a new algorithm for security key generation, which method is provided to the serpent encryption algorithm. The LRO-S technique encrypts sensitive patient data before storing it in the cloud. The primary goal of this study is to improve the safety and adaptability of medical professionals' access to cloud-based patient-sensitive data more securely. The experiment's findings suggest that the secret keys generated are sufficiently random and one of a kind to provide adequate protection for the data stored in modern healthcare management systems. The proposed minimizes the time needed to encrypt and decrypt data and improves privacy standards. This study found that the suggested technique

outperformed previous techniques in terms of reducing execution time and is cost-effective.

. III.PROPOSED SYSTEM

DATASET COLLECTION

This project introduces a robust healthcare data management system leveraging a centralized blockchain approach. The system involves a secure flow of information between patients, healthcare providers, and a Central Authority (CA). When a patient receives treatment, the doctor records the details, and these records are securely transferred to the CA. The CA utilizes Non-Fungible Token (NFT) storage for storing. Implement an system in healthcare data management to accurately identify and resolve cases of duplicate patient names, ensuring precise record delivery and minimizing confusion.

Design the healthcare data management system to be scalable, ensuring efficient performance as the volume of patient records increases. Streamline the process of healthcare data compilation by facilitating doctors in securely and seamlessly submitting patient records to a Centralized Authority (CA). Utilize blockchain technology and NFT storage to ensure data integrity and immutability. Motivate stakeholders by emphasizing how the healthcare data management system contributes to enhanced patient care. Efficient access to accurate and comprehensive health records can lead to better-informed medical decisions, timely interventions, and ultimately improved health outcomes for patients.

Highlight the system's capability to simplify and streamline administrative and clinical workflows for healthcare professionals. By reducing paperwork, minimizing redundancies, and enhancing data accessibility, the system aims to boost overall efficiency, allowing doctors and staff to focus more on patient care. Inspire motivation by showcasing the potential for data-driven insights.

The system not only improves record-keeping but also opens avenues for valuable analytics. By harnessing healthcare data, stakeholders can derive meaningful insights to guide research, treatment strategies, and overall healthcare decision-making. Despite its potential benefits, implementing a centralized blockchain system in healthcare comes with challenges. These include scalability issues, regulatory concerns, interoperability with existing systems, and ensuring the security and privacy of sensitive medical data. Medical records are stored across a decentralized network of nodes, each maintaining a copy of the blockchain. This decentralization ensures that there's no single point of failure, enhancing the security and availability of the data.

Patient data is encrypted before being stored on the blockchain, ensuring privacy and confidentiality. Access to sensitive information is controlled using cryptographic keys, with patients having full control over who can access their medical records.

Algorithm 1: Pseudo code of the algorithm

```
// Define the structure of a medical record
structure MedicalRecord {
    string   patientID;
    string    doctorID;
    string   diagnosis;
    string   treatment;
    string timestamp;
}

// Define the structure of a block in the blockchain
structure Block {
    int index;
    string previousHash;
    MedicalRecord data;
    string hash;
    string nonce;
}

// Initialize an empty blockchain
Blockchain blockchain;

// Function to calculate the hash of a block
function calculateHash(block) {
    return hash(block.index + block.previousHash +
block.data + block.nonce);
}

// Function to mine a new block
function mineBlock(lastBlock, newData) {
    newBlock.index = lastBlock.index + 1;
    newBlock.previousHash = lastBlock.hash;
    newBlock.data = newData;
    newBlock.nonce = "0000"; // Initial nonce value
    newBlock.hash = calculateHash(newBlock);

    // Proof-of-work algorithm (adjustable difficulty)
    while (newBlock.hash.substring(0, 4) != "0000") {
        newBlock.nonce++;
        newBlock.hash = calculateHash(newBlock);
    }

    return newBlock;
}

// Function to add a new medical record to the blockchain
function addMedicalRecord(patientID, doctorID,
diagnosis, treatment) {
    newRecord = {
        patientID: patientID,
        doctorID: doctorID,
        diagnosis: diagnosis,
        treatment: treatment,
        timestamp: getCurrentTimestamp()
    };

    lastBlock = getLastBlock(blockchain);
    newBlock = mineBlock(lastBlock, newRecord);
    blockchain.addBlock(newBlock);
}
Return medicalRecods}
```

DATA PRE-PROCESSING

In this project MedicalCare Data Management, the website of Health plus has been created as interface. CA and Patient should login on the website to access the Medical records. In additional features enable on the website is caretaker (trusted one) also login and access the Medical record because in emergence the patient does not available at any time. The Medical records are manipulate only by the CA and Patient can view their records. Healthcare providers provide the health records to CA can upload the records in the website and records are stored in the NFT storage. If patient requires to view the Medical records, send the request to the CA and get the acknowledgement to access the data.

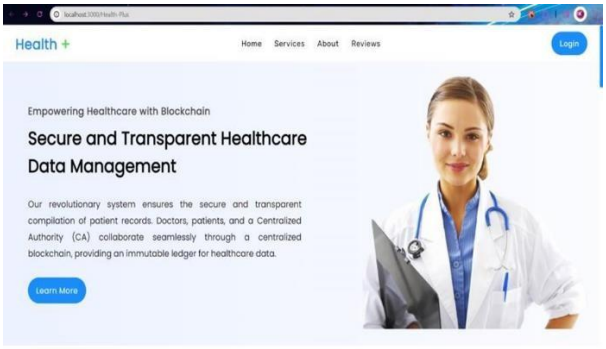

Figure 3.1 Health Plus Website image

IV RESULT AND DISCUSSION

The implementation of blockchain technology and NFT storage ensures that patient records are securely stored and tamper-proof. This significantly reduces the risk of data breaches and unauthorized access, enhancing overall data security within the healthcare system.The transparency provided by the blockchain ledger allows for the tracking of every interaction with patient records, from creation to access. This transparency fosters trust among stakeholders and ensures accountability in the management of patient data.The use of IPFS hash URLs provides a user-friendly way for patients to access their records securely. This accessibility feature improves patient engagement and empowers individuals to take an active role in managing their healthcare information.By centralizing patient records on a blockchain ledger, the system simplifies record-keeping processes for healthcare providers. This leads to greater efficiency in managing patient information, reducing administrative burden and potential errors.While the system offers enhanced data security, ensuring compliance with data privacy regulations such as HIPAA (Health Insurance Portability and Accountability Act) is crucial. Additional measures may be needed to address regulatory requirements and protect patient privacy effectively.

As the system scales to accommodate a growing number of patients and healthcare providers, ensuring optimal performance and scalability becomes critical. Continuous monitoring and optimization of the blockchain network are necessary to maintain system efficiency and responsiveness.
Successful implementation of the system depends on user adoption and proper training for healthcare providers and patients. Clear communication and educational initiatives are essential to ensure that all stakeholders understand how to interact with the system effectively.Integrating the healthcare data management system with existing electronic health record (EHR) systems and healthcare infrastructure is important for interoperability. Seamless data exchange between systems can improve care coordination and facilitate better healthcare outcomes for patients. While the system offers numerous benefits, it's essential to consider the associated costs of implementation, maintenance, and ongoing support. Cost-effectiveness analyses should be conducted to assess the long-term financial implications and ensure sustainable adoption of the system. Overall, the described healthcare data management system shows great promise in addressing key challenges in healthcare record-keeping, including data security, transparency, and accessibility. However, careful consideration of various factors, including regulatory compliance, scalability, user adoption, interoperability, and cost, is necessary to maximize its effectiveness and impact in real-world healthcare settings.In conclusion, while further research and development are needed to optimize the accuracy and efficiency of the system and address any challenges that may arise in its implementation, the potential benefits of the eye-controlled mouse cursor system make it a promising development in the field of assistive technology. If successful, it can revolutionize computer accessibility and provide a more inclusive computing experience for individuals with disabilities.

Figure3.2 Registration form

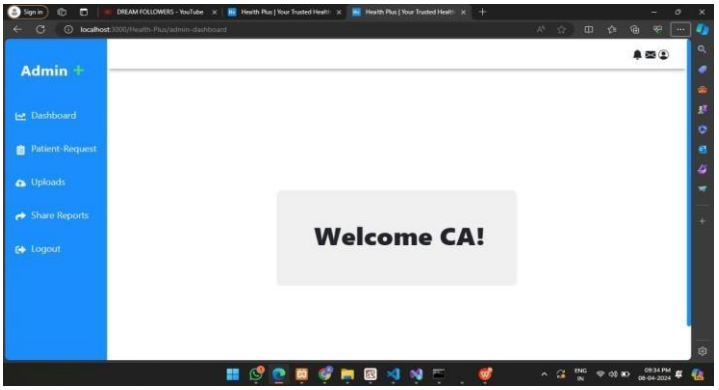

Figure3.3 CA Interface

Figure3.4 CA Upload Patient Report

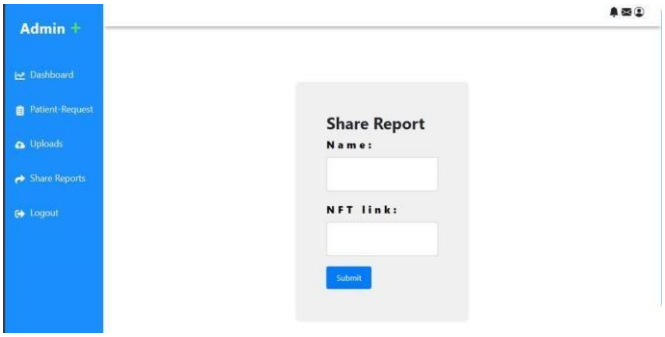

Figure3.5 Response through the NFT Link

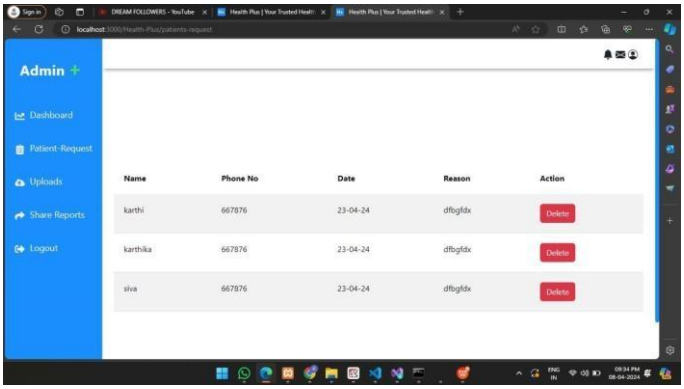

Figure3.6 Patient Record

IV.EXISTING SYSTEM

With the increasing usage of medical subspecialties concerns regarding data sharing, triangulation, and ethical issues are being encountered due to a lack of heterogeneity in data representation. The impact of a data breach can be consequentialist, deontological, or both so there is a need for enforcement of federal laws focusing on health data sharing and usage. Models like Federated learning, Differential Privacy, and Cryptographic techniques can be used to protect the privacy of patients and safety concerns can be tackled off responsibly.

DISADVANTAGES OF EXISTING SYSTEM

Scalability Challenges: As the system accumulates a growing volume of healthcare data, scalability becomes a concern. Ensuring that the infrastructure and architecture can handle increased data loads without compromising performance or responsiveness poses a significant challenge.

Accuracy and Patient Matching: It designed to handle cases of patients with the same name must be robust and accurate. Achieving precision in patient identification, especially when faced with common names and potential data variations, poses a challenge.

User Education and Acceptance: Ensuring that both healthcare professionals and patients are adequately educated and accept the new healthcare data management system can be challenging.

Improved Patient Outcomes: Motivate stakeholders by emphasizing how the healthcare data management system contributes to enhanced patient care. Efficient access to accurate and comprehensive health records can lead to better-informed medical decisions, timely interventions, and ultimately improved health outcomes for patients.

Streamlined Workflows: Highlight the system's capability to simplify and streamline administrative and clinical workflows for healthcare professionals. By reducing paperwork, minimizing redundancies, and enhancing data accessibility, the system aims to boost overall efficiency, allowing doctors and staff to focus more on patient care.

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V.CONCLUSION

In conclusion, the proposed healthcare data management system represents a significant advancement in addressing critical challenges in the healthcare industry, particularly in the realm of patient record management. By harnessing the power of blockchain technology, NFT storage, and IPFS, this system offers a robust framework for ensuring the security, transparency, and accessibility of patient records. Throughout this discussion, several key findings emerge, underscoring the transformative potential of the described system. First and foremost, the implementation of blockchain technology and NFT storage provides a secure and tamper-proof environment for storing patient records.

The decentralized nature of the blockchain ledger ensures that patient data remains immutable and resistant to unauthorized alterations, significantly enhancing data security. Moreover, the use of NFT storage adds an additional layer of protection, guaranteeing the uniqueness and integrity of each patient record. This heightened level of security not only safeguards sensitive patient information but also fosters trust and confidence among stakeholders. Furthermore, the system's emphasis on transparency is a pivotal aspect of its design. By leveraging the transparency inherent in blockchain technology, stakeholders can track and audit every interaction with patient records, from creation to access.

This transparency promotes accountability and integrity in the management of patient data, mitigating concerns related to data manipulation or misuse. Patients and healthcare providers alike can have confidence in the accuracy and authenticity of the information contained within the system.

Additionally, the system's focus on accessibility is paramount in empowering patients to take an active role in managing their healthcare information. The utilization of IPFS hash URLs provides a user-friendly mechanism for patients to securely access their records, enhancing convenience and engagement.

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