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Medical System Verification through Blockchain

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ABSTRACT: Healthcare systems have recently faced security threats and data issues, making them less reliable in analyzing medical data. Traditional methods of identifying medical record share often impractical, associated with possible tampering and centralized risks. This paper presents a new concept of medical diagnosis based on blockchain technology decentralization, immutability, and transparency of blockchain provide a solution to increase trust in medical information and processes. The framework uses a private blockchain network to store and manage medical information, while enabling tamper proof and secure sharing among doctors, patients, and other relevant stakeholders. Data encryption, access control and authentication are achieved using cryptography technology and smart contracts.

KEYWORDS: Blockchain, Medical Information, Decentralized ledger, Smart Contracts

I. INTRODUCTION

Blockchain electronics may be used to construct secure dispersed, and obvious healing records. Medical news is protected Expected correct. It constitutes a distributed, interfered authentication, and safe atmosphere. Blockchain is immediately being projected to discover and resolve imperfections in healthcare. Some news leaks and safety have enhanced the course in the healing society. In 2019, it was stated that 6.8 heap consumers' healing facts were hacked in India. The average healthcare rupture resumes an expected confusion of \$ 7.12 heap in 2019. Recently, many arrangements have begun to look knowledgeable about the use of blockchain in healthcare to have better protection. The Blockchain that was received in 2008 to look after against attacks on the written dossier is a delivered account book that records undertakings by building a common, unchangeable arrangement. Traditional cure is a usual trade that exhibits the presence of new science and the future.

As the healthcare subdivision sustains an ending revolution, it encounters meaningful challenges having to do with dossier uprightness safety, and the genuineness of healing brands and experts. Traditional wholes repeatedly encounter challenges like illegitimate approaches to healing records, counterfeit healing provisions, and difficult processes for proving healthcare references. This project plans a resolution by taking advantage of blockchain science, which specifies a distributed and secure account book that cannot be changed. Our aim accompanying the blockchain search is to keep healing records from tampering, guarantee the legality of healing merchandise, and shorten the proof of healthcare experts' references. This pioneering system not only upgrades protection and transparency but too allows more adept dossier giving between healthcare providers.

II.MOTIVATION

The mission is motivated by improving safety, reliability and efficiency in healthcare. The program will be able to solve some of the biggest healthcare problems in the world today, including protecting medical data, preventing contamination of equipment due to medical error, ensuring good information sharing and increasing trust among healthcare Professionals. Therefore, greatly improving patient safety, preserving the integrity of medical records and facilitating treatment.

Key motivations behind this project are:

- Enhanced Data Security
- Improved Data Integrity
- Streamlined Verification Processes
- Fraud Reduction

III.OBJECTIVES

1. The motivation behind the Medical system verification through blockchain to secure the medical record from unauthorized tampering or alteration by maintaining them in an immutable blockchain ledger.
2. To develop a blockchain based system for authenticating and validation of medical products and distribution processes.
3. For standardization and easy sharing of data among various healthcare system and providers.
4. To Authenticate and verify the professional qualifications and license of doctors, nurses, and other health care professionals through a tamper- proof blockchain record.

IV.LITERATURE SURVEY

Here's a brief summary of each of the papers listed, which we can use for the literature survey in our project: This architecture ensures security through the use of elliptic curve digital signature algorithm and proof-of-work as a consensus mechanism.[4]in future it connects the hospital directory, electronic medical records and network of ambulance. this components will be interconnected via a blockchain network, allowing users to locate the nearest medical services and ambulances in case of emergency.[1]. Smart contracts are not only related to the implementation of access control, but also the storage of medical information, and are therefore at the heart of this solution. There are three smart contracts in total: policy contract (PSC), access control contract (ASC), and medical record contract (RSC). This paper combines IPFS and blockchain to alleviate the storage pressure of blockchain, but this is only a transitional stage, and in the future, we should consider solving the data storage problem from the blockchain.[2] Blockchain is nothing but an unchangeable distributed database shared by a group of nodes over a p2p network. Each activity on this network is called a transaction. A group of such transactions forms a block. A block is associated with a timestamp, hash value, and hash of the prior block. This chaining of blocks together makes the ledger tamper-proof and immutable. The blocks are appended to the network after verification by the Proof-of-Work consensus or Any other custom consensus algorithm.[3] A blockchain network used in the health- care system to preserve It can help avoid the fear of data manipulation in healthcare and supports a unique data storage pattern at the highest level of security. There are innovative applications of Blockchain in healthcare due to inherent encryption and decentralization. It enhances the security of patients' electronic medical records, promotes the monetization of health information, improves interoperability among healthcare organizations, and helps counterfeit combat medicines.[4] In this paper it mainly focus on the zero knowledge proof, in that both parties are sharing the correct information between each other. each node must check the validity of transactions and sender exchange the information together with verification nodes. the transaction between patient and hospital was submitted to distributed consensus through PBFT algorithm[5].

V.METHODOLOGY

1] We create a connection for hospital and patient stores to enable hospital patients and stores to record, access and manage information.2] Create smart contracts between medical stores for monthly medical providers. Create smart contracts using Solidity Ethereum.3] We check the validity period of the medicine through smart contracts and check whether the medicine comes from authorized personnel. Hospitals and Clinics (Creation of Medical Records).4]

Responsibilities: Hospitals and clinics are the source of medical records, which can carry information such as patient medical history and laboratory results, and other sensitive information. Medical records are stored and must be securely stored and protected. 5] Smart Contract: Automatically verify on the blockchain. Such contracts ensure that the data in question meets the specified conditions before being added to the blockchain. appropriate standards for sex. 6] Once the verification is complete, the confirmation will be sent back to the organizations (hospitals, laboratories, doctors). 7] Immutable data function: After verification medical data is stored in an immutable form on the blockchain. This step ensures the protection of medical records

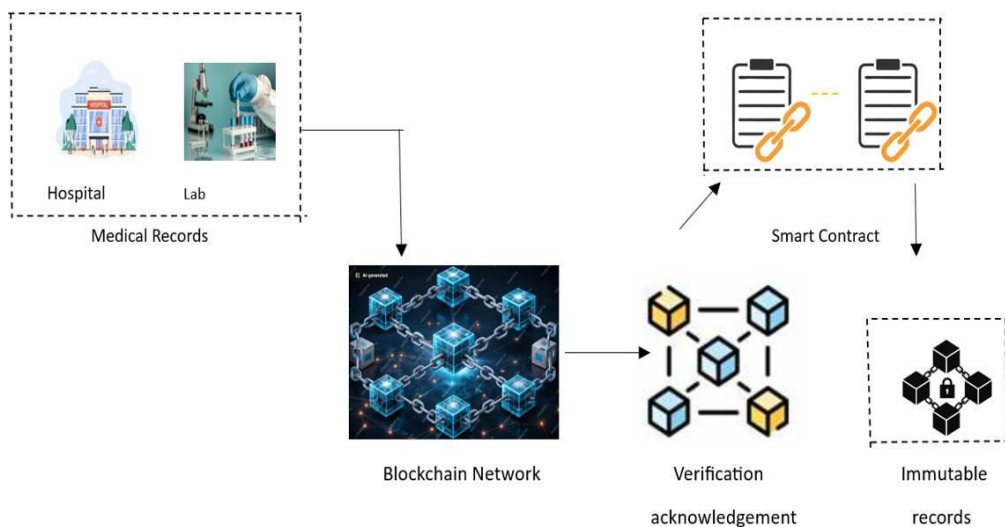


Fig. Blockchain-Based Medical System Architecture

The document envisions the following entities:

- **Hospital:** These are actually of the kind that request medical records and are the ones providing them.
- **Medical Records:** This main element relates to information of patients on a protected and stored level, which is being used in the system.
- **Smart Contract:** The smart contract should mainly activate dealing with medical records, which are the conditions that have to be met first to access or modify the data.
- **Blockchain Network:** Provides a secure, centralized record system to support the transaction of medical data as well as verification procedures.
- **Verification:** Ensures the accuracy and correctness of the medical data and the processes.
- **Immutable:** This blockchain attribute ensures that the records cannot be tampered with thus, the medical data are intact.

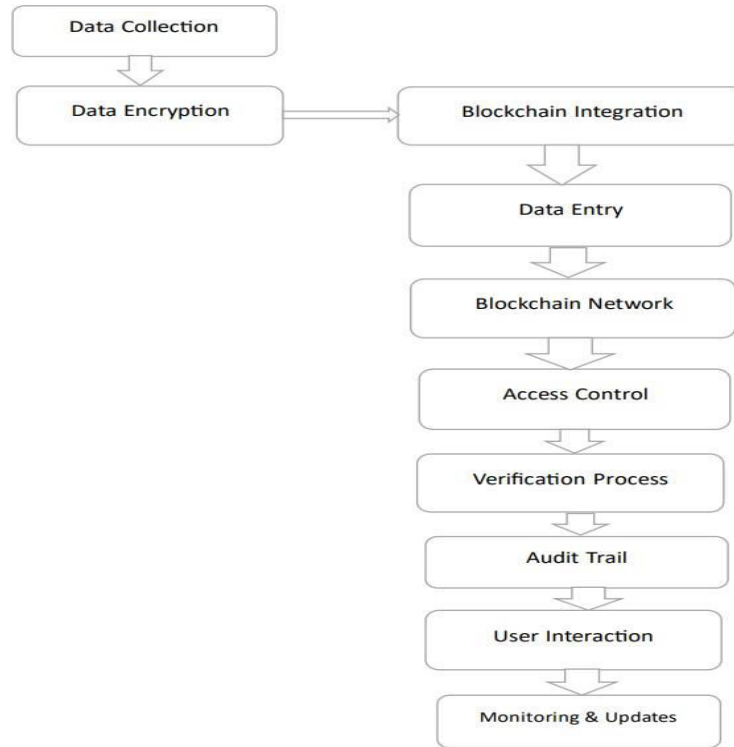


Fig. Workflow for Medical System Verification Using Blockchain

This flow represents a secure and efficient method for managing sensitive data using blockchain technology

- **Data Collection:** Initial step where data is gathered from various sources.
- **Data Encryption:** Collected data is encrypted to ensure security and privacy before it is stored or transferred.
- **Blockchain Integration:** : The encrypted data is then integrated into the blockchain system, ensuring it becomes part of the immutable ledger.
- **Data Entry:** Process of entering the encrypted data into the blockchain.
- **Blockchain Network:** The data is stored within the decentralized blockchain network, making it secure and immutable.
- **Access Control:** Ensures that only authorized parties can access or interact with the data within the blockchain.
- **Verification Process:** A process to verify the authenticity and validity of the data or transactions on the blockchain.
- **Audit Trail:** Blockchain inherently provides an audit trail, recording every transaction or change made to the data.
- **User Interaction:** The step where users interact with the system, such as accessing or updating information (subject to access controls).
- **Monitoring Updates:** Continuous monitoring of the system for security, performance, and necessary updates to ensure the system remains robust.

VI.PROJECT FEASIBILITY

1]Technical Feasibility: Blockchain platform Ethereum other platform can support smart contract and decentralized application 2]Economic Feasibility: Technology cost: costs of choosing the Blockchain platform (for example, Ethereum) 3]Maintenance: The periodic update and support provided to the blockchain system. Operational cost: accommodates the server security

VII.PROJECT SCOPE

- 1) **Security** : Describes how the immutable ledger of blockchain can make healthcare systems safer with regards to data.
- 2) **Transparency**: consider how blockchain technology may improve transparencies and account- abilities in managing medical records.
- 3) **Trust**: Investigate the possibility of blockchain in establishing trust among patients, providers, and healthcare providers.
- 4) **Efficiency**: Define how blockchain will improve efficiency in carrying out operations in a medical system by making the processes streamlined.

VIII.CONCLUSION

This system has the potential to revolutionize the healthcare industry by providing a secure transparent and decentralized way to manage medical data and systems. It can increase transparency and accountability in clinical trails ensuring that data is accurate and reliable. Blockchain technology can improve access to healthcare services by providing a platform for patients to access quality medical services remotely.

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