Enhancing Patient Privacy in Electronic Medical Records: Leveraging Cloud Computing For Secure Exchange and Sharing

Himanshu Thakre, Vaikalp Rodge, Falguni Dekate

G. H. Raisoni College of Engineering, Nagpur, Maharashtra, India

Abstract: *Confidentiality is a very important issue when storing electronic medical records. The confidentiality of electronic health records must be protected according to the definitions set forth in the Health Insurance Portability and Accountability Act (HIPPA). Therefore, a strategy is needed to protect patient privacy during the exchange and sharing of electronic medical records. Privacy protection systems can be divided into four types: anonymous, anonymous, anonymous and invisible. Previous research in this area has used encryption and encryption to obfuscate the confidentiality of electronic medical records to ensure privacy protection. However, this system is more difficult to implement due to the lack of connection and vision. Therefore, this article attempts to make improvements in this area to ensure a consistent process between patients and electronic medical records. Cloud computing is known for fast computing and large storage space. Through the use of the cloud, electronic medical records in hospitals can be consolidated to facilitate the exchange and sharing of electronic medical records, providing adequate electronic medical records for small hospitals or clinics with limited resources.*

Keywords: Confidentiality, Electronic medical records, Privacy protection, Health Insurance Portability and Accountability Act HIPAA, Cloud computing

1. Introduction

Today our medical system is very weak as compared to other nation. According to research there is one doctor for every 1457 people as per the country's current population. It makes it very difficult to manage all the document related to medica for the patient. Hence our system proposes a concept to make a medical history card which holds all the medical reports and documents related to the patient.

Our idea is to connect the medical history card with the Aadhar of the individual so it is easy to connect and collect the data from citizens of our country. The accumulated data can then be fetched and used up any health organization as per the will of the patient. The details of the patient will be managed and handled using the blockchain management from cloud. The additional feature of this technology is that it works on a credit system basis. Once the data are stored and the card is formed, the patient can avail the health facilities and the due payment can be done through the credit provided.

The hadoop database will assure the systematic tracking of the health records and the cloud distributed blockchain will provide the managed credit system. The cloud will act as the data warehouse for the records and the credibility of the data will be incorporated using hash table powered by blockchain. This system will allow a unique identification to individual patient. The database for the patient will be fetched and updated using their Aadhar link. Once the medical record link is established to the card, the medical health record will be aggregated using cloud.

Our system integrates the health card to a mobile app in which we could scan the bar code provided in the card and the respective patient data will be displayed inclusive of all the latest report.

The patient can either chose to enter the documents by their own or their report would be fetched by the clinic database. This would reduce the complexity of the system and could be used by the diverse population of our country. Through this app patient can book doctor appointment and also they can see that the policy or insurance (which holds 1 year plan, 2 year plan and many more) are valid or expired and they can also renew the insurance plan through the app only by paying and also choose different plan

2. The Proposed System

1) The patient document will be stored in the cloud.
2) The database would contain their entire medical history.
3) It would make the health survey of the country feasible.
4) The history card linked to the Aadhar would allow transparency in between the system.
5) The payment for the medical bills would be done on a credit based system.
6) The credit would either be an insurance allowance by the Banks or the Government schemes for the BPL citizens.
7) The history card would allow the minorities to avail any yoganas promoted by the government reducing the intermediary baggage.
8) This will allow the secured and managed documents of a patient.
9) The health record can be made resourceful using the electric health record.
10) The credit system will allow the patient to avail the medical facilities without the intermediate cost.
11) The government schemes initiated for below poverty line can reach them directly.
12) The card provides the entire user with the insurance facilities thus making it easier for the government to track the health budget of the county.
13) The health insurance companies can have a generalized system for their policy.

3. The Need for Blockchain in Healthcare

When it comes to healthcare, growth pressure is increasing at an incredible pace. What is needed today is good hygiene supported by new and advanced technology. Here blockchain will play an important role in the transformation of the healthcare industry. Additionally, the healthcare system is shifting towards a patient centered approach that focuses on two important things: Easy access to services and access to necessary medical resources. Blockchain empowers healthcare organizations to deliver adequate patient care and quality healthcare facilities. Exchanging health-related information is a time-consuming and repetitive process that incurs high costs for the health care sector. Technology may soon solve the problem here. Using blockchain technology, the public can participate in health research. Additionally, better research and public health information will improve health care for many people. Centralized repositories are used to manage entire medical systems and organizations.

4. Features-

4.1 Store patient information:

By far the most important issues are data protection, sharing and collaboration in public health management. This particular problem is achieved thanks to the use of blockchain. When used correctly, these technologies can improve security, information exchange, collaboration, integrity, instant updates, and access. There are also significant concerns about data protection, especially in the areas of personal medicine and wearable technologies. Patients and medical staff need a secure and direct way to collect, send and request information online without worrying about security issues; Therefore, blockchain technology is used to solve these problems, and different studies have been created before and after health information. There are blood tests, quality tests, prognoses, and health evaluations for many people. It may provide results that indicate the presence of certain data or information. If doctors access the stored data and have doubts about its validity, they will check it against the original data stored in the blockchain system. Blockchain is based on existing encryption technologies, including encryption methods suitable for information sharing. Physicians record the patient's name, date of birth, diagnosis, treatment, and medical history in patient records in EHR format. This information is stored in cloud computing or in the existing database.

4.2 Analyze patient data

Researchers can effectively analyze patient data for a particular procedure on a large scale of patients with access to the truth. This has had significant consequences for these patients and improved standards of management. With blockchain infrastructure in place, pharmaceutical companies will instantly collect data to deliver more customized medicines or services to patients. Blockchain makes the job of pharmacies easier because it has all the information. Based on these results, they will give patients good advice about taking their medications. It will use wear data collected in real time to inform doctors about the patient's current condition and alert them of any emergencies.

4.3 Verification

Transactions are verified on the blockchain until they are linked to the chain and processed by the algorithm. Authenticity is sealed until the item is encrypted, digitally signed and stored. Healthcare companies, technology and the medical industry are working hard to identify opportunities to understand what is happening now and what will happen next so that the future is safer and cheaper. When healthcare management can identify benefits, Blockchain can compete successfully in the healthcare ecosystem.

4.4 Security and Transparency

It provides good security and transparency while allowing doctors to spend more time treating patients. In addition, support will be provided for clinical research and treatments for all rare diseases. Seamless exchange of information between healthcare facilities contributes to accurate diagnosis, effective treatment and cost- effectiveness in healthcare. Blockchain allows many healthcare organizations to stay connected and exchange messages through a single community leader for security and transparency. When using such a system, users can share and monitor their data and other activities on the system without having to find additional integrity and privacy solutions.

4.5 Health Record Keeping

Blockchain may be the best technology for record keeping in the medical world. Applications include sharing medical information, managing electronic medical records, managing insurance, and performing administrative tasks. Patients can send their medical information to the blockchain network through the application. Enable collaboration between sensors and smart devices based on digital blockchain contracts. In general, electronic health records are reported by more than one source. Blockchain will consolidate all the details and give patients access to the history. Connecting all information to the same place will give us new insights into patient health. Thus, the blockchain paradigm will ensure that the information is accurate and legal and protect the user's privacy.
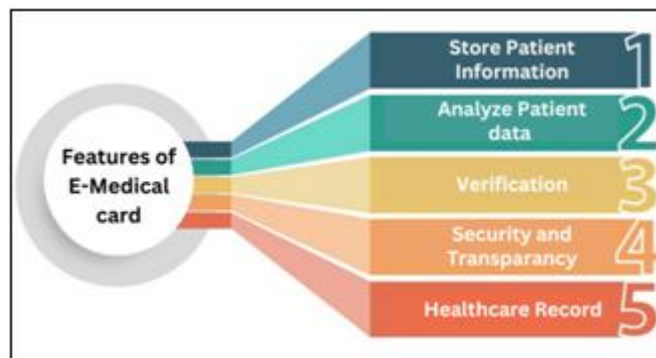
5. Discussion

Blockchain technology brings trust and results to clinical research. This information can be stored in digital fingerprints as a smart contract on the blockchain. Security of network infrastructure at all levels, identification and authentication of all participants, and unified authorization standards for access to electronic medical records are just some of the benefits of blockchain technology in healthcare. Blockchain is being used to control drug supply and track illegal drugs. The machine is even suitable for storing information about a patient, thus helping to determine and verify the effectiveness of certain procedures. Blockchain is used to store medical information, clinical research, patient care, increase security, disclose information, and ensure transparency. It keeps the hospital's financial records and reduces data transfer times and costs.

It can solve many problems in a data-centric environment. Blockchain technology will create a hash value for the individual in a patient's medical records. The blockchain system will also encourage patients to disclose their personal information to third parties while keeping their identities private. Clinical studies require large data sets. Researchers focus on this information and conduct routine experiments to provide analysis, prediction, and performance for various situations. Analyze the data and make further decisions based on these findings. However, many researchers may alter the data and evidence collected to change the results.

In addition, many pharmaceutical companies want to collect scientific data that will provide good results for their companies. Therefore, researchers are using blockchain technology to make research simpler and more understandable. It will help make the data safe, consistent and directly diagnostic. The information collected can improve patient care and provide post-marketing analysis to improve outcomes. These standards are based on the core values of blockchain technology, such as open governance, transparent auditing, transparent information, sustainability, and enhanced privacy and security. This ensures that doctors meet current health standards, including safe medication use.
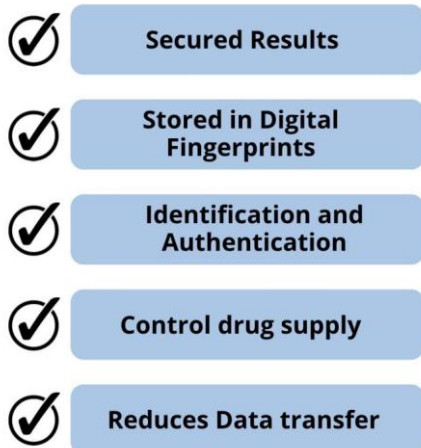
6. Limitations and Future Scope

Blockchain technology has also entered the field of medicine and some problems need to be solved in this field. One of the biggest problems with using technology in healthcare is the lack of expertise. Blockchain applications are still in their infancy and need more research and education. But this also applies to the role of medical organizations and regulators. It is time for the healthcare sector to evolve. It is likely that blockchain application will become widespread in healthcare in the future. Its use in treatment will improve with this new technology, as it helps explain the results and progress in treatment. Blockchain technology is key to verifying transactions and data transfers. In the future, transactions will be confirmed and recorded using blockchain technology with the approval of network members. Blockchain will provide patient-level digital security through public and private key encryption as the foundation for next-generation health information sharing. The technology holds promise for patient data processing, crime prevention, improved collaboration, process design, drug and medication management, and monitoring treatment and supplies control. Blockchain has great promise in healthcare.

7. Conclusion

Blockchain has new applications in the healthcare industry due to better understanding and deployment. It improves the security of patients' electronic medical records, facilitates the use of health information, facilitates interoperability between hospital,and helps prevent counterfeit medications. Different healthcare systems can be revolutionized using blockchain technology; Healthcare, digital processes authorized by smart contracts and other areas are one of the most important areas of blockchain use. By removing intermediaries from the payment chain, smart contracts will reduce costs. The potential of blockchain in healthcare depends largely on the adoption of key technologies in the ecosystem. It includes monitoring systems, health insurance, drug testing, and drug testing. Hospitals can use a blockchain framework to identify their services and even use tracking devices throughout their lifecycle. Blockchain technology can be used effectively to improve patient history management, especially tracking and insurance processes, thus accelerating treatment with accurate information. Overall, these technologies will greatly improve and ultimately change the way patients and doctors treat, use medical information, and improve health.

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