ELECTRONIC HEALTH RECORDS USING BLOCKCHAIN

Prof. Shwetha K R B[1], Adithya K B[2], Keerti Kolachi K[3], Shrusti Patil R[4], Syeda Anum M[5]

[1] *Associate Professor, CSE, AMCEC, Karnataka, India*

[2] *Student, CSE, AMCEC, Karnataka, India*

[3] *Student, CSE, AMCEC, Karnataka, India*

[4] *Student, CSE, AMCEC, Karnataka, India*

[5] *Student, CSE, AMCEC, Karnataka, India*

ABSTRACT

Block chain have been an interesting research area for a long time and the benefits it provide have been used by a number of various industries. Similarly, the healthcare sector stands to benefit immensely from the block chain technology due to security, privacy, confidentiality and decentralization. Nevertheless, the Electronic Health Record (EHR) systems face problems regarding data security, integrity and management. In this paper, we discuss how the block chain 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 block chain technology in healthcare sector for EHR. The aim of our proposed framework is firstly to implement block chain technology for EHR and secondly to provide secure storage of electronic records by doing granular access rules for the users of the proposed framework. Moreover, this frame work also discusses the scalability problem faced by the block chain technology in general via use of off-chain storage of the records.

Keyword: - *Patient Data security, Block chain ,Patient Data Store ,Restricted Access, Meta mask.*

1. INTRODUCTION

The recent advent in technology is affecting all parts of human life and is changing the way we use and perceive things previously. Just like the changes technology has offered in various other sectors of life, it is also adding new ways for improvement in healthcare sector. The main benefits that advancement in technology is offering are to improve security, user experience and other aspects of health care sector. These benefits were offered by Electronic Health Record (EHR) and Electronic Medical Record (EMR) sys terms. However, they still face some issues regarding the security of medical records, user ownership of data, data integrity etc. The solution to these issues could be the use of a novel technology, i.e., Block chain. This technology offers to provide a secure, temper-proof platform for storing medical records and other health care related information, Before the advent of modern technology, health care system used paper based system to store the medical records. This paper based medical record system was inefficient, insecure, unorganized and was not temper-proof. It also faced the issue of data- duplication and redundancy as all the institutions that patient visited had various copies of patients medical records. The healthcare sector faced a trend shift towards EHR systems that were designed to combine paper-based and electronic medical records (EMR).

2. PROBLEM STATEMENT

Developing a secure and privacy-compliant Electronic Health Records(EHR) system using block chain technology, addressing concerns of network infrastructure security ,identity verification challenges, and ensuring compatibility with healthcare regulations like GDPR and HIPAA.

3. BACKGROUND WORK

As far as now there is no background or related work related to this project.

4. OBJECTIVE

The objective of the project appears to be enhancing the security of the patients health records through block chain technology:

1. Enhanced Data Security: Implement a block chain based system to enhance the security of the health records. Ensure that patient data is encrypted, and access is restricted using robust cryptographic techniques
2. Improve Interoperability: Facilitate seamless interoperability between different health care providers and systems. Enable secure and standardized data exchange to improve coordination of care .
3. Patient Empowerment: Develop features that allows patients to have greater control over their health data. Enable patients to grant and revoke access to their records, promoting privacy and consent.
4. Immutable Record Keeping: Utilize block chain immutability to create an unalterable record of patient health data. Ensure that once data is recorded, it cannot be tampered with, providing a trustworthy source of information.

Overall, the objective is to create a secure, user-friendly, and reliable patient centric health care system that enhances the protection of the patient details from unauthorized access.

5. LITERATURE SURVEY

A literature survey for a project on enhancing patient data security through a selective block chain mechanism controlled by the admin of the application would involve researching existing studies, patents, and technologies related to electronic health systems, user interfaces, authentication, security, and related fields

“MedRec Using Block Chain for Medical Data Access and Permission Management ”:

It is highlighted that significant effects of security of the patient data, developing predictive models. In this paper they propose Med Rec: a novel, decentralized record management system to handle EMRs using block chain technology.

The Advantages and the Disadvantages of the Block Chain:

This paper proposes a new method to estimate the advantages and the disadvantages of the block chain technology. and they have explained where the block chain technologies have been facing the problems, and methods to overcome these problems, and the importance of the block chain.

Cloud enabled patient centric EHR management system :

This paper proposes an method of enabling patient health records in the cloud technology, by accessing the EHR stored at the third party such as cloud providers. This service allows a patient to create , manage and control satisfies both the health care providers and patients.

By conducting a comprehensive literature survey across these areas, the project team can gain valuable insights and identify relevant technologies and best practices to inform the design and implementation of the block chain mechanism for electronic health records of the patients.

6. METHODOLOGY

The methodology for implementing the block chain technology for patients health care records involves several key steps, including system design, prototyping, testing, and refinement. Here's a structured approach to the methodology:

Requirements Gathering:

Define the specific requirements of the patient health records store based on the provided description, including functionality, security, user interface, and integration with electronic health records.

System Design:

Develop a detailed system architecture outlining the components, interfaces, and interactions of the doctor, patient, and the admin. Specify the software components required, and the algorithm used for the implementation. Design the user interface layout for the interaction between the patient's and the doctor's.

Prototype Development:

Build a functional prototype of the block chain technology based on the system design. Select appropriate software components and make the interactions between the doctor and the patients, create a meta mask accounts for the both the users and check the data from the doctor's dash board is going to the patient's dash board .

Testing and Validation:

Conduct thorough testing of the prototype to evaluate its performance, functionality, and security. Test the reliability and durability of the block chain technology under various conditions, such as different patient and doctor's. Verify that the selective block chain mechanism effectively prevents unauthorized access while allowing legitimate users to unlock their accounts.

User Feedback and Iteration:

Gather feedback from users and stakeholders through usability testing and surveys to identify any issues or areas for improvement. Iterate on the design and implementation of the block chain mechanism based on user feedback and testing results. Make necessary adjustments to the hardware, software, or user interface to address usability concerns, improve reliability, or enhance security.

Integration and Deployment:

Integrate the block chain mechanism into the electronic health records , such as the cloud based technology for the larger number of users. Ensure compatibility with different electronic health record models and configurations, and provide documentation and support for installation and setup. Deploy the final version of the selective block chain mechanism for field testing and real-world use, monitoring its performance and collecting feedback for further refinement.

7. ARCHITECTURE

The From the above Fig 1, initially patient will be have his own meta mask account. After patient login in to his account ,if cant book the appointment with the doctor by choosing the available doctor and then doctor can be able to see the appointment of the patient and the doctor can see give the medication for the patient based on the problem and then patient can see the doctor prescription in their dash board and they can take the following medicines and then doctor will also suggest some test to under go, and doctor himself upload the details of the test details of the patients in their appointment dash board, and the data will enter in to the ethereum block chain using smart contracts, and then it will display in the patient's dash board's and the patients will access their complete health records.

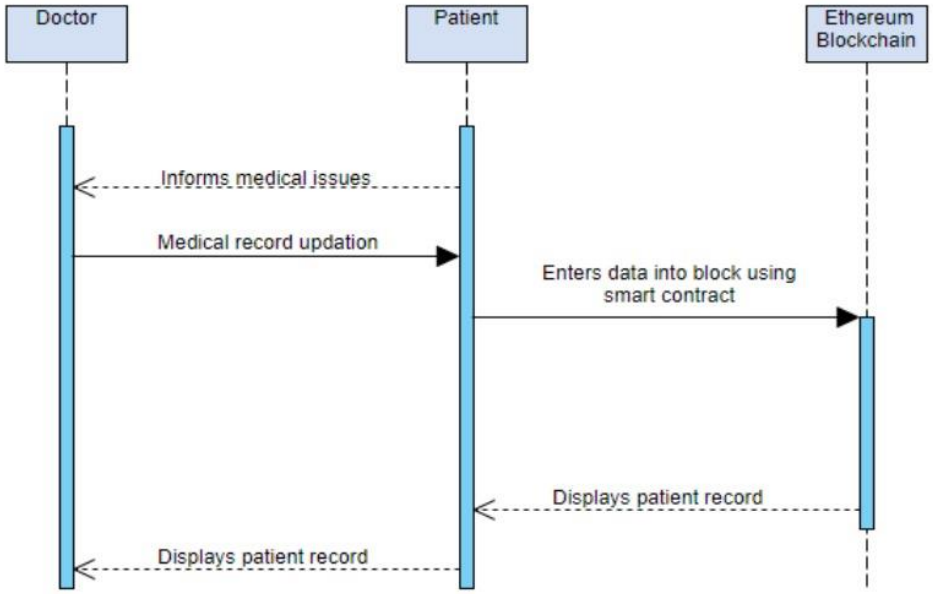

Figure 1. System Architecture Diagram

8. RESULTS

The expected results of this project include:

After implementing the selective block chain mechanism for patient data security as described, thorough testing and validation were conducted to evaluate its performance and effectiveness. The results showed that the system successfully restricted unauthorized access to the others while allowing legitimate users like doctors and patients to unlock their dash boards in the application. The block chain mechanism, comprising meta mask accounts created by the admin and then users like doctors and patients will be able to access their respective dash boards . User feedback and usability testing indicated that the system was intuitive and easy to use, with patients able to navigate the interface and interact with the doctor's without difficulty. Additionally, the integration of the selective block chain mechanism with existing electronic health record systems, such as the storing and retrieving the patient data, proved seamless and compatible with different electronic health records models and configurations. Overall, the results demonstrated that the selective block chain mechanism significantly enhanced patient data security, providing a robust and user-friendly solution for preventing theft and unauthorized access.

9. CONCLUSION

In conclusion, the implementation of the block chain mechanism for electronic health records has proven to be a successful endeavor. The system effectively enhances security by allowing users to access their account selectively through their meta mask accounts, while keeping the others persons not accessible to their accounts. Through thorough testing and validation, it was demonstrated that the mechanism operates reliably, preventing unauthorized access while enabling legitimate users to unlock the acccounts. User feedback and usability testing confirmed that the system is intuitive and user-friendly, contributing to its overall effectiveness and adoption. The seamless integration with existing electronic health records stores ensures compatibility and ease of installation across different electronic health record models and configurations. Overall, the block chain mechanism represents a significant

advancement in patient data security technology, providing a robust and convenient solution for mitigating theft and enhancing patient data safety.

REFERENCES

[1] " MedRec Using Block Chain for Medical Data Access and Premission Managment" by Asaph, al.(2016), published in the International Conference on Open and Big Data.

[2] "The Advantages and Disadvantages of the Block Chain Technology" by Julija Golosova , Andrejs Romanovs, presented at the IEEE International Conference on Advances in Information, Electronic and Electric Engineering(AIEEE),2018.

[3] "Cloud enabled patient centric EHR management system" by M.Preethi and R.Balakrishna,published in the IEEE Conference on advanced communication,2014.

[4] "Analysis of the security and privacy requirements of cloud electronic health records " by G Ferna'ndez and ML Coronado, published in Control and Computing Technologies,2013.