HealthCare Based on Blockchain

Rohit Sharma[1], Mr. Saurabh Gautam[2]

[1]*Student, Information Technology, Maharaja Agrasen Institute of Technology*
[2]*Assistant Professor, Information Technology, Maharaja Agrasen Institute of Technology*

---***---

Abstract - World has become an online center these days. Online networking and sharing of facts have emerged as a commonplace aspect. With the growing population inside the online global and numerous sectors switching online, information breaches and protection vulnerabilities have turn out to be quite commonplace. Healthcare quarter has been the use of vintage techniques in securing sufferers facts which have induced a huge loss to the healthcare industry. To subside this difficulty, we've applied an answer for this trouble the usage of blockchain in the healthcare sector. Blockchain generation is an era built to provide a decentralized system. Patients can without difficulty save their statistics and provide get admission to simplest to those they want to provide get admission to. Patients and medical doctors can without problems get the right of entry to and share facts without any protection vulnerability. This venture uses clever contracts and the MERN Stack era in constructing internet-primarily based healthcare software.

*Key Words***:** Blockchain, ledger, MERN Stack

1.INTRODUCTION

Blockchain is now prepared to explore and address the vulnerabilities of the healthcare machine. Diverse records breach and security vulnerability are getting common within the scientific zone.[1] in 2019, 6.8 million person's facts healthcare reviews have been hacked via a collection in India according to the reports. The common breach of healthcare continues to grow and incurred a price of $7.12 million within the 12 months 2019. Here, blockchain overcomes the vulnerabilities of the vintage healthcare system by way of offering better ledger machine and consumer verification.

Fig 1: Blockchain System

Satoshi Nakomoto based the cryptocurrency bitcoin in 2008 which provided an attack-resistant machine for recording information. Blockchain is a decentralized ledger which

information the transaction through constructing immutable blocks connected together. Healthcare has been a conventional enterprise which has shown firmness towards new and upcoming technologies.

With this utility, there could be no records breach possible. Without any third birthday party interference, records ruptures or safety vulnerabilities is nearly impossible. It creates a gadget that the affected person can consider upon and offers different components as properly [2]. Healthcare has end up online because of the covid-19-crisis and to make it reliable and an efficient system, we want a technology to accept as true with upon for our security and privateness. Blockchain helps us all and thus, enables in bringing protection within the healthcare area.

At some point of those instances, generation has advanced to the next degree. Most of the sector has migrated to the net international. But, due to this latest migration, safety vulnerabilities and privateness problems have multiplied loads as nicely. To triumph over this, the usage of diverse safety technology has elevated as properly. Blockchain generation is one such technology that provides protection and privateness to the users [3]. Blockchain is a composition that stores blocks together in more than one database, in a community through p2p network.

Fig 2: Health Care in Blockchain
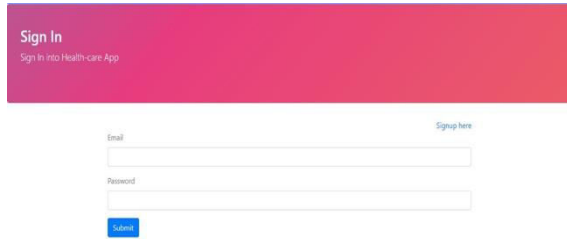
.

2. Methodology

The application has been advanced the use of MERN stack and using ganache and solidity language. MERN stack consists of MongoDB, react.js and node.js. Blockchain code has been written in solidity and JavaScript.

Fig 3: Sign in page

The assignment saves affected person facts at the blockchain. The blockchain basically shops the get entry to key in it and the records are stored inside the MongoDB server. There may be two participants physician and affected person.

1. The affected Person signs up as patient and use that role in the application.
2. Patient has all the scope to allow which doctors they want to allow.
3. Physician signs up as the doctor and has the option to see the available patient documents.
4. We have a chat-bot for the patients for any information that patient doesn't have.
5. We have added google maps Apis to find pharmacy nearby the patient.
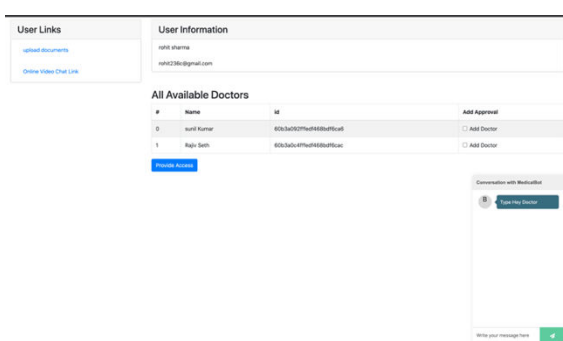
Fig 4: Chat Bot for patients

The project is divided into 5 components basically:

1. We used SDLC to expand this task. The model used the iterative version for developing this venture. Iterative model is a technique of implementation of the software improvement lifestyles cycle which concentrates on the iterative implementation of all of the steps until the very last device is whole.

2. In the backend, we used rest apis for the project. We used MongoDB within the backend for storing customers and (json-web-token) authentication and verification of patients and doctors. The backend is absolutely independent and does not depend on the frontend.
3. The libraries we used within the backend encompass mongoose, JWT, item-code and numerous others. We used the MVC model for constructing relaxation apis. We used passport.js library as properly for authentication in register and signup.
4. For blockchain integration, we used solidity for making contracts and JavaScript. We used vanilla JavaScript for developing the blockchain using class-primarily based structure. The blockchain is included into the backend in node.js.
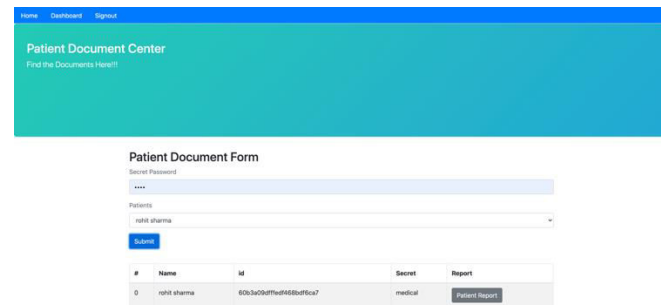
Fig 5: Patient Documentation Centre

- The patient sign in using email, name and password and role. The patient then, provides access to the doctors for the access to the documents.
- Patient has to upload documents with a secret, and that transaction is stored in the blockchain.
- The documents get encrypted and gets stored in the database and can only be accessed if, the user has the correct secret and access rights.
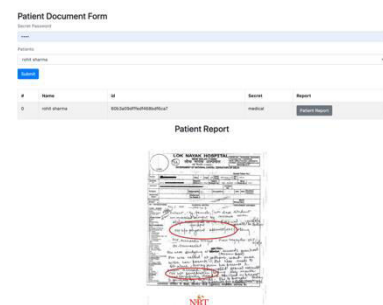
Fig 6: Patient Documents visible to doctors

3. Result & Discussion

The old EHR gadget poses various vulnerabilities. The single imperative authority causes various protection problems and leads to the information breach. Our software focuses on offering a better person interface and higher safety to the users. Blockchain helps in creating a higher-secured application without any 0.33-party interference.[9] We've got used MERN stack and ganache and smart contracts in our system.

Our software allows in various factors:

1.   Easy person interface and better safety.

2.   No crucial authority and better person experience.

3.   Protection from hackers and diverse other offerings just like the register, signup and login.

4.   The usage of the ultra-modern technology like MERN stack in growing and preserving the software.

5.   Fact's verification and having extra protection layer in maintaining the software.

The use of NoSQL databases to offer horizontal scaling i.e., Sharding to the software.
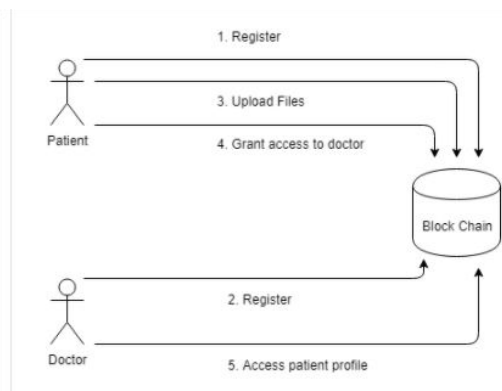

Fig 7: Schema for blockchain

5.   Conclusion

In this paper, we attempted to construct a utility that offers better person revel in and security to customers. We've got explained the methodology and the effects received on this mission. We have used relaxation Apis and NOSQL database in this challenge. It consists of blockchain that adds protection to the utility. The utility follows the SDLC version and supplied publicity to numerous technologies. MERN stack generation helped this utility to come to be scalable on afterward levels.

Presently, the software is the use of easy internet-based architecture but on later degrees, it is able to be upgraded with numerous functionality and better security as properly. With different use cases as properly, this utility can be utilized in different sectors and along with greater brought abilities.

REFERENCES

[1]   Pinyaphat, Tasatanattakool and Techapanupreed Chian (2018), "Blockchain: Challenges and applications." In International Conference on Information Networking, Institute of Electrical and Electronics Engineers, 473–475.

[2]   Mohanta, Bhabendu Kumar, Debasish Jena, and Soumyashree S Pand (2018), "An Overview of Smart Contract and Use cases in Blockchain Technology." Institute of Electrical and Electronics Engineers, 9th ICCCNT, 12–20.

[3]   Tom Joseph, Seymour, Dean Frantsvog, and Tod Graeber (2014), "Electronic Health Records (EHR)." American Journal of Health Sciences, Research Gate.

[4]   Priefer, Dennis & Kneisel, Peter & Strüber, Daniel. (2017). Iterative Model-Driven Development of Software Extensions for Web Content Management Systems. 10.1007/978-3-319-61482-3_9.

[5]   Brancaccio P, Maffulli N, Buonauro R, Limongelli FM.(2008) Serum enzyme monitoring in sports medicine. Clin Sports Med; 27(1): 1-18, vii.

[6]   in *IEEE Access*, vol. 7, pp. 147782-147795, 2019, doi: 10.1109/ACCESS.2019.2946373.

[7]   Nakamoto, Satoshi (2009), "Bitcoin: A peer-to-peer electronic cash system."

[8]   https://www.euromoney.com/learning/blockchain-explained/how-transactions-get-into-the-blockchain.

[9]   Mohanta, Bhabendu Kumar, Debasish Jena, and Soumyashree S Pand (2018), "An Overview of Smart Contract and Use cases in Blockchain Technology." Institute of Electrical and Electronics Engineers, 9th ICCCNT, 12–20

[10] Fekih, Rim & Lahami, Mariam. (2020). Application of Blockchain Technology in Healthcare: A Comprehensive Study.