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Smart Health Consulting Online System Using Blockchain

G Sainath[1], K Tanishq[2], K Sujith[3], Associate Prof. Dr. R Uma Mageswari[4]
[1, 2, 3, 4]*Department of Computer Science and Engineering Vardhaman College of Engineering Hyderabad*

Abstract: ***The current healthcare industry col-lects huge amounts of healthcare data which, unfortunately, are not "mined" to discover hid-den information for effective decision making. BlockChain has been a current trend for at-taining diagnostic results because it keeps the data secure and immutable. BlockChain further extend the support for the process of extracting hidden information from massive dataset, cate-gorizing valid and unique patterns in data. By means of this fruitful insights Blockchain is used in healthcare sector for better decision making. Researchers all over the world are working in either multi agents or in ontologies for developing system in health care domain with help of blockchain. It might have happened so many times that you or someone need doctor help but they are not available due to some reasons. The work proposed here suggests a health management system which supports end user to effectively use online consultation and uses blockchain for storing the patients insights and doctors information. Through this intelligent healthcare system the patient gets guidence from the doctor related their health issues.***

Index Terms: block chain, SMART HEALTH

I. INTRODUCTION

Smart Health Care Prediction using Block Chain is a powerful new technology which is of high interest in the computer world. It is a sub field of computer science that uses already existing data in different databases to transform it to new research and results. The actual task is to extract data by automatic or semi-automatic means. The different parameters included in Block Chain include cluster-ing, forecasting, path analysis and predictive analy-sis. With the growing research in the field of health informatics a lot of data is being produced. The analysis of such a large amount of data is very hard and requires excessive knowledge. Smart health care applies Block Chain techniques for health diagnosis. Block Chain refers to extracting meaning full infor-mation from the different huge amount of dataset. It is the process of determining the unseen finding pattern and knowledge from the massive amount of data set.

It is found that Block Chain has significant re-search doings in the field of medical sciences since there is a requirement of well-organized methodolo-gies for analyzing, predicting and detecting diseases. To detect and predict diseases Block Chain appli-cations are used for the management of healthcare, health information, patient care system, etc. It also plays a major role in analyzing survivability of a disease.The article [11] states that Block Chain clas-sification techniques play a vital role in healthcare domain by classifying the patient dataset. Block Chain classification technique is used to analyses and predicts many diseases. The classification tech-niques like Feature selection methods, improve the performance accuracy of the algorithm by reducing the dimensionality of the feature and it can be grouped into a wrapper and filter method. The tendency for Block Chain application in healthcare today is great, because the healthcare sector is rich with information.Block chain, the inspiration of Bitcoin, has received intensive attentions recently. block chain is AN changeless ledger that permits transactions crop up in a very decentralized manner. block chain-based applications area unit bobbing up, covering varied fields together with money services, name system and web of Things (IoT), and so on. However, there area unit still several challenges of block chain technology like quantifiability and security issues waiting to be overcome.The pro-posed system uses the django based website as the front-end and the backend is associated with the etherium blockchain which is most secure and easy to use.This article contains the Literature Servey on in Section-II and Section-III is about our proposed system and the Section-IV consists information about out projects implementation and Section-V is about the results that the proposed system has generated and the section-VI contains the data about the conclusion and futurescope of the proposed system.

II. LITERATURE SURVEY

The authors [4] presents a comprehensive sum-mary on block chain technology.This paper offers an summary of block chain architecture first off and compare some typical agreement algorithms utilized in completely different block chains. more-over, technical challenges and up to date advances area unit concisely listed.

It tend to additionally lay out potential future trends for block chain. In this paper, we present a comprehensive survey on the block chain based healthcare applications and cur-rent innovations to promote block chain techniques.

Smart health consulting online system that utilizes blockchain technology could help improve patient privacy, security, and control over their personal health information.[3] Smart health consulting on-line systems that make use of blockchain technology have the potential to transform the way healthcare services are delivered. Blockchains are distributed ledger systems that are decentralized, transparent, and immutable, making them ideal for health con-sulting services. The use of blockchain can address some of the key challenges faced by the health-care industry, such as the fragmentation of medical records, the high cost of healthcare services, and the lack of transparency and accountability. Also the use of blockchain in smart health consulting online systems can improve the efficiency and security of healthcare services, while also enhancing the privacy and confidentiality of patients' data by en-abling patients to access high-quality care remotely and securely. The use of blockchain technology in healthcare is still in its early stages, but has the potential to revolutionize the industry. As such, developing a smart health consulting online system that incorporates blockchain technology could offer many benefits for patients, providers, and other stakeholders in the healthcare ecosystem.

The research article [10] explores the use of blockchain in healthcare . The article discusses how blockchain technology can be used to create a trusted and secure environment for insurance transactions, but also notes that there are still many technical and practical challenges to be addressed. Another relevant article [9] provides an overview of how blockchain technology can be used to improve healthcare data sharing, clinical trial management, and supply chain management. It also discusses potential barriers to adoption and how they can be addressed. The research article that discusses the use of blockchain in smart health consulting online systems [8] The article proposes a blockchain-based solution for sharing medical records between health-care providers and patients in a secure and efficient manner.

The proposed solution consists of a permissioned blockchain network where healthcare providers and patients are the nodes. Each node maintains a copy of the blockchain, which contains a tamper-proof record of all the medical records that have been shared. The records are encrypted to ensure the privacy and confidentiality of the patients' data.The article also discusses the use of smart contracts, which are self-executing programs that automate the process of sharing medical records. Smart contracts can ensure that medical records are only shared with authorized parties, and that the data is not altered or deleted without proper authorization.

In a research article titled [7] the authors propose a smart health consulting online system that utilizes blockchain technology to provide secure, confiden-tial, and reliable health consulting services. The proposed system employs a decentralized network of healthcare providers and patients, and the data exchange is mediated by a blockchain-based smart contract.The authors further state that the proposed system has several advantages, including data se-curity and privacy, transparency, and integrity. By utilizing blockchain, the system can ensure that patient data is protected from unauthorized access and manipulation. Moreover, the system allows for transparent and secure access to patient data, which can enhance the quality of healthcare services. The authors propose the use of a consensus mechanism known as Proof of Authority (PoA) to ensure the integrity of the data stored on the blockchain. PoA is a consensus mechanism that enables a network of validators to reach agreement on the validity of transactions and blocks. The proposed system also includes a smart contract that governs the interac-tions between patients and healthcare professionals. The smart contract is designed to ensure that all interactions are transparent and that all parties are held accountable for their actions. The use of a smart contract also enables the system to automate certain processes, such as payment processing.

A recent research article titled [6] proposes the use of blockchain technology in a healthcare consult-ing system to enable secure data storage, transfer, and access. The proposed system leverages the decentralized and immutable nature of blockchain to enable secure and private sharing of medical data between patients, healthcare providers, and consultants. The system uses smart contracts to enable the automation of healthcare operations such as appointment scheduling, medical record sharing, and payment processing. One of the key advantages of the proposed system is that it allows patients to have complete control over their medical data and provides them with a secure and private platform to share their data with healthcare providers and consultants. The system also enables healthcare providers to access patient data securely and ef-ficiently, which can lead to improved patient out-comes and reduced costs.

The article [5] describes the development and implementation of a blockchain-based electronic health record (EHR) system that allows for secure, decentralized storage and sharing of patient data. The system uses a permissioned blockchain to en-sure only authorized parties can access and modify patient records, and a consensus mechanism to maintain the integrity of the data. The authors also discuss the use of smart contracts to automate cer-tain healthcare processes, such as insurance claims processing and prescription verification.

By using blockchain technology, the system is able to reduce the risk of errors and fraud, while also improving the speed and efficiency of these processes.

III. PROPOSED SYSTEM

A SMART Health Consulting System which is de-signed helps patients in diagnosing their disease and prescribe related medicines. Patients can take online appointment and can visit doctor for medication.To secure patients data the proposed system using Block chain technology for storage.The Block chain store each data as block/transaction and associate each block with unique hashcode . While storing new records Block chain will verify hashcode of all previous blocks and if hashcode matches then data is stored securely and doesn't allow to alter the data/block by hacker or hospital internal employees. Due to this verification Block chain data is called as immutable or tamper proof. Thus it provides more authentication for the proposed system. The Fig-1 showcases the architecture of our system.

A. Algorithm

As we know hash is a process of converting raw data into another format of data(plain text to cipher text) so that we can't reproduce it again back.We can achieve the hash value by performing mathematical operations.These operations can be done by using specific functions known as Hash Functions.The proposed system is focusing on using SHA-256 Algorithm ,one of the strongest hash function avail-able.The 256-bit key makes AES(Advanced Encryp-tion Standard Algorithm) is an excellent partner-function. It is specified in the standard 'FIPS 180-4' of the NIST.Hashing is the process of scrambling raw information to the extent that it cannot repro-duce it back to its original form. It takes a piece of information and passes it through a function that performs mathematical operations on the plaintext. This function is called the hash function, and the

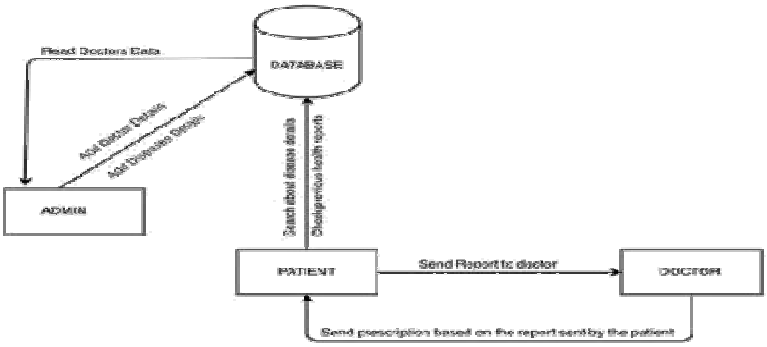

Fig. 1: Architecture of proposed system

output is called the hash value/digest. Among the many advancements seen in network security, en-cryption and hashing have been the core principles of additional security modules. The secure hash algorithm with a digest size of 256 bits, or the SHA 256 algorithm, is one of the most widely used hash algorithms. While there are other variants, SHA 256 has been at the forefront of real-world applications.

Fig-1 shows how the proposed system works and the connection between front-end(webpage) and the back-end (etherium blockchain) and how the storing and retrieval of data from the database is achieved.

B. Highlights of Proposed System

Blockchain technology has the potential to revolu-tionize the healthcare industry by providing a secure and decentralized platform for storing and sharing patient data. Some of the key advantages of using blockchain in the health sector are:

1) Improved data privacy and security: Blockchain technology allows for secure and tamper-proof stor-age of patient data, providing a high level of privacy and security. The decentralized nature of blockchain also means that there is no central point of failure, reducing the risk of data breaches and cyber attacks.
2) Efficient record-keeping: Blockchain technol-ogy provides a single, unified platform for storing and sharing patient data, eliminating the need for multiple records and reducing the risk of errors and inconsistencies.
3) Enhanced data sharing: Blockchain technology allows for secure and seamless sharing of patient data between healthcare providers, improving col-laboration and coordination of care.

4) Streamlined clinical trials: Blockchain technol-ogy can streamline the clinical trial process by providing a secure and transparent platform for data sharing and verification, reducing costs and accelerating the development of new treatments.

5) Improved supply chain management: Blockchain technology can be used to track the movement of medical supplies and equipment, ensuring that they are authentic and not counterfeit.

Overall, the use of blockchain technology in the healthcare industry has the potential to improve pa-tient outcomes, reduce costs, and increase efficiency and transparency.

IV. IMPLEMENTATION AND LIMITATIONS

The developed system has a web application for booking an appointment for consulting a doctor and which can also suggest the doctor based on symptoms provided by patient and the application also access the previous records like prescriptions and diagnosis details. Also this can be accessed by doctor for better medication and helps the patient in case of emergencies. they can even get their prescription sent through the website.

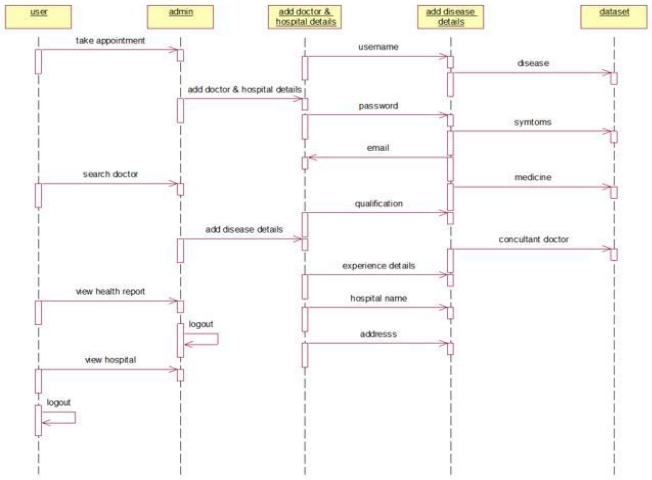

Fig. 2: Sequence Diagram

1) Step 1:Admin

First admin adds the data of the relavant doctors and hospitals which are associated with our website and also enters the data for the symptoms of general diseases

2) Step 2:Doctor

here doctor will login into his specific page of our website and can access the data of the patients who are reffered for him and can suggest the preferred medication

3) Step 3:Patient

here patient should first signup with our website to create an account on his name and then can enter the symptoms he is facing and can upload the previous prescription if any and then can consult the preferred doctor who can access the data uploaded by the patient.

Block chain technology is incorporated into the healthcare industry, in which specific challenges would have to be addressed. The big problem with the utilisation of this advanced technology for med-ical facilities is the lack of expertise. Block chain applications are still in the early stages and must do more work for technology exploration and research. It, however, applies to medical associations and regulators obligations. The time has come for the health sector to improve. Block chain in the field of healthcare is very likely to expand in the future.

V. RESULTS

The screenshots shown here displays the results of how the system interacts with the patients as well as how the doctor can get the data of the patients.The way how they suggests the medication and the result back to the patients.

Fig. 3: HOME PAGE

Fig-3 displays the logins required for the user to access our website which includes the admin , doctor , patient login buttons.

Fig. 4: Admin Login

Fig-4 displays the access given to the admin in which the admin can add the details of the doctors and the diseases.

Fig. 5: Patient Login

Fig-5 displays the access the given to the patient in which patient can contact the required doctor and send the relavent reports.

Fig. 6: Hospital Details

Fig-6 displays tne hospitals that are associated with our project which are availiable to the patient for consultation.

Fig. 7: Prescription

Fig-7 shows the prescription details that are sent back to patient after the consultation by the pre-scribed doctor.

VI. CONCLUSION AND FUTURE SCOPE

A smart health consulting system that uses blockchain technology can greatly enhance the healthcare industry by increasing data security, pro-moting transparency, and improving patient out-comes. By utilizing blockchain, health data can be securely and efficiently stored, shared, and accessed by authorized parties, while maintaining patient privacy. Additionally, smart contracts can automate processes, reduce administrative costs, and stream-line healthcare delivery. However, the adoption of blockchain in healthcare is still in its early stages and requires collaboration between stakeholders, government regulations, and investment in technol-ogy infrastructure. Overall, the potential benefits of blockchain in healthcare are vast, and its im-plementation could lead to a more efficient and effective healthcare system. The work focus here tried to mimic an online healthcare system with the blockchain as backend and insights found to be beneficial in the vision of patients and doctors. The future scope of a smart health consulting system using blockchain is very promising thus extend this work further with accommodation of more features to the frontend pages for the better patients and doctor's interaction.

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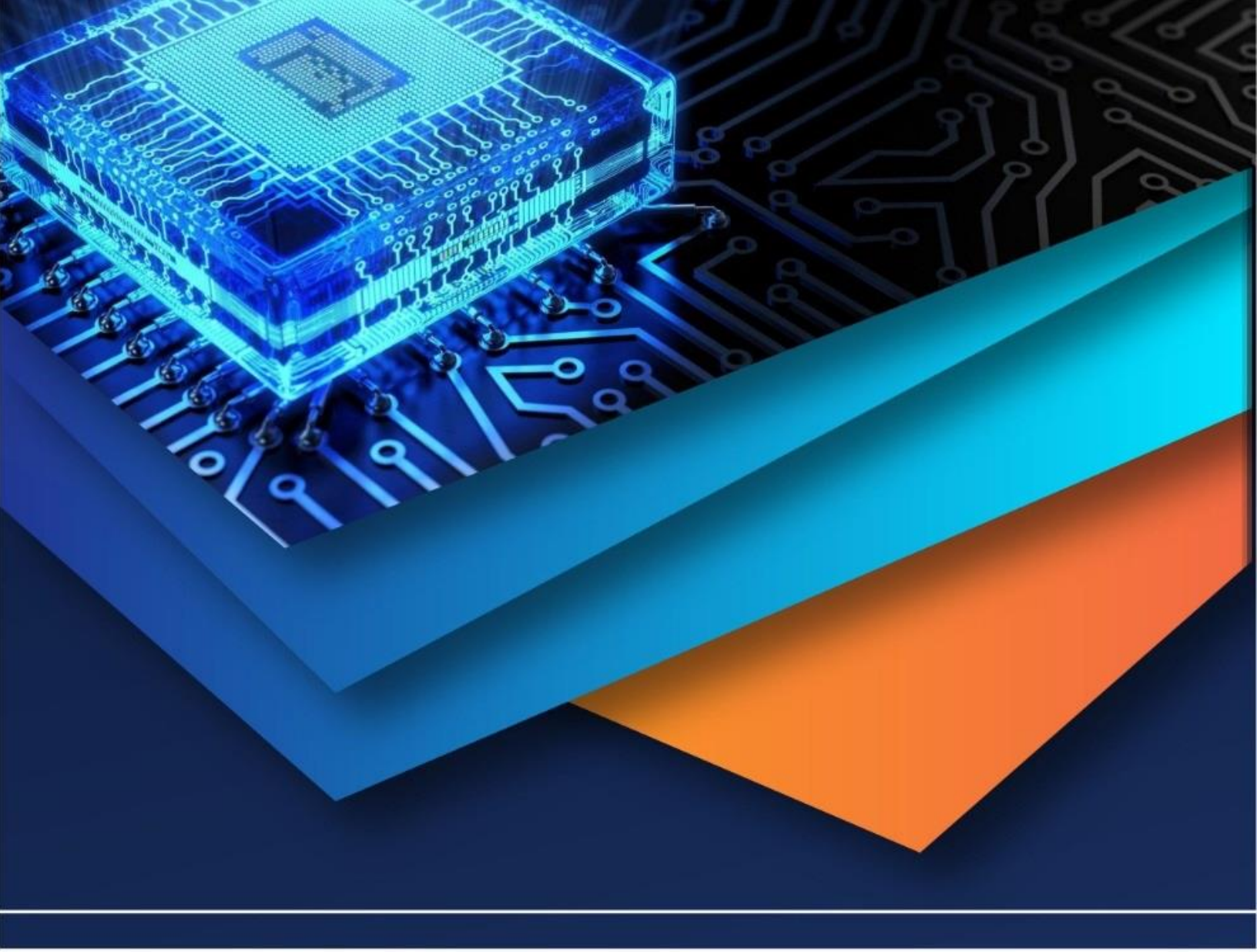

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