BLOCKCHAIN TECHNOLOGY APPLICATIONS IN HEALTHCARE

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ABSTRACT

Block chain is a cutting-edge technology being used to provide creative solutions in a number of industries, including healthcare. In order to store and share patient data among hospitals, labs, pharmacies, and doctors, the healthcare system uses a block chain network. Block chain-based software can reliably detect serious errors, including potentially harmful ones, in the medical domain. As a result, it can enhance the efficiency, security, and openness of medical data exchange within the healthcare system. Medical facilities can improve the analysis of healthcare information and obtain new insights with the use of this technology. In this essay, we examined block chain technology and its important medical applications. Diagrammatic discussion is provided of the many abilities, enablers, and unified work-flow process of block chain technology to help healthcare worldwide. Block chain technology has the potential to enhance data efficiency for healthcare, as it plays a crucial role in managing fraud in clinical studies. It facilitates a distinct data storage pattern at the greatest level of security and can help allay concerns about data manipulation in the healthcare industry. It offers adaptability, connectivity, responsibility, and data access authentication. Health records must be kept private and secure for various reasons. Block chain prevents specific dangers and aids in the decentralized safeguarding of healthcare data.

Keywords: Block chain, healthcare, data efficiency, technology.

BLOCKCHAIN TECHNOLOGY

The major Issues facing contemporary healthcare systems are excessive maintenance and administration expenditures [1]. The healthcare system is a multifaceted, intricate system that includes many areas, each with its own set of stakeholders, including patients, practitioners, researchers, managers, and support workers [2]. Consequently, managing and classifying patient data becomes an enormous task [3,4]. The difficulty is compounded by the fact that various healthcare areas have diverse data structures and operations. These factors make it extremely difficult for different healthcare areas to effectively exchange information about healthcare [5].

To tackle health information records and exchange, a system is required to be developed, managed, and maintained. A third party develops and maintains traditional personal health record and electronic health record systems, with trust, privacy, and data security remaining important challenges [6]. However, the third-party-based existing healthcare recording systems cannot satisfy stakeholders' privacy needs [7]. As a result, the traditional electronic healthcare model lacks transparency because of privacy and data security issues.

The development, management, and upkeep of a system is necessary to address health information records and interchange. Traditional personal health record and electronic health record systems are developed and maintained by a third party; trust, privacy, and data security are still major obstacles [6]. Nevertheless, stakeholders' demands for privacy cannot be met by the third-party-based healthcare recording systems now in place [7]. Because of privacy and data security concerns, the conventional electronic healthcare approach lacks transparency.Because of privacy and data security concerns, the conventional electronic healthcare approach lacks transparency. Blockchain technology has tremendous potential in addressing security-related issues and the challenging challenge of massive and extremely diversified data in healthcare systems. [8] Blockchain is a digital ledger, peer-to-peer network, and decentralized, distributed database [9].

The blockchain facilitates the safe transfer of information between parties by connecting numerous computers through nodes and does not require any transactions to create new blocks. The client can use a blockchain that is encrypted to access all authorized and verified medical information. Anybody can add a new chain to the block and select transactions. A blockchain's master key is a hash, and it can provide unique identifiers for cryptocurrencies to add data by utilizing this hash function. Stakeholders are reluctant to cooperate for the exchange of health information since traditional electronic health record and personal health record-based health information exchange systems have not been able to address privacy and security-related concerns.

This has led to an increase in healthcare costs, which is very expensive for both patients and healthcare providers. These days, researchers and governments are looking to blockchain technology to address these issues connected to trust. According to IBM, a number of prominent healthcare firms believe blockchain will modernize healthcare administration systems and create a decentralized architecture for the exchange of electronic health information, which will significantly alter the healthcare system [10].

The blockchain technology market is expected to reach over $500 million in revenue by 2022 [11]. Despite the fact that blockchain technology has been the subject of numerous research

in the healthcare sector, the body of current literature does not offer a complete picture of the application areas. Thus, it becomes necessary to carry out a thorough investigation into the potential uses of blockchain technology in the healthcare sector.

These days, a lot of servers are constructed with the ability to assist customers via mobile devices. With the help of numerous apps and mobile devices, it is now feasible to generate and send enormous amounts of medical data on a weekly or daily basis thanks to internet services. Many challenges, including those related to cost, strategy, preserving uniformity, and individual behavioral constraints on services, can be addressed by the current healthcare system [12]. Nonetheless, suppliers to the healthcare system don't always take advantage of the newest advancements in technology inside the supply chain. For instance, they do not make appropriate use of the recent collection and distribution of medical supplies. Indeed, according to a research on Healthcare Finance, almost USD 25.7 billion is

Annually for needless operations and supply management [13]. To ameliorate the constraints and meet the growing demands for better healthcare, a significant amount of work must be concentrated on developing a smart healthcare system. It might work on design and development problems based on smart tools, devices, upgraded facilities, and modern healthcare infrastructure. Additionally, it might create intelligent healthcare using biosensors, customer-connected apps, and the most recent emergency response technologies.

[14]. Thus, in order to create a more effective network, we must ascertain which consensus algorithms are already in use in numerous blockchain networks and which ones function well with IoT-based infrastructure to enhance healthcare services. [15]. Distributed Data Storage System (DDSS), a quicker data sharing mechanism, offers an additional solution to blockchain's massive data storage issue.

It tracks several papers with the same name in one location by using file translation and data caching. But occasionally, when a large file is uploaded to DDSS, it breaks the file up into multiple smaller data objects—256 kb, for instance—and connects each of these items to an empty object so that Distributed Hash Tables (DHT) can be used to recover the entire file.

Some sensors can collect data automatically from users and can transfer them to a certain storage or cloud for further processing by physicians, nurses, and medical staff. Several pieces of rules and regulations have been proposed to save individual patients' privacy. These laws always require appropriate security management for controlling, sharing, and exchanging the health of patient data, and failure to follow them is strongly prosecuted, with severe penalties being imposed on electronic healthcare systems (EHRs).

Certain sensors have the ability to automatically gather user data and send it to a specific storage location or cloud so that doctors, nurses, and other medical professionals can process it further [18]. A number of laws and guidelines have been put forth to protect the privacy of certain patients. In order to monitor, share, and exchange patient health data, these regulations always demand effective security management. Violation of these rules is strictly prohibited, and electronic healthcare systems (EHRs) risk facing harsh fines. Nearly 70% of healthcare executives anticipate that blockchain would have a significant impact on improving the clinical trial system, health domain, regulatory compliance, and developing a decentralized framework for exchanging electronic health records (EHRs), according to an IBM survey.

Blockchain-based healthcare management solutions are becoming more and more common in both the academic and practical domains due to the availability of improved data security and administration at a reduced cost. Over the past ten years, there has been a dramatic increase in research interest in blockchain-based healthcare systems. Comprehensive information gathering and depiction of previous actions in this domain are lacking for future research. Current review papers summarize current advances in this topic in brief and point out the advantages and disadvantages of the solutions proposed by scholars.

These review papers, however, do not offer a thorough analysis of all the various facets of blockchain in the healthcare system, including the research themes being pursued, the healthcare domains where blockchain is most commonly applied, applications of blockchain in particular domains, and current blockchain-based healthcare systems. Comprehensive information gathering and depiction of previous actions in this domain are lacking for future research.

CONCLUSION

Because of its intrinsic decentralization and encryption, blockchain technology has several creative uses in the medical field. It increases the interoperability between healthcare organizations, boosts the monetization of health information, strengthens the safety of patients' electronic medical data, and aids in the fight against counterfeit medications. Blockchain technology has the potential to revolutionize a variety of healthcare professions. One of the most important uses of blockchain is in the digital agreements made possible by intelligent contracts in the healthcare industry. Smart contracts reduce expenses by cutting out middlemen from the payment process. The potential of Blockchain in the healthcare industry is heavily reliant on the ecosystem's acceptance of related cutting-edge technology. Clinical studies, medication tracing, healthcare insurance, and system tracking are all included. Hospitals can use device monitoring to map their services utilizing a Blockchain architecture, even during the course of their whole life cycle.

ACKNOWLEDGEMENT

The authors are thankful to the Parikrama Diploma in Pharmaceutical Sciences Kashti for extending facilities required for completion of the work.

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