

# Study on Applications of Blockchain Technology in Health Care System

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## ABSTRACT

Blockchain is a distributed database that multiple parties can maintain and share. This new technology is expected to greatly impact the healthcare industry. It can help address various issues related to patient care. The potential of blockchain technology to improve the healthcare industry's privacy, security, and interoperability is immense. Its decentralized nature enables it to securely store and share medical records, which can be accessed and utilized by various stakeholders, such as patients and healthcare providers. Blockchain can help decrease the risk of unauthorized access and manipulation of patient data, improve transparency, and increase the quality of patient care. It can also help healthcare institutions and providers share updated and accurate medical records. Patients can gain more control over the medical data they collect through blockchain technology. This can help them make informed decisions regarding their health and contribute to the development of effective healthcare policies. It can also help them participate in the research process by securely sharing their information with scientists. Overall, blockchain technology's adoption in the healthcare industry can help improve the efficiency and effectiveness of the system. This paper aims to introduce the general idea of the blockchain and its applications in the healthcare industry.

Keywords: Healthcare, Blockchain, Medicine

## INTRODUCTION

The concept of blockchain, which is a distributed database that keeps track of a growing number of transactions, is commonly referred to as the chain of trust. It can help businesses streamline

their operations by establishing transparency and accountability. In 2008, the creator of Bitcoin, Satoshi Nakamoto, developed the digital ledger technology that is the basis for the exchange of cryptocurrency. The Bitcoin, Ethereum, and Litecoin (BC) network is the backbone of various cryptocurrencies. It allows users to keep track of their transactions in a decentralized manner. A definition of blockchain is similar to that of a distributed ledger: It's a system that's composed of blocks, which are connected with each other.

The term blockchain refers to the way in which transaction data is stored in BC, which is done through the combination of linked blocks. As the number of transactions grows, the chain grows. The care that you receive is added in your personal ledger as a result of all the entries being stored as blocks on the chain. Blockchain technology is a type of mathematical model that can be used to create real-time and secure transactions. It is categorized into three different categories.

The concept of distributed system has been around for a long time, and it refers to a group of computers that are independent of one another and are spread across a geographical area. It is now commonly used as a type of autonomous system that allows nodes to communicate with each other. A decentralized organization does not have a central point that manages transactions or holds information on identities. The Block is a type of file that can be used to store data. It can be a text file, a video sample, a spreadsheet, or any other kind of data that can be accessed by a machine. The nodes are interconnected and act as a chain to govern the exchange of information. This type of system is referred to as a message broadcasting system. It allows the nodes to communicate and transfer information between one another. The simple concept of a transaction is that the information is transferred from one node to another in a single operation.

## APPLICATIONS OF BLOCKCHAIN TECHNOLOGY IN HEALTHCARE

Blockchain technology (BCT) was originally designed to be used in the areas of cryptocurrencies and economics. However, it is now being utilized in various fields, such as medical research [1]. Blockchain technology has the potential to transform the way healthcare is delivered by allowing users to interact with the data collected in various forms of applications, such as medicine and genomics. These include e-health, telemedicine, and tele-monitoring.

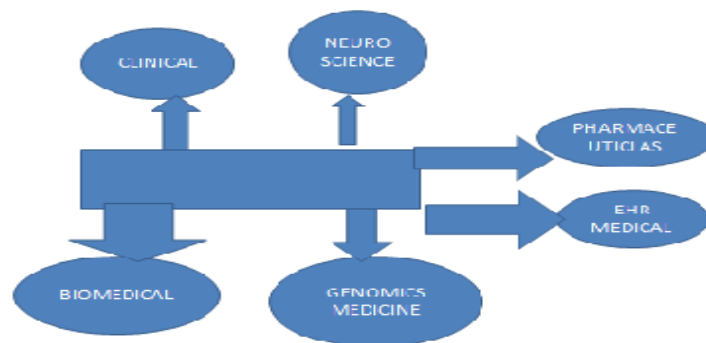


Figure – 1. Blockchain applications in healthcare

- **Medical Records**

One of the main advantages of blockchain technology is its ability to create a secure and tamper-proof system that can be utilized to store and share health electronic health records (EHRs). This type of technology can help prevent data breaches and guarantee the privacy of patients' information. With blockchain, patients can have total control over their health information.

The increasing need for faster and better decision-making capabilities in healthcare organizations has led to the development of digital health records. Although blockchain technology is commonly used in the healthcare industry to create electronic medical records, it is not designed to store and manage the records of patients. This technology is used to monitor and manage the activities of individuals[2-4]. Due to the increasing number of people using electronic health records, researchers are developing blockchain technology to improve the efficiency and security of these systems. One of the most common applications of this technology is to manage the confidentiality and authentication of patient data. The MedRec prototype aims to provide a comprehensive history of a patient's healthcare information [5].

- **Clinical Trials**

In addition to being used in healthcare, blockchain technology can also be utilized in the clinical trials industry. This type of technology can help ensure the integrity and transparency of the data collected in these trials. It can help improve the efficiency of the process and prevent fraud. When it comes to conducting clinical trials, there are various issues that can arise. These include data privacy, patient enrollment, and record-keeping [6]. Researchers are currently working on developing novel blockchain-based solutions that can help address these issues [7]. The potential of blockchain technology to transform the healthcare industry is immense. It can be used for various applications such as machine learning and artificial intelligence [8,9].

- **Supply Chain Management**

Healthcare organizations can use blockchain technology to improve their supply chain management. Through this method, they can monitor the movement of medical devices and drugs between the manufacturer and the patient. It can help prevent counterfeits and ensure that the medicines are genuine. This process involves ensuring the correct quantities and delivery of drugs to patients at the appropriate time[10]. Blockchain technology enables pharmaceutical transactions to be traced and tracked, which eliminates the need for intermediaries and enhances the efficiency and safety of the process.

- **Health Insurance**

In order to improve the transparency and efficiency of healthcare insurance, blockchain technology can be used to manage and store data related to claims and policies. This type of technology can help prevent costly errors and fraud and lower the premiums for patients.

- **Telemedicine**

Through blockchain technology, healthcare providers can now improve the security of their virtual consultations by keeping their patients' privacy and medical data secure. This could help improve the quality of patient care and increase their trust in telemedicine.

## **ADVANTAGES AND CHALLENGES OF BLOCKCHAIN TECHNOLOGY IN HEALTHCARE**

The widespread use of blockchain technology in healthcare has created secure and efficient communication channels between different systems. This eliminates the need for boundaries and geographical limitations and allows patients to receive the most accurate and timely care. Developers can create applications with blockchain technology, which is an emerging type of digital ledger that allows for a transparent and verifiable history of every transaction. It's expected to have various advantages, such as immutability and decentralization [11,12,13].

- Privacy and Security Concerns of Data

The use of blockchain technology ensures that transactions are secure. Its robust encryption algorithm makes it incredibly difficult for unauthorized individuals to access the system. But, while it is transparent, it can still provide users with partial anonymity, which could cause privacy concerns for some. The security and privacy of data are some of the most critical issues that blockchain applications must address [14]. Since the system allows users to verify the records, it could expose the data to various risks [12,15].

- Storage Management

The management of blockchain technology's storage capacity is one of the biggest issues that it faces. Since it's designed to only process limited amounts of data, it doesn't require a lot of storage [16].

- Interoperability Factors

When it comes to the exchange of data, interoperability is a critical issue that blockchains have to address [14]. This is because, if they are to function properly, they have to ensure that the various providers and communication services are working seamlessly [17].

- Standardization Issues

Despite the advancements that have been made in blockchain technology, it's still not feasible for the medical and healthcare sectors to fully implement it. To ensure that the system is secure and compliant, international standards have to be established. The nature and size of the data being shared using blockchain technology will also be taken into account when establishing global standards.

## **CONCLUSION AND FUTURE ASPECTS**

The study looked into blockchain's applications in the healthcare industry. Due to the immense growth of this technology, it is being widely used in various areas of healthcare to enhance the efficiency of their operations. The study also found that most research on this topic is focused on the sharing of health records. The study also looked into the potential applications of blockchain in the biomedical research and pharmaceutical sectors. It found that these sectors could benefit from its ability to improve the efficiency of their supply chains and provide more personalized care.

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