

**BLOCKCHAIN ROLEPLAY IN HEALTHCARE DURING PANDEMIC TIMES**

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**Abstract:**

Coronavirus pandemic has engulfed the entire world since late 2019. The entire world is currently facing multifarious problems due to the emergence of the Coronavirus pandemic. The sudden outbreak of a pandemic exposed the unpreparedness of the healthcare system in dealing with such situations. In the near future, Blockchain technology can prove to be very useful in managing the Coronavirus pandemic. A blockchain is a database that has data stored in a block in encrypted format in decentralized and distributed networks. These blocks of blockchain are chained together in chronological order. Digital assets are distributed rather than replicated or relocated, resulting in an immutable record of the object. Blockchain technology can play an important role in the healthcare system. Implementing innovative technology like blockchain in modern healthcare systems can prove to be very effective in the planning of operations and resource deployment. In this paper, the use of blockchain in solving problems that arose due to the Coronavirus pandemic is discussed.



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**Key Words:** *Blockchain, COVID-19, Coronavirus, Ethereum, Ledger, Decentralized system, Smart contracts, Traceability, Tracking system, Transparency*

**Introduction:**

In late 2019, a coronavirus (COVID-19) outbreak triggered a global health emergency [1]. The number of new coronavirus cases rose to over a million in just over three months around the world. Because of the virus's rapid spread, new cases were reported every hour around the world. At the same time, the number of deaths and infections was rapidly increasing. As a result of the COVID-19 pandemic, lockdowns and social distancing measures were imposed, which significantly impacted worldwide economies. The rapid spread of the COVID-19 pandemic has revealed the shortcomings of the modern healthcare system in dealing with a sudden outbreak of any disease. Scientists all over the world started working rigorously in developing cures for the disease as well as they started working to find the potential growth of the virus.

Deep learning, machine learning, artificial intelligence (AI), and blockchain are cutting-edge technology that could aid in the fight against the crisis. Blockchain technology, in particular, has the potential to revolutionize a variety of industries, which can be more impactful for healthcare industries.



# Electronic International Interdisciplinary Research Journal

Volume-X, Issues-VI

Nov - Dec, 2021

## Overview of Blockchain Technology:

Blockchain is a decentralized system with unique features including unbreakable data infrastructure, transparency, and cryptographic encryption tools built-in. It's a chain of blocks that makes up a distributed ledger. Due to its underlying cryptographic technology, which is used to authenticate network participants, blockchain's decentralized platform is securely encrypted. Once a transaction is approved and authenticated, it is chained to prior transactions with a unique hash, it takes a lot of resources to edit transactions added to the blockchain network. As a result, changing one transaction would change this hash, alerting all members and making it nearly hard to modify or delete data. All members of the network have access to the data recorded on the blockchain, ensuring transparency among participants. Blockchain technology has a lot of potential uses that might help in the current pandemic's battle. It can be used to streamline vaccination and medicine clinical trials, boost public awareness. It can also serve as a dependable data tracker.

In Blockchain technology, there is a sequence of blocks that connect each newly updated block to its prior block until they're all linked back to the genesis block to form a secure chain. This eliminates the possibility of change because each block is securely linked to the one before it using a hash label, forming a strong link between them. [2]

Blockchain Technology is also known as a database that records and stores user transactions. The ledger is immune to tampering because each transaction has a unique cryptographic signature independent from a timestamp. Furthermore, this immutable ledger is shared across the entire network at the same time, allowing users to be updated in real-time.

## Blockchain Roleplay in Covid-19:

Coronavirus is an extremely contagious disease. Hence, scientists from all around the world are working hard to find the best solutions for vaccination, reducing the spread of infection, and quickly identifying viral carriers. Blockchain already has significant potential to become a key element in the fight against COVID-19. It would allow for effective tracking and monitoring solutions. It would provide a transparent supply chain for critical items and also a platform for secure payments. This is possible because blockchain is made up of blocks that are chronologically ordered lists of encrypted signatures, as well as a secure distributed ledger with permanent transactions. These records are shared by all network members. [2]. By eliminating intermediaries that handle manual transactions, blockchains and public ledgers can be used to attain cost reduction. Following are few use cases of Blockchain:

### Contactless Payment:

The financial use of blockchain is one of the most important benefits of this technology to promote public health. Financial innovations based on cryptocurrencies appear to be ready for widespread adoption, allowing for digital payments that eliminate the need for contact while maintaining social distance. Cryptocurrencies such as Bitcoin and Ethereum have been particularly well received and can be used for contactless payments.

### Maintaining Electronic Health Records of Patients:

Health records of patients are stored on External Hard Disk or SSD in hospitals. Transfer of a patient's health record from one hospital to another hospital becomes difficult. In this case, blockchain technology can prove to be useful. A patient's complete health record can be stored on the blockchain which can be secured by a private key. It becomes very easy for a patient to share his health record between different hospitals and organizations. Individual patients might use the same information on the blockchain to quickly unlock and share their health data with other physicians or organizations using a shareable private key. Also, blockchain can maintain the past record of any patient's well organized, so physicians can easily access the history and do analysis on the treatment and medication done on the



# Electronic International Interdisciplinary Research Journal

Volume-X, Issues-VI

Nov - Dec, 2021

patient. This could aid in the communication and coordination of health information technology (HIT) among diverse users.[6]

## **Better Patient Care:**

Blockchain can be used to store health records of patients which can be secured using the private key. These health records can be updated as and when a patient undergoes medical check-ups. There will be a single system which is a blockchain where all the records of the patients will be stored. This will create ease of access to the records, also records can be accessed rapidly. It will also avoid miscommunication among different medical professionals dealing with the same patient. It will also result in a faster and correct diagnosis of the patient.

## **Mobile Health Applications:**

With the digital revolution, digital healthcare applications are becoming extremely important. We are experiencing tremendous growth in smart health care devices. These devices are internet-connected smartly calculate and notify reports to doctors. Electronic medical records (EMRs) were discovered to be kept secure on a blockchain network, and the data could be transferred to medical professionals quickly, as well as used for self-monitoring and home care.

## **Health Insurance:**

Blockchain technology is best suited for health insurance claims. The main reason for this is that data stored on the blockchain is immutable. Blockchain will store and present the medical events of patients as they have occurred. There is no scope for tampering with the data for fraud purposes.

## **Privacy Protection:**

In these trying times, a balance between data collecting and privacy protection is required. Blockchain can be used to more efficiently collect and analyse medical data, as well as monitor patients' movements to ensure the appropriate social distancing while preserving their identities. There is no central authority, and clients have control over their data on a blockchain platform. They can exchange data that is important for coronavirus alleviation efforts while maintaining their privacy and identity. Furthermore, governments and healthcare organizations can increase data collection by tracking coronaviruses, while clients can rest assured that their information will not be revealed or shared. A group of European privacy experts developed a blockchain-based architecture for COVID-19 Bluetooth contact tracing. [3][4]

## **Contact Tracing:**

Contact tracing is a method of preventing the transmission of a virus by proactively identifying, informing, and, if required, quarantining those who are at a higher risk than others. This tracing method is valuable, and smartphones can help improve the system's effectiveness if privacy and other issues are addressed. Contact-tracing activities are used by governments and healthcare organizations to keep track of patients. Using blockchain at each phase, on the other hand, improves the accuracy and reliability of the data collected. Blockchain technology can track patient movements and provide real-time updates on afflicted areas. It can also be used to detect virus-free zones and alert the public to safe regions. Keep in mind that this data might be gathered from monitoring companies utilizing a combination of technologies, such as artificial intelligence (AI) and Geographic Information Systems (GIS).[5]

## **Conclusion:**

While dealing with unexpected situations like coronavirus outbreaks, one always resorts to technology for help. It is evident from past history that technology has always pulled us out of such situations. For patient-centred access to and exchange of health information, blockchain is a potent and feasible solution. In the blockchain implemented system,



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Volume-X, Issues-VI

Nov - Dec, 2021

data is stored in a decentralized manner. This methodology not only ensures safety but also ease of access and has other benefits like the interoperability of data amongst different healthcare organizations. This field is new and facing a lot of challenges due to a lack of proper and complete knowledge about the working of the system and its potential. There is also a shortage of competent blockchain specialists. As future work, it can be aimed to address these shortcomings of the blockchain system and build a viable healthcare system.

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