Internet of medical things: A potential tool for emerging smart healthcare

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Abstract

The "Internet of Things" (IoT) is a system of physical objects or "Things" integrated and attached to the internet to share information with other systems and devices. In terms of technical implementation, it means expediting data exchange and keeping the data on a safe cloud server, where computers connected to a network can share data and communicate with one another over the server. Many innovations are available, smart gadgets are preferred even in healthcare system also. Assessment and detection is also preferred to be done with the use of IoMT. Blockchain is also being used as a method for security and assessment in healthcare systems. In this chapter details about the IoMT will be discussed.

The "Internet of Things" (IoT) is a network of physical objects or "Things" that are integrated and connected to the internet in order to exchange data with other systems and devices. In terms of technology, it involves speeding data exchange and putting the data on a secure cloud server, where a grapewine of connected computing tools can divide data and communicate with each other across the data processor. Numerous innovations have been made on items and devices "smart" by adding integrated software that either unlocks previously unattainable features or enhances already available ones. [1] A new, "smart" healthcare system that emphasizes early diagnosis, spreading-prevention, education, and treatment as well as making it simpler to adapt to the new normal has been developed by scientists in response to COVID-19. In addition to examining the corpus of evidence already available that shows how well IoMT improves patients and the healthcare system. [2] Through the use of telehealth made possible by the Internet of Medical Things (IoMT), both caretakers or healthcare providers and patients have successfully accepted remote patient monitoring, screening, and treatment. Especially in the midst of a global epidemic, smart devices driven by the Internet of Things (IoMT) are multiplying everywhere. The high volume of requirement, however, makes the healthcare industry one of IoMT's most challenging application fields. [3] An IoMT-based smart healthcare system consists of a network of several smart medical devices that are connected to one another through the internet. The steps of a smart healthcare system constructed using the IoMT framework are as follows:. Firstly, a patient's body will be used to gather medical data using smart sensors built into wearable or implantable devices that are linked by a body sensor network (BSN) or wireless sensor network (WSN). [4]

This data will then be transmitted over the internet to the component handling the prediction and analysis step. After receiving the medical data, analysis can be performed using a suitable AI-based data transformation and interpretation technique.

IoMT and Healthcare facility

smartphone apps with artificial intelligence can be used to contact physicians or other healthcare needs in the event of critical issues. Self-preventive techniques can be applied in non-serious situations. [5 ] Real-time disease management and prevention are both made possible by AI, which also enhances user experience. SHS deals with the patient's most private medical information. Therefore, it is a very important task to provide necessary safety techniques in IoMT-based SHS. Utilising an IoMT-SAF device to do web-based security assessments, detecting network intrusion and intermediate security threats within the IoMT systems, etc.., IoMT security can also be provided by AI. [6] AI can automatically inform several parties in an emergency circumstance, which will help save a life by taking quick action . As a result, clinicians can use AI to efficiently manage patient records and offer after-hours medical care. Blockchain can also be utilised to provide security in an IoMT network. This distributed database maintains secure and decentralised information electronically in a digital format, ensuring the security and accuracy of data. Consequently, it promotes confidence on its own, without the aid of a third party. Blockchain can be utilised in IoMT to provide security in medical servers with electronic health records like MedRec, which can be used for permission and access control management of medical data. [7].

Blockchain

Information may be securely and transparently stored and transmitted thanks to blockchain technology. It comprises of a database that records all previous communications among its users. This directory is distributable and safe. The fact that it is distributed among its users directly, without the use of a middleman, allows everyone to verify the chain's reliability.

There are three ways to use the blockchain, It employs trustworthy and secure transactions:

To transfer assets (such as cash, shares and securities, etc.)

For a better supply chain and asset and product tracability

To protect private information (such as ballots, health records, degrees, etc.) [8]

Furthermore, the manufacturing sector has a wide range of uses for blockchain technology. We will leverage sensor data to effectively utilise blockchain in companies, and particularly in Industry 4.0. In this framework, we talk about Internet of Things (IoT) technology, which serves as a data source for the blockchain to protect.[9]

E Health and blockchain

Data interchange between different medical devices and healthcare providers is crucial in an IoT network. However, one of the biggest issues with safe data communication is data fragmentation. A knowledge gap between healthcare workers caring for the same patient could be caused by data fragmentation. The recovery procedure could be more challenging if there is a shortage of knowledge. Blockchain technology is employed to address the issue of data breakage and aid healthcare facilities in connecting the network's data repositories. [10]

The secure transmission of blockchain technology may be due to three factors. As a beginning, it has an immutable "ledger" that users may access and control. It ensures that once a record is added to the ledger, it cannot be modified. In addition, a set of predetermined rules apply to every transaction in the ledger. The second is that blockchain is a distributed system that operates simultaneously on a variety of computers and gadgets. Third, blockchain relies on a smart contract approach to follow the rules of agreements and data sharing regulations. The electronic medical records (EMRs) stored on the blockchain are subject to access privileges that are determined by the smart contract, which also manages identities. It is depicted that physicians can only access the EMRs to which they have been given permission. [11] Blockchain is widely acknowledged as a useful tool in the healthcare industry for preventing data breaches, improving the accuracy of medical information, and lowering expenses. Blockchain technology is being tested in some nations, including Australia and the UK, to coordinate patient, healthcare provider, and insurance company medical information and transactions. Because the Blockchain is controlled by a decentralised network of computers, which simultaneously records every transaction, conflicting information is quickly identified. [12] With IoT and Blockchain, we could easily collect various medical data from numerous nodes, do in-flight patient monitoring, and store the data more securely.. Big Data tools could be used to store the data effectively because Blockchain technology currently lacks database functionalities. Big data and blockchain technologies have both grown quickly. Combining these two cutting-edge technologies solves two crucial requirements for Big Data analysis, namely security and effective data organisation. [13]

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