Chapter 2
Blockchain–Based Cybersecurity in Internet of Medical Things (IoMT)– Based Assistive Systems

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ABSTRACT

Today's internet of medical things (IoMT) devices has revolutionized healthcare by enabling the development of assistive systems that enhance patient care and improve healthcare outcomes. However, the increasing connectivity and data exchange in IoMT systems raise issues about cybersecurity and patient data privacy. This chapter explains the application of blockchain-based cybersecurity in IoMT-based assistive systems. Blockchain technology offers a decentralized and immutable ledger that ensures the integrity, security, and transparency of data in IoMT systems. By adding blockchain, cybersecurity challenges in IoMT can be addressed effectively (with providing several benefits, including enhanced data protection, secure identity management, and robust access control mechanisms). Generally, in a blockchain-based cybersecurity framework for IoMT, patient health data is stored in encrypted form on the blockchain, preventing unauthorized access/tampering. Smart contracts, programmable blockchain protocols, can automate access control and consent management, etc.

1. INTRODUCTION

1.1 Overview of IoMT-Based Assistive Systems

Internet of Medical Things based assistive systems refer to the integration of medical devices, sensors, and healthcare systems with the internet to provide advanced monitoring, diagnostic, and assistance capabilities for individuals in need of medical support (Bai & Liu, 2020). These systems add the power of connectivity and data analysis to enhance healthcare delivery, improve patient outcomes, and enable more personalized and proactive care. Here is an overview of IoMT-based assistive systems and their key components:

- Medical Devices and Sensors: IoMT systems incorporate various medical devices and sensors to capture and monitor physiological data. These can include wearable devices like fitness trackers, smartwatches, and biosensors that measure parameters such as heart rate, blood pressure, glucose levels, and activity levels. Additionally, home monitoring devices such as blood glucose meters, blood pressure monitors, and spirometers may be connected to the IoMT network.
- Data Collection and Transmission: The collected data from medical devices and sensors is securely transmitted to a centralized platform or cloud infrastructure through wireless technologies like Bluetooth, Wi-Fi, or cellular networks. This allows healthcare providers to access and analyze the data in real-time, regardless of the location of the patient.
- Cloud Infrastructure: The cloud infrastructure serves as a centralized repository for storing and processing the collected data. It provides scalability, high availability, and security for the large amount of data generated by IoMT devices. Cloud platforms also enable advanced analytics, machine learning, and artificial intelligence algorithms to derive meaningful information from the data.
- Data Analytics and Artificial Intelligence: IoMT-based assistive systems add data analytics and AI techniques to interpret the collected data and provide important information. These systems can detect patterns, identify anomalies, and generate predictive models to assist in disease management, early detection of potential health issues, and proactive interventions. AI algorithms can also help in decision support, suggesting appropriate treatment plans or medication adjustments.
- Remote Monitoring and Telemedicine: IoMT enables remote monitoring of patients, allowing healthcare providers to track important signs and health parameters without the need for in-person visits. Telemedicine applications

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