


Chapter 6

Blockchain–Empowered Data Security and Privacy–Preserving Framework for Wearable Medical Devices

A. Sasikumar


 <https://orcid.org/0000-0003-1480-4950>

SRM Institute of Science and Technology, India

P. Selvakumari

Rajalakshmi Institute of Technology, India

P. Rajasekar

 <https://orcid.org/0000-0002-1104-9972>

SRM Institute of Science and Technology, India

S. Wilson Prakash

SRM Institute of Science and Technology, India

Imran Javeed Settu

*Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology,
India*

ABSTRACT

The value of individual lives is anticipated to be enhanced by wearable medical devices. Secure sharing and protecting data privacy are two of the primary technological challenges that smart wearable medical devices must address. A centralized

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organization that verifies transactions and interaction permissions generally serves as the foundation for medical management devices. Consequently, it is possible to consider this centralized organization a single point of failure. We propose a novel blockchain-empowered wearable device secure system that protects the privacy of medical devices. The proposed framework enhances security and productivity by fusing smart contracts for data processing automation with blockchain technology's decentralized, transparent, and impenetrable features. Smart contracts can quickly identify vulnerable devices that have been compromised or represent a risk to the medical network. Therefore, establishing control over one's own devices protects the data and prevents malicious activity. privacy of the data owner.

1. INTRODUCTION

Wearable medical devices are smart, portable gadgets that utilize sensors and tracking techniques to accumulate, transmit, and visualize personal biological data, including blood pressure, blood sugar levels, and heart rate. By facilitating transmission of data to cloud or hospital records via the Internet or cellular networks, these gadgets allow healthcare practitioners to diagnose and monitor patients remotely in real-time (Iqbal et al., 2021). Medical information is now more accessible and shareable because of the growing use of Internet of Things (IoT) wearable technology. But it has also increased the possibility of privacy violations. Sensitive medical information may be compromised by hostile activity or unauthorized access, which might seriously endanger patients and the related healthcare facilities. It is challenging to address these issues, as traditional centralized data storage techniques are susceptible to abuse and attacks. Thus, it has become increasingly difficult to analyze and share medical data while maintaining data privacy.

The quantity of data required for wearable devices to be useful in healthcare prediction remains a challenge. The real-time data from wearable devices are used for analysis, in that a significant amount of device information are stored, raising security and privacy concerns (Barua et al., 2022). The processing limits of wearable technology create weaknesses and the potential for substantial patient data leaks. The service's dependability and honesty are further concerns. Some components of healthcare may have to be sacrificed to prioritize others. For this area of remote healthcare, which relies on the precision of prediction models and wearable data, service integrity is crucial. The network's flexibility in deploying and providing these predictive healthcare services is another problem. The diversity introduced by wearable devices poses a significant challenge to standardization in IoT networks. Due to this diversity, the medical server must undergo constant repairs and upgrades to remain current with each new wearable device. Finally, concerns related

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