Chapter 4
Secure Medical Data Transmission Over Wireless Body Area Network Using Blockchain

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ABSTRACT

With the application of wireless body area networks, patients can be remotely monitored by doctors. WBANs collect the medical data and transmit it over the internet for further processing. There is need to ensure security of such highly sensitive data over the network. This has deliberately attracted researcher interest to provide WBAN security by integrating blockchain. This chapter discusses internet of things (IoT) architecture of WBANs and proposes a lightweight secure access control using blockchain to achieve higher performance.

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INTRODUCTION

Blockchain technology is among the most essential findings and innovative technologies that are playing a critical role in the technical modern world. Blockchain covers the data privacy and keeps assurance among people regardless of their location of access. The growth of blockchain technology has forced researchers and professionals to investigate innovative approaches to utilize blockchain technology in a broad variety of areas over the last couple of years. Blockchain was initially implemented as a tool to power Bitcoin but has now grown to such an extent of being applied to various decentralized implementations as a fundamental technology. Blockchain, specifically, within the medical care, medical experimentation, and insurance sectors, is being considered an important technique for handling confidential information (Fekih and Lahami, 2020). Healthcare could be described as a framework involving three main elements:

- Main suppliers of hospital facilities, such as doctors, nurses, administration of hospitals, and technicians.
- Essential services are linked with medical services, including certain medical research and health insurance.
- Health and health-oriented program recipients, i.e. patients or the people. In an attempt to encourage, preserve or restore the wellbeing of recipients, the healthcare system is considered to be consisting of contact-based and technology-based remote surveillance facilities provided by the constituent service provider

Confidentiality and protection violations are reportedly growing every year in the area of medical care with greater than 300 violations recorded in 2017 and 37 million hospital information compromised between 2010 and 2017. Moreover, the growing digitalization of healthcare also resulted in the identification of issues associated with safe handling, possession, exchange of individual health information, and relevant medical information. Blockchain has been presented as a means of solving crucial healthcare problems, like an encrypted exchange of medical information and enforcement with data protection laws.

The widespread adoption of healthcare digitization has contributed to the production of vast electronic medical databases. Such development raises significant requirements for data security for healthcare when being in use and exchange. As a secure and open platform for storing and sharing information, the emergence of blockchain technology is opening the ways for new opportunities to solve serious healthcare data safety, protection, and integrity problems. Over the past couple of years, blockchain technology has drawn tremendous interest from businesses and