Chapter 6
Blockchain Technology in Healthcare:
Advantages, Challenges, and Impact on Health 4.0

A. Anitha

https://orcid.org/0000-0002-6005-8429

Vellore Institute of Technology, India

K. Anitha

https://orcid.org/0000-0002-1940-2101

Meenakshi Academy of Higher Education and Research, India

J. Amala

https://orcid.org/0009-0002-9448-7106

Dwaraka Doss Goverdhan Doss Vaishnav College, Chennai, India

Balakrishnan Kamaraj

https://orcid.org/0000-0001-6723-5865

Madurai Medical College, India

ABSTRACT

The advancements of AI techniques and its transformation made an intelligent automated process using Internet of Things (IoT), machine optimization in various industrial applications. One of the notable change happens in the healthcare industry witnessed significant progress, leading to the emergence of Health 4.0. This new era encompasses a wide range of cutting-edge technologies including the Internet of Things (IoT), Internet of Services (IoS), Medical Cyber-Physical Systems (CPS), Health Cloud, Health Fog etc. The largest barrier to electronic healthcare is securing all medical equipment that are connected to the internet. Blockchain, a

distributed and immutable ledger or database, has gained popularity across various sectors, including healthcare, due to its efficiency and reliability by offering features such as decentralization, enhanced security, and immutability. This chapter aims to explore the advantages and challenges associated with implementing blockchain technology in healthcare 4.0 by providing factual evaluation of block chain's progress in healthcare.

1. INTRODUCTION

One of the biggest challenges of the healthcare sector is to maintain the patient details in a secured manner. There are certain threats involved in the data security such as data breaches, tampering, counterfeiting which causes inefficiency in the system. The existing healthcare system utilizes the centralized server which has the problem of standardization make them vulnerable to cyber attacks. The immutable nature of blockchain technology helps to address these issues by providing decentralized and security communication of medical information. Blockchain based smart contract system helps in obtaining secured data transmissions which is discussed by Haritha and Anitha (2024).

The safe, decentralized, and transparent management of medical data is made possible by blockchain technology, which has the potential to revolutionize the healthcare industry. Blockchain guarantees the immutability and integrity of medical research data, supply chain information, and electronic health records (EHRs) by employing distributed ledger technology. By giving authorization to insurance companies and medical professionals, patients can manage who has access to their medical records. Blockchain-based systems make it easier to share medical records securely, speed up clinical studies, and track medications in real time. Insurance claims and billing are two examples of processes that smart contracts automate. Blockchain-based solutions also help to prevent counterfeiting, allow for accurate tracking of medical devices, and promote cooperation amongst researchers. Early adopters are already investigating the potential benefits of blockchain technology, such as better patient outcomes, more data security, and lower healthcare costs. These early adopters include hospitals, pharmaceutical businesses, and health insurance providers.

The remaining sections of the chapter are structured as follows: The background research on blockchain technology is covered in Section 2, and the review process methodology is covered in Section 3. Section 4 provided an analysis of the state of healthcare today, while Sections 5 and 6 covered the impact and uses of blockchain technology in the field. Sections 7 and 8 address potential solutions and their ramifications in real time, while Section 9 discusses the drawbacks and performance of

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