


Chapter 10

Managing Health Data Landscapes and Blockchain Framework for Precision Medicine, Clinical Trials, and Genomic Biomarker Discovery

Bhupinder Singh

 <https://orcid.org/0009-0006-4779-2553>

Sharda University, India

Christian Kaunert

 <https://orcid.org/0000-0002-4493-2235>

Dublin City University, Ireland

Kittisak Jermsittiparsert

 <https://orcid.org/0000-0003-3245-8705>

Shinawatra University, Thailand

ABSTRACT

Blockchain governance in healthcare plays a vital role at the crossroads of technology and medical services. With Blockchain transforming how healthcare operates, having a strong governance structure is essential. This framework addresses ethical and regulatory issues while also ensuring that AI-driven tools and algorithms are

DOI: 10.4018/979-8-3693-9641-4.ch010

Copyright © 2025, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

used responsibly, ethically, and securely in the healthcare sector. The regulation of AI in healthcare and its associated challenges at national, regional, and international levels is a topic of both complexity and importance. These reports offer guidelines and key principles for the ethical and responsible implementation of AI systems. Specifically, blockchain in healthcare must be designed and used in ways that uphold human dignity, fundamental rights, and core values. This chapter comprehensively explores the diverse arena of AI systems which should foster equity, fairness, inclusiveness and accountability.

1. INTRODUCTION

Blockchain in healthcare has demonstrated enormous promise to transform medical procedures, from robotic surgery and virtual health aides to automated diagnosis and individualized treatment regimens (Sasaki et al., 2024). The incorporation of Blockchain into healthcare systems poses notable governance and regulatory obstacles, despite its potential benefits (Singh & Kaunert, 2024). The ethical application of AI technology and compliance with legal requirements are critical for patient safety and public trust as these technologies advance. With automating processes that would otherwise require human labor, Blockchain helps patients, physicians, and hospital managers accomplish the same goals more quickly and affordably (Singh et al., 2024). There are many different uses of blockchain in healthcare, such as finding new genetic links, helping with robotic surgery, automating administrative processes, creating personalized treatment regimens, and other creative applications. Blockchain technologies have the potential to significantly improve health outcomes, advance research and clinical trials, enable early detection and diagnosis for more effective treatments, and empower healthcare professionals and patients, especially in remote areas or developing countries (Singh & Kaunert, 2024).

Blockchain brings with it several ethical, legal, and social concerns including issues related to data privacy, algorithmic bias, patient safety and environmental impact. The World Health Organization (WHO) has published two reports on the use of AI in healthcare, one in 2021 and another in 2023. The use of Blockchain in healthcare includes enhancing patient and healthcare provider experiences via the use of technologies like deep learning, machine learning, natural language processing, and other AI techniques. AI's capacity for data analysis and prediction enables medical professionals to manage resources more effectively and take a more proactive approach to various healthcare procedures. These technologies help health managers locate electronic health records more quickly and effectively, diagnose patients more quickly and precisely, and provide patients with more individualized and timely care.

26 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/managing-health-data-landscapes-and-blockchain-framework-for-precision-medicine-clinical-trials-and-genomic-biomarker-discovery/362459

Related Content

Research on multi-view clustering algorithm on epileptic EEG signal
(2022). *International Journal of Health Systems and Translational Medicine* (pp. 0-0).
www.irma-international.org/article//282682

Bag-of-Features in Microscopic Images Classification
Samsad Beagum, Amira S. Ashour and Nilanjan Dey (2017). *Medical Imaging: Concepts, Methodologies, Tools, and Applications* (pp. 435-456).
www.irma-international.org/chapter/bag-of-features-in-microscopic-images-classification/159724

Refinement of Hypothesis Testing in Conjugation Tables of $r(c)$ Size on the Example of Testing New Forms of Treatment
Lidiya Filippovna Taenvatand Mikhail Mikhailovith Taenvat (2022). *International Journal of Health Systems and Translational Medicine* (pp. 1-13).
www.irma-international.org/article/refinement-of-hypothesis-testing-in-conjugation-tables-of-rc-size-on-the-example-of-testing-new-forms-of-treatment/306691

Using in Vivo Subject-Specific Musculotendon Parameters to Investigate Voluntary Movement Changes after Stroke: An EMG-Driven Model of Elbow Joint
Hujing Huand Le Li (2014). *Applications, Challenges, and Advancements in Electromyography Signal Processing* (pp. 161-180).
www.irma-international.org/chapter/using-in-vivo-subject-specific-musculotendon-parameters-to-investigate-voluntary-movement-changes-after-stroke/110760

Exploring Holistic Managerial Thinking to Better Manage Healthcare Cybersecurity
Darrell Norman Burrell, Amalisha S. Sabie-Aridi, Anton Shufutinsky, Jorja B. Wright, Calvin Noblesand Maurice Dawson (2022). *International Journal of Health Systems and Translational Medicine* (pp. 1-13).
www.irma-international.org/article/exploring-holistic-managerial-thinking-to-better-manage-healthcare-cybersecurity/300337