

Blockchain Innovations for Healthcare

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Blockchain is an important emerging technology. Data stored in the blockchain are immutable and decentralized, which enhances security and user authentication. It is a type of distributed ledger that promotes security and transparency. Blockchain is transforming commerce (e.g., cryptocurrency) and is also expected to make an impact on other critical applications, especially healthcare.

Blockchain has the potential to transform the way data are stored and accessed. It has received much attention in the financial domain due to its secure and verifiable decentralized architecture as well as the removal of third parties, which increases privacy. In some domains, however, there is vigorous debate regarding the use of blockchain due to the technical challenges and costs. Some of these challenges are slowing the integration and adoption of blockchain, especially in fields that could greatly benefit, such as the healthcare industry.

A variety of healthcare blockchain data-management application themes have been published: *personal healthcare records*, *medical supply chain*, *clinical research*, *insurance claims*, and *medical professional credentials*. These areas in the healthcare domain view blockchain as a solution to improve system qualities such improved availability (e.g., accessibility from multiple sources), performance (e.g., eliminate bottlenecks), security (e.g., no single point of attack), and transparency (e.g., trace contents to their source). Using blockchain alone, however, introduces some key challenges for healthcare data: scalability and performance (e.g., medical files are too large to store), usability (e.g., unfamiliarity with cryptographic concepts), secure identification (e.g., healthcare interoperability), and dissemination difficulty (e.g., cost/adoption). This special issue improves the state of the art to bring together the latest developments and applications using blockchain in the area of healthcare.

We are very pleased to offer our readers an *IT Professional* Special Issue on Blockchain Innovations for Healthcare.

ABOUT THIS ISSUE

In this issue, blockchain was reviewed as a solution for addressing the many healthcare dimensions. In the first article, "Alleviating Challenges Related to FDA-Approved Medical Wearables Using Blockchain Technology," a conceptual model leveraging blockchain to improve security, privacy, interoperability, and data integrity of data collected from medical wearable technology is discussed. Using wearables to monitor chronic disease care more effectively is an important topic as wearables can provide more than a static view of patient progress.

The article "A Transparent and Traceable Coverage Analysis Model for Vaccine Supply-Chain Using Blockchain Technology," focuses on tracking a vaccine from the manufacturer to the patient. Early experiments and pilot studies in India have shown that the use of blockchain in supply chain management is effective.

The article "Healthcare Insurance Frauds: Taxonomy and Blockchain-Based Detection Framework (Block-HI)," discusses health insurance fraud, which has been its own crisis in the healthcare industry. The issue is not only financial, but can be detrimental to the care of a patient when the support of providers is missed. Blockchain can facilitate the validation of healthcare claims in a secure, immutable, and transparent manner. The authors present a taxonomy of healthcare insurance claims frauds, and proposed and evaluated blockchain-based healthcare insurance claims fraud-detection framework.

The final article "Could Blockchain Help with COVID-19 Crisis?" covers the topic on the application and use of blockchain in a global healthcare crisis. In this article, the authors present a discussion on five areas where blockchain can be leveraged during a global health crisis. They performed a literature review and presented novel blockchain application scenarios such as early detection of outbreaks, expediting trials, managing the medical supply chain, facilitating contact tracing, and tracking insurance claims. This article not only highlights the potential of blockchain benefits during a global pandemic, but also presented research opportunities to address current challenges when utilizing blockchain.

We hope that you will enjoy reading this issue as much as we have in working with the immensely

talented set of authors to bring them to you! Please consider writing for our upcoming special issues in the future.

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