Chapter 70

Blockchain With IoT and AI:
A Review of Agriculture and Healthcare

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ABSTRACT

Blockchain, Internet of Things (IoT), and Artificial Intelligence (AI) are remarkable emerging technologies in the coming few decades. Blockchain technology makes the application more secure and transparent, AI offers analyses the application, and IoT makes the application connected, flexible, and efficient. This paper studies the literature, formulates the research question, and summarizes the contribution of block-chain application, particularly targeting AI and IoT in agriculture and healthcare sectors. This study reveals that 20% of papers are available in agriculture and 14% available in healthcare that integrates blockchain with IoT and AI. Furthermore, the objective of the paper is to study the role of blockchain with IoT and AI in agriculture and healthcare systems in light of the literature review. The integration of blockchain with IoT and AI are playing important roles in agriculture and healthcare fields to man-age food supply chains, drug supply chains, traceability of products, smart contracts, monitoring the products, connected, and intelligent prediction.

1. INTRODUCTION

A recent paradigm shift in engineering and technology has completely moving towards Artificial Intelligence, IoT and Blockchain. Mobile-broadband access devices, IoT, smart networks, big data analytics, AI and Blockchain have provided a new vision and aspect in the field of Agriculture and Healthcare sector. These key tools and technologies used to magnify the production, marketing processes and wellbeing of humanity. IoT is a system where each real world entity is provided with unique identifiers and able

to communicate over an Internet (Singh and Agrawal, 2018). AI offers analytical and decision making capability to machine like a human being. AI and IoT brings the application smart and intelligent, for example, smart city (Dubey et al., 2020), smart health (Tian et al., 2019) and smart agriculture (Saiz-Rubio & Rovira-Más, 2020). The Blockchain technology refereed as a decentralized, distributed ledger that records the origins of a digital asset. These three technologies are combining together and reforming the various sectors including healthcare, agriculture, food supply, real estate, retail, etc.

The Blockchain is defined as a chain of Blocks that comprises information. Every block registers all of the current transactions, and after completion stores into the Blockchain as a permanent database. Each time a block gets completed and a new block is created. This technique is based on timestamp of a digital document which is unable to backdate or temper. Block in Blockchain is both a time-and date-stamped, secured server, and at the same time, a secured peer-to-peer database. Earlier Blockchain was only underlying technology used for cryptocurrency or bitcoin. Blockchain technology has the skill to automate payment in crypto currency and access to a shared ledger of data, transactions, and logs in a decentralized, secure, and trusted manner (Salah and Rehman, 2019). The Blockchain provides a direct communication between two specific parties to exchange of data or initiate the peer-to-peer transactions. Ethereum provides an open and distributed public Blockchain platform in which smart contracts can be deployed (Buterin, 2016). These contracts are functional to a broader range of business circumstances like contract processing, ownership changes, and economy sharing (Wu et al., 2019). Blockchain technology offer service mainly to trace and track of transaction to streamline and quicken the transaction and validation process. These services are not only used in cryptocurrency but also proving remarkable in other field where quick and rapid transaction required between a series of entity. There are various application areas of Blockchain like cryptocurrency, healthcare, Agriculture, food supply, copyright, banking (Chen et al., 2018; Casino et al., 2019), and real estate (Dijkstra, 2017).

Agriculture and health sectors are really two important areas that need to be focused and have the opportunity to integrate with recent technology like IoT, AI along with Blockchain. Blockchain play a significant role in agriculture and health areas to supply product and services from source to destination.

AI and IoT have already proven its importance in the field of Agriculture and Healthcare system. IoT is generating a global network of smart connected devices that can enrich Agriculture and Healthcare system. AI coupled with pervasive connectivity, is empowering exponential value being generated by IoT through its analyzing, classification and prediction ability. The interconnection of a huge number of IoT devices is suffering from the numerous privacy and security concerns (Ali, 2019). The IoT-based healthcare applications often end up monitoring and gathering sensitive personal data of patients. When such data or information is visible to third parties, such as health-care providers, the prospects of inadvertent or malicious privacy compromise become greatly probable (Yin et al, 2019). Compliance with the privacy and security concerns for a specific application is a substantial challenge in IoT-based systems (Lin and Bergmann, 2016). Blockchain based solutions can help in addressing the issues related to security and privacy. A significant advancement in Blockchain and its ability to integrate with AI and IoT provides a transparent transaction system to business (Briggs and Buchhols, 2019).Blockchain technology with IoT and AI technology can quickly track and process information related to food items right from their source to the end consumer.

Presently, Supply chain Management (SCM) has been also growing in Agriculture and Healthcare. Blockchain offers excellent capability of supply chain management in a transparent and distributed manner. The blockchain has the prospective to convert all types of digital transactions, comprising in procurement, logistic and supply chain. Blockchain capability assists worldwide manufacture to solve

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