Chapter 10
Recent Trends in Block Chain Technology: Challenges and Opportunities

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ABSTRACT

Blockchain is a peer-to-peer (P2P) distributed ledger technology that provides openness and confidence for a new age of transactional applications. The fundamental fabric for bitcoin is blockchain, which is a design pattern made up of three core elements: a distributed network, a public ledger, and digital transactions. Digital transactions are recorded in a public ledger by members of the distributed network. Members of the network run algorithms to test and validate the planned transaction before adding it to the network. The latest transaction is applied to the public ledger if a number of the network participants believe that the transaction is legitimate. In minutes or seconds, changes to the public ledger are mirrored in all copies of the blockchain. A transaction is immutable after it has been added and cannot be reversed or deleted. No one user of the network has the ability to tamper with or change data, and everybody in the network has a full copy of the blockchain. Blockchain is a peer-to-peer (P2P) network of nodes made up of network members.

INTRODUCTION

Blockchain has become recognised as the distributed ledger for all transactions and solved the double-spend issue by integrating peer-to-peer infrastructure with public-key cryptography after it was first conceptualised as a central feature to facilitate transactions in the digital currency – Bitcoin. A blockchain, literally, is a network of knowledge blocks that records Bitcoin transactions; of course, there are

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strict laws that regulate how to check the block's authenticity to ensure that it cannot be changed or vanish. Blockchain technology refers to the algorithms and computing infrastructure for generating, adding, and utilising blocks. The double-spend dilemma is solved by blockchain technologies using public-key cryptography, in which each individual is given a private key and a public key is exchanged with all other users. The basic concept behind blockchain is that it is a distributed ledger that contains records of transactions that are exchanged by participants. None each of these transactions is validated by a plurality of the system's users, illegitimate transactions are unable to pass mutual scrutiny. A record can never be changed once it is generated and approved by the blockchain. Existing blockchain research has primarily concentrated on device performance, stability, and novel applications. One of the most critical problems for blockchain is performance (Abbott, 2000; Allenby, 2012; Almeida et al., 2015; Antonopoulos, 2014; Ansell & Gash, 2007). To build a new transaction record on the blockchain, a very strict authentication procedure is needed, which results in a substantial delay in validation period and waste of computational resources.

A transaction currently requires about 10 minutes to be authenticated. Thousands of nodes are now working to process and validate transfers. These problems severely restrict the scope of blockchain implementations. As an alternative, Since IoT devices which have to deal with limited computing capacity or low strength, existing blockchain approaches are typically not appropriate for the Internet of Things (IoT) network. As an innovative platform, blockchain has been hailed as a new way to address the demands of individuals, technology, and organisations. For a contract, trust has become a critical function that blockchain may offer. People could be able to share their assets without fear of violating their privacy thanks to modern confidence structures emerging from Blockchain. The blockchin technology allows for open, peer-to-peer, and coalition-based business group organisation. The Bitcoin framework has served as a realistic model of a decentralised enterprise under which no single government is in charge of the system's problem and management. The peer-to-peer relationships between nodes in the blockchain framework are peer to peer. Furthermore, blockchains have the ability to organise, vote, and shape coalitions. The blockchain system's technical components include trustless computation, smart contracts, and network stability (Dubovitskaya et al., 2017; Kblaw et al., 2016; Mylrea & Gourisetti, 2017; Strobel et al., 2018; Yaji et al., 2018).

In a shared blockchain scheme, to reach a consensus. People may not have to care about the confidence problem of smart contracts, because an entity will be autonomous dependent on the autoexecution of codes. These functions are based on network reliability, which allows users to put their faith in the device while conducting business transactions. Researchers should conduct three stages of analysis to resolve the problems of blockchain implementation in a market environment: logical, prescriptive, and descriptive levels. Currently, market analysis in blockchain is mostly focused on the conceptual stage, which conceptualises blockchain technologies in business, and the prescriptive level, which details blockchain business implementations.

For health care and information technology, this is an interesting moment (IT). Health care is seeing a groundbreaking transition to disease prevention and management that combines a particular patient's genetic profile, diet, and climate, thanks to advancements in genetic science and precision medicine. Simultaneously, technological advancements have resulted in vast libraries of health records, resources for tracking health data, and increased people's involvement in their own health care (How Blockchain Can Fight Fraud, 2019; Kolias et al., 2017; Kshetri, 2017; Trautman & Ormerod, 2016; Yeoh, 2017). In the area of health IT, combining these advances in health care and information technology will result in revolutionary reform.