Chapter 19
Artificial Intelligence Models for Blockchain-Based Intelligent Networks Systems: Concepts, Methodologies, Tools, and Applications

Sonali Dash
https://orcid.org/0000-0002-6153-2655
Chandigarh University, India

Priyadarsan Parida
GIET University, India

Gupteswar Sahu
Raghu Engineering College, India

Osamah Ibrahim Khalaf
https://orcid.org/0000-0002-4750-8384
Al-Nahrain University, Iraq

ABSTRACT

Blockchain is a decentralized architecture with built-in security to improve the trust and integrity of transactions. Blockchain can facilitate authentication and authorization without utilizing any trusted authority. There is no single authority that governs how the rules will be applied. Anyone is free to join the public blockchain network. Bitcoin is an example of public blockchain. Consortium blockchain is considered as partly decentralized architecture that can be open or private. Hyperledger and R3CEV are the examples of consortium blockchain. In private blockchain, nodes are restricted and have strict authority management on data access. Keeping in view of different blockchain technologies, this chapter has proposed four different applications of blockchain technology. The first one is detecting product genuineness using blockchain. The second is an application of blockchain in citizen participation. The third one is implementation of security in cloud computing using blockchain. The fourth is e-voting and event registration using blockchain technology.

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INTRODUCTION

The objectives of smart contracts are to reduce the need for trusted intermediaries, mediation and enforcement costs, fraudulent losses, and the reduction of risk and risk variations (Duan, Zhang, Gong, Brown, & Li, 2020; Ma et al., 2020).

The first cryptocurrency is known as Bitcoin and that is brought into the market in 2008 and launched in 2009 is allocated to power. That means no single party or authority can control completely. Money can be transferred from a bitcoin wallet to other account through a verified network (Lee & Jang, 2020). Nodes those are included is known as miners and solve mathematical problem to incorporate a public book block. Each block containing the latest activity is linked to the preceding block utilizing the previous cryptographic hash thus creating an immovable and unstable blockchain (Saxena, Thomas, Gope, Burnap, & Kumar, 2020). The digital currency transfer between accounts can be done using bitcoin. The metadata is introduced to bitcoin in 2013 through Colin Coins project. In addition to color-sensitive transaction rules, a collection of bitcoins of a certain color can be utilized to monitor and deal with real world assets (Ribalta, Lombard-Platet, Salinesi, & Lafourcade, 2021). Evidence of the work of the Ethereum Visual Machine (EVM) is represented by wood; is the operating time mode of the commands set in Ethereum. It delivers design specification and protocol utilizing Ethereum. Over the years, many applications have used blockchain and Ethereum: IBM uses blockchain in real estate sales management by keeping event data records and document shipping and nestles S demonstrating the technology can enable a government wisely (K., Pandey, & Dhanalakshmi, 2018).

The Blockchains is important technology that has grown in a short period of time. It has big implications in nearby future integrated internet systems ranging from medicine to military to finance (Dash, Parida, & Bhoi, 2020; Mohanty, Patra, & Parida, 2021; Pournader, Shi, Seuring, & Koh, 2020; Rout & Parida, 2020). A blockchain is an allocated ledger that preserves an ever-increasing list of/or data records which are secured from revision or tampering (Gopalakrishnan, Silaghi, Bhattacharjee, & Keleher, 2004). The de-centralized nature of the blockchain helps it in avoiding the trap of single point failures in the process of checking and validating the transactions happening (Reyna, Martín, Chen, Soler, & Díaz, 2018). The blocks in the blockchain is a data structure which contain records of individual transactions, timestamps along with link to the previous block with the results of any executables of blockchain (Kuo, Kim, & Ohno-Machado, 2017). The blocks serve as a public record with very less chances of tampering (Tyagi, Chandrasekaran, & Sreenath, 2022). A feature of blockchain is a majority consensus can be used approve a transaction where earlier an intermediate authority was needed (Nofer, Gomber, Hinz, & Schiereck, 2017).

The Blockchain presents for the first time a barter storage system without a central authority where users can semi anonymously carry fully trustworthy transactions globally (Paliwal, Chandra, & Sharma, 2020). It brings real changes in many domains. One of the most legitimate domains for application of blockchain is voting (Sahoo, Singhar, Nayak, & Mohanta, 2019). Building a secure electronic voting system is difficult as governments all over the world have failed as there remain many flaws in the implantation of the IT systems. The voting is a crucial part of the societal system which should be executed without any failure. The voting is an important part of society which makes it a crucial system such that it must not fail while executing. There is rising apathy among citizens regarding various systems of the society which include voting, wrongful government spending of money, embezzling of resources, transparency in system. Creation of decentralized platform can address many weaknesses that are inherent