Internet of Things-Based Secure Healthcare Framework using Block Chain Technology

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ABSTRACT

Today, the Internet of Things (IoT) is becoming more common and finds applications in several domains, especially in the healthcare sector. Due to the rising demands of IoT, a massive quantity of sensing data gets generated from diverse sensing devices. Artificial Intelligence (AI) techniques are vital for providing a scalable and precise analysis of data in real time. But the design and development of a useful big data analysis technique face a few challenges, like centralized architecture, security, and privacy, resource constraints, and the lack of adequate training data. On the other hand, the rising blockchain technology offers a decentralized architecture. It enables secure sharing of data and resources to the different nodes of the IoT network and is promoted for removing centralized control and resolving the problems of AI.

Keywords: Internet of things; Artificial intelligence; Block chain

INTRODUCTION

Data generated from IoT devices is increasing dramatically. One of the most interesting applications of IoT is e-health or intelligent medical care. Medical data generated by IoT devices is critical and sensitive to any unauthorized access. This data should be protected carefully because it is directly related to patient's life. Security concerns are more accentuated in the medical field and need a special attention especially when this field embraces IoT. In parallel to the advancement in the e-health domain, a new technology that was conceived first to secure financial transactions of the famous crypto currency bit coin, was and still developing to find its applications in many domains including the medical field. Blockchain technology is a peer-to-peer technology that provides a global consensus and assures that no one can alter or change previously validated transactions. Blockchain is very good solutions for security but it still suffer from some problems especially when used by IoT devices. In this case, arise multiple problems such as scalability, complexity and architectural based problems. In this work, we aim to build an intelligent medical system in which all partners interact in an IoT/Cloud environment with protocols for communication, management and sharing of private data using blockchain technology. We aim mainly to solve the problems related to the integration between IoT and blockchain.

Things have become a household name in many areas now. IoT is so versatile in nature that everyone is finding their own meaning from it and thus it remains an evolving subject till now. As the name suggests, Blockchain is made up of a chain of blocks, which are time stamped and are identified by a cryptographic hash. A timestamp allows a sequential ordering of blocks and the hash is used to uniquely identify a block. The parent block of the chain is called Genesis and further blocks all contain cryptographic hashes of previous blocks thereby maintaining the chain. Any node that has access to this reverse linked data structure can know the state of data and gain access to it anytime from anywhere.

WHAT IS BLOCKCHAIN?

Blockchain is an information technology that allows transactions to be verified by a group of unreliable actors. It provides a distributed, immutable, transparent, secure and auditable ledger. This is mainly a distributed database of all transactions or digital events that have been executed and shared among participating parties. Once entered in the blockchain, information can never be modified or erased. The blockchain contains a certain and verifiable record of every single transaction ever made. In a blockchain network, whenever a new transaction (record) is created, a new block is automatically generated stating the date

and the time (known as a "timestamp") when the record was entered in the block.

INTEGRATION OF OTHER TECHNOLOGIES

Various other cutting-edge technologies can be implemented along with Blockchain, such as cloud computing mobile edge computing fog computing big data analytics artificial intelligence, and cyber physical systems. The use of cloud computing can enable the extensive use of computation resources for additional processing. Various backend applications can be deployed on the cloud end as it scales very efficiently. Cloud storage can be used to store the Blockchain when its size increases and it becomes difficult for other nodes to handle it. Cyber physical systems provide a certain level of autonomous behavior where machines can interact with one another and behave accordingly. By using Blockchain-based smart contracts, this autonomous behavior can multiply as actions can be predefined. Such concepts can be easily integrated leading to manifold benefits.

CONCLUSION

In this paper, we discussed the working of a Blockchain, which has taken a very firm hold in e-healthcare in a very short span of time. We focus on how smart contracts over Blockchain can be used in the domain of Internet of Things and analyze what advantages and challenges it brings with itself. A comparison of the results of the proposed approach and the traditional approach shows that the proposed approach outperforms very well. The proposed approach shows that the average packet delivery ratio has an increase in delivery of the data packet because in the proposed approach no legitimate node is participating in the data transmission among the chains. Similarly, the same trend is being followed in the performance parameter of average latency and average energy efficiency. In the next section, future trends are discussed for more applications and other details.