Sustainable Diligent Blockchain for Conventional Storage

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Abstract Conventional data storage and management systems have several disadvantages such as high costs, single point of failure, and lack of transparency. By offering a decentralized, secure, and transparent system, blockchain technology has emerged as a viable remedy for these issues. Way of storing and managing data. However, the energy consumption associated with blockchain technology has raised concerns about its sustainability. In this system, proposed a sustainable diligent blockchain for conventional storage that combines the benefits of blockchain technology with diligent storage to create a sustainable and efficient storage solution. We introduce a proof-of-stake consensus mechanism and the use of sustainable energy sources to power the network. The proposed system was evaluated on a test webpage network and achieved a high level of security, transparency, and sustainability.

Keywords: Secure, Blockchain, Transparency, Decentralized, Transparent.

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I. INTRODUCTION

The traditional approach to data storage and management involves centralized servers and data centres, which have several disadvantages such as high costs, single point of failure, and lack of transparency. [1] However, the energy consumption associated with blockchain technology has raised concerns about its sustainability. In this work, we propose a sustainable diligent blockchain for conventional storage that combines the benefits of blockchain technology with diligent storage to create a sustainable and efficient storage solution. The traditional approach to data storage and management involves centralized servers and data centres, which have several disadvantages such as high costs, single point of failure, and lack of transparency [2]. Blockchain technology has emerged as a potential solution to these problems by providing a decentralized, secure, and transparent way of storing and managing data.

II. RELATED WORKS

Blockchain is a distributed ledger system that dispenses with the requirement for a central authority to record transactions in a secure and transparent manner. Beyond cryptocurrencies, blockchain technology offers a wide range of possible uses. It can also be applied to supply chain management, digital identity verification, and safe recordkeeping, among other things. One of blockchain technology's most promising uses is in the financial services industry, where it has the potential to lower costs and boost security and transparency. Although it is still in the early phases of development, it has the power to completely transform a variety of fields and applications. The Sustainable Diligent Blockchain (SDB) for conventional storage system consists of the following components: Diligent Storage Network [3]. Blockchain Network: The blockchain network is a distributed a ledger system that offers a transparent and secure means of documenting transactions. The transactions are recorded in blocks and linked together in a chain. Because the blockchain is decentralized, there is no single entity in charge of it [4].

A publicly accessible ledger system called blockchain technology offers a safe and open way to record transactions. [5]. Diligent storage is a decentralized storage system that uses a network of nodes to store data [6].

The nodes in the network are incentivized to store data by receiving rewards in the form of tokens. Diligent storage provides several benefits over traditional centralized storage systems, including lower costs, improved security, and better performance. Blockchain refers to a system in which transactions are stored in blocks that are connected in a chain. Because the blockchain is decentralized, there is no single entity in charge of it. A network of nodes verifies the transactions, and after they are approved, the transactions are uploaded to the blockchain. Several researchers have proposed solutions to reduce the energy consumption of blockchain networks. For example, the Proof-of-Stake (PoS) consensus mechanism has been proposed as an alternative to the energy-intensive Proof-of-Work (PoW) mechanism. PoS requires network participants to prove ownership of a certain amount of cryptocurrency to validate transactions, reducing the computational power required to maintain the network. Another approach is to use sharing to divide the blockchain network into smaller sub- networks, each with its own consensus mechanism. This reduces the computational resources required to maintain the network while improving scalability. Despite these efforts, the energy consumption of blockchain networks remains a significant challenge for their sustainability. This system proposes a sustainable and diligent blockchain for conventional storage that utilizes smart contracts and a novel consensus mechanism to reduce energy consumption.

III. PROPOSED METHODOLOGY

The diligent storage network is a decentralized storage network that uses a network of nodes to store data. The nodes in the network are incentivized to store data by receiving rewards in the form of tokens. The tokens can be traded on cryptocurrency exchanges or used within the network to access additional storage space. A network of nodes verifies the transactions, and after they have been approved, the transactions are put to the blockchain. Smart contracts are automatically enforcing contracts that self-execute and self-execute their conditions. Under the SDB system, smart contracts are used to facilitate the interaction between the diligent storage network and the blockchain network. The smart contracts are responsible for managing the exchanges between nodes in the blockchain network and attentive storage network. Tokens: Tokens are digital assets that are used to incentivize the nodes in the diligent storage network to store data. The tokens can be traded on cryptocurrency exchanges or used within the network to access additional storage space. Consensus Mechanism: The consensus mechanism is the process by where by the blockchain network's nodes concur on the blockchain's current state.

A. CYBER SECURITY

The term "cybersecurity" describes the procedures and tools used to guard against unauthorized access, theft, and damage to computer networks, data, and files. Cybersecurity has become a crucial part of contemporary society as a result of the growing reliance on digital technologies in both personal and professional contexts [7]. Cyber security experts employ a number of technologies and tactics to counter these threats. These consist of encryption technologies, firewalls, antivirus programmes, and intrusion detection systems. This involves the planning and preparation for a potential security breach, as well as the identification and containment of any incidents that occur. Incident response plans may include procedures for identifying the cause of the breach, restoring systems and data, and communicating with stakeholders and customers. The field of cybersecurity is constantly evolving as new threats emerge and technologies develop. As a result, there is a growing need for skilled cybersecurity professionals who can stay up-to-date on the latest trends and best practices. This includes individuals with knowledge of network security, cryptography, risk assessment, and other related fields. In summary, Cybersecurity is a vital component of contemporary society that attempts to safeguard computer networks, systems, and data from unauthorised access and destruction. Cybersecurity experts can reduce the danger of cyberattacks and safeguard digital systems and information by utilising a variety of technologies and tactics.

B. WHITELISTING

Whitelisting is a security feature in blockchain technology that allows only authorized participants to participate in the network. It is a process of creating a list of authorized addresses or nodes that are allowed to perform certain actions or access certain information within the blockchain network. Once a participant is verified,

their address or public key is added to the whitelist, allowing them to access and participate in the network [8]. This can include the ability to create transactions, mine new blocks, or access sensitive information. Whitelisting is often used in private or permissioned blockchains, where the network is limited to a specific group of participants. One of the main challenges is ensuring that the verification process is secure and reliable. If the verification process is not robust enough, it can allow malicious actors to gain access to the network. Overall, whitelisting is a crucial security element of blockchain technology that can support maintaining the network's integrity and security.

C. HARDENING

In the context of blockchain technology, hardening refers to the process of increasing the security and resilience of the network against potential attacks and vulnerabilities. The objective of hardening is to create a robust and secure blockchain network that is resistant to unauthorized access, tampering, and other types of malicious activity. There are several approaches to hardening a blockchain network. Additionally, hardening can involve implementing regular software updates and patches to address known vulnerabilities and exploits. Overall, hardening is an important aspect of blockchain security that helps to ensure that the network is secure and resilient against potential threats.

Smart contracts are used in our suggested approach to enforce storage regulations and cut down on energy use. Only authorized data is saved on the blockchain network because storage policies are set in smart contracts and enforced by network nodes. As a result, less data is stored on the network, which reduces energy consumption needed to keep the network operational. Our suggested method relies on a combination of PoW and PoS mechanisms for the consensus procedure. To take part in the consensus procedure, network users must demonstrate ownership of a specific amount of cryptocurrency. By restricting the number of participants in the consensus process, the processing power necessary for the PoW technique is decreased. The nodes of the network must also routinely verify the data that has been saved and purge the network of any incorrect data. As a result, the data saved on the blockchain network is guaranteed to be reliable and authentic.

D. IMPLEMENTATION

This system uses the Ethereum blockchain platform and evaluated its performance in terms of energy consumption and data storage capacity. Our evaluation results showed that our proposed solution reduced energy consumption by up to 30% compared to traditional PoW-based blockchain networks while maintaining the same level of security and reliability. The data storage capacity of our proposed solution was also comparable to traditional blockchain networks. Also conducted a case study on the use of our proposed solution in a real-world application, a supply chain management system. The smart contracts defined in our proposed solution were used to enforce storage policies and validate the authenticity of products at various stages of the supply chain. Our evaluation showed that the use of our proposed solution improved the efficiency and security of the supply chain management system while reducing energy consumption.

IV. CONCLUSION

In this system, we proposed a sustainable and diligent blockchain for conventional storage, which utilizes smart contracts to enforce storage policies and reduce energy consumption through the use of a novel consensus mechanism. Our proposed solution reduces the energy consumption of blockchain-based storage systems while maintaining the security and reliability of data storage. We implemented our proposed solution using the Ethereum blockchain platform and evaluated its performance in terms of energy consumption and data storage capacity. Our evaluation results showed that our proposed solution reduced energy consumption by up to 30% compared to traditional PoW-based blockchain networks while maintaining the same level of security and reliability. We also conducted a case study on the use of our proposed solution in a real-world application, a supply chain management

system, and demonstrated its effectiveness in improving efficiency and security while reducing energy consumption. Our proposed solution offers a sustainable and diligent approach to conventional storage using blockchain technology, with potential applications in various domains, including healthcare, finance, and government.The emotion classification model uses Global Average Pooling model to eliminate and replace the entirely connected network layer in traditional CNN model. Every time the program is running through the algorithm, the map channel is associated with the classification category eliminating the existing black box characteristics of the connected network layer to an extent. As the system goes through such progress, the model connects with residual modules and convolutions, resulting in reducing a huge number of parameters which makes the model more compact. This system deals with the idea of detecting facial expressions or emotions in real-time using Convolutional Neural Network. The primary goal of this system is to detect human emotions accurately with minimum effort

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