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Online Examination System Based in Blockchain Network: Review

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ABSTRACT: The distributed ledgers that are computerised, secure, and allow for secure, open, and unchangeable transactions are known as smart contracts. Data is created and verified via smart contracts with the use of hashing. It is a mathematical process that employs SHA-256, the most potent cryptographic hash algorithm. The input text generates a 256-bit signature as a result. An extremely popular platform for developing DApps is the Ethereum Blockchain Platform. This platform is part of a public network that is accessible to everyone, and anybody can use it to make and receive transactions. Every industry, including supply chains, business, and education, has adopted blockchain technology. The Ethereum Blockchain Platform in Education System is studied in this essay. With the help of the Blockchain Ethereum Platform and its Smart Contract features, which enable the server runtime environments NodeJS and MongoDB database system, we have created an application for the Online-Examination System. The security of blockchain-based solutions exceeds that of all cloud-based systems combined. We have also examined how blockchain-based online testing is more reliable than other approaches.

I. INTRODUCTION

Nowadays, everything has moved online, making knowledge accessible to everyone, wherever. It brings up fresh issues like data security, openness, and trust throughout the global network. Due to COVID-19, many universities and independent organisations, like the National Testing Agency (NTA), are currently offering the exam online. The main barriers to such online testing systems are trust and security. Private network lockers, passwords, One-Time Passwords (OTP), and strong security passwords, among other services, are provided by a number of worldwide market companies. Due of the participation of third parties, one of the major issues in using existing solutions is information security. Blockchain is a new technology that kicks off the privatisation revolution and keeps user data in their hands at all times. The blockchain network does not involve any outside parties in the access or processing of services. Data blocks are used to store and manage data in blockchain networks. Blockchain protects the integrity of its data by cryptographically validating each individual data block. In the blockchain network, a cryptographic hash code links each data block. Every data block has a distinct hash code that is produced by using the potent cryptographic algorithm SHA-256. These hash codes are verified by validators, who use various consensus mechanisms to provide each data block with a valid signature code. The blockchain distributed network's consensus mechanism is a procedure that imposes mathematical operations and strategies to obtain the best signature agreement on each data block. One of the best decentralised ledger applications is blockchain. Decentralized Ledgers are also known as Smart Contracts on the blockchain since they are wisely contained all of the data that is generated automatically after the fulfilment of the assignment.

In this work, we describe a blockchain-enabled online examination system. Candidates sign up for the exam and submit the required payment through this application. It guarantees that only people who have been authenticated can take part in the test. They log in and insert the transaction hash to begin the examination in the second procedure. Following exam completion, a smart contract on the blockchain network securely sends all exam-related data to the testing facility. A smart contract is created using the exam data, including the questions, answers, transaction amount, and time stamp. Finally, a proof copy of this smart contract is provided to the testing facility and the user.

II. LITERATURE SURVEY

Weichao Gao, William G. Hatcher, Wei Yu:- In this article, we assess how well existing and developing blockchain solutions address these problems. We specifically look at the fundamental ideas behind blockchain and pertinent approaches, highlight its key characteristics, and evaluate the landscape of accessible platforms and research. We examine blockchain from the perspectives of emerging applications like IoT, Big Data, Cloud, and Edge computing of



practical interest. These paradigms are required to fully integrate modern computing services, and we also outline the security and performance concerns of blockchain for widespread use.

Miles Gietzmann, Francesco Grossetti:- The structure of this essay is as follows: Blockchain technology is described in Section 2 along with evidence that it is a subclass of all conceivable DLTs. The criticism made by Risius and Spohrer (2017) that there haven't been many studies in the literature that show the business case for adopting a blockchain outside of the specific field of producing a cryptocurrency is the next topic we'll cover. In order to overcome this issue, we suggest that businesses start by taking into account the entire class of potential DLTs rather than focusing only on the unique example of a blockchain for a variety of commercial scenarios. We outline four general options that enterprises would have to choose from when figuring out how to create a useful value-creating DLTs.

Heng Hou:- This article's goal is to discuss the blockchain technology's use in e-government especially in the setting of China. District Chancheng, a section of China's Guangdong Province's Foshan City has started a 'The Comprehensive Experimental Area of Big' project Since 2016, data in the province of Guangdong. advancing the blockchain technology is being used in e-government as This project's crucial component, which is the initial application of China's government is using blockchain. Using Chancheng's initiative This article examines the framework, challenges, and results of a case study.and difficulties of implementing blockchain in e-government present and explains the benefits of blockchain technology to the advancement of public services and e-government in China..

Feng Tian:- In China, food safety has emerged as a major issue in recent years. Building an agri-food supply chain traceability system is becoming more and more important as traditional agri-food logistics patterns can no longer meet market needs. In this paper, we first examine how RFID (Radio-Frequency IDentification) and blockchain technology are being used and developed. We then examine the benefits and drawbacks of utilising RFID and blockchain technology in the construction of the agri-food supply chain traceability system, and we finally present the system's construction process. By gathering, transferring, and exchanging the true information about agri-food in production, processing, and storage, it may achieve traceability with reliable data along the full agri-food supply chain, effectively guaranteeing the food safety.

Shi-Cho Cha, Jyun-Fu Chen, ChunhuaSu, Kuo-Hui Yeh:- The difficulties of safe management and effective access control of IoT devices have received a lot of attention as a result of the escalating importance of privacy. In this study, we provide an architecture for a Blockchain Connected Gateway (BC gateway), which securely and adaptively upholds user privacy choices for Internet of Things (IoT) devices in the blockchain network. Because the gateway successfully shields users' sensitive data from being accessed without their knowledge, individual privacy leaks can be avoided. It is suggested that a strong digital signature approach be used for privacy preference management and authentication. In order to settle privacy conflicts, we also use the blockchain network as the foundation for data processing and maintenance.

Zonyin Shae, Jeffrey Hsiung Tsai:- This article addresses several design elements, suggests a blockchain platform architecture for clinical trials and precision medicine, and offers some insights into the technical needs and difficulties. In our blockchain platform, we identify 4 new system architecture components that must be created on top of conventional blockchain and talk about their technological obstacles. To develop and research parallel computing methodologies for big data analytics, (a) a new blockchain-based general distributed and parallel computing paradigm component; (b) a blockchain application data management component for data integrity, big data integration, and integrating disparate medical-related data;

Pradip Kumar Sharma, Mu-Yen Chen, Jong Hyuk Park: In order to adhere to the necessary design criteria, this study offers a unique distributed cloud architecture based on blockchain technology with controller fog nodes at the network's edge. A distributed cloud architecture based on blockchain technology is the suggested paradigm, and it offers low-cost, secure, and on-demand access to the most competitive computing infrastructures in an IoT network. The suggested model makes high-performance computing affordable by building a distributed cloud infrastructure. Furthermore, we offer a secure distributed fog node architecture that makes use of SDN and blockchain technologies in order to bring computing resources to the edge of the IoT network and enable low latency access to vast volumes of data in a secure manner.



Ahmed Kosba, Andrew Miller, Elaine Shi, Zikai Wen, Charalampos Papamanthou: In this article, we'll talk about smart contract protocols that let parties communicate with a blockchain like this. The blockchain can be viewed as a hypothetical party (in actuality decentralised) that can be trusted for correctness and availability but not for privacy, presuming that the decentralised consensus mechanism is safe. A blockchain of this kind offers a potent metaphor for creating distributed protocols. Developing smart contract technologies on top of decentralised cryptocurrencies enable untrustworthy parties to conduct secure transactions without the involvement of reliable middlemen. The decentralised blockchain makes sure that honest parties get fair recompense in the event of contract violations or terminations. Transactional privacy, however, is absent from current systems. The blockchain discloses every transaction, including the flow of money between pseudonyms and the amount exchanged.

Gábor Magyar: In our article, we outline how blockchain technology might assist in resolving the issue of safe data storage while also maintaining data accessibility. We follow the fundamental tenets of the American HIPAA legislation, which establishes the public accessibility standards for health data, although local restrictions may differ greatly.

A well-designed distributed peer-to-peer network that is free of intermediaries and intermediaries can be used to incentivize the smooth running of a full-featured EHR system thanks to the decentralised, intermediary-free, cryptographically protected properties of the blockchain.

Ruzhi Xu, Lu Zhang, Huawei Zhao, Yun Peng: In this study, we suggest a blockchain-based digital rights management system for network media. Blockchain is a technology that implements consensus, irreversibility, and traceability for online data using cryptographic algorithms, hash chains, and consensus mechanisms. These blockchain functionalities can be used by the suggested plan to implement efficient administration of network media production, copyright management, transaction management, and user behaviour management. Additionally, our suggested plan might foreseeably offer a crucial assistance for the network media platform to create a sustainable development of a favourable ecological atmosphere.

III. CONCLUSION

We have discussed the value of a blockchain network for the education sector in this essay. We have created a blockchain-based system for online exams. In this essay, we also contrast the blockchain-based and cloud-based systems. We used one of the best applications, the Smart contract, and the open-source blockchain platform Ethereum in this. This study is pertinent to our work on using smart contracts successfully in the contemporary educational system.

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