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A Trustworthy Data Sharing Framework Using Blockchain Technology and Adaptive Transaction Validation

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ABSTRACT: In the realm of data sharing, trust remains a significant barrier, hindering widespread collaboration. The absence of transparent infrastructures for establishing data trust hampers data owners' willingness to share their data and raises concerns for data users regarding the reliability of shared data. Addressing this, the concept of data trust facilitates data sharing by compelling data users to be transparent about the data sharing and reuse processes. Blockchain technology, known for its distributed and transparent administration through a consensus-maintained immutable ledger, offers a promising solution.

This project introduces an end-to-end framework for data trust leveraging blockchain technology to enhance trustworthy data sharing. The framework focuses on assessing data quality, managing access control, and providing data provenance and activity monitoring. An assessment model incorporating reputation, endorsement, and confidence factors evaluates data quality.

Moreover, an adaptive approach is proposed to determine the number of transaction validators based on computed trust values. The framework addresses concerns from both data owners and users, ensuring data's trustworthiness and quality at the source and its ethical and secure utilization at the endpoint. Extensive experimental studies demonstrate the system's efficiency in handling numerous transactions with low latency.

KEYWORDS: Blockchain, Smart contracts, Peer-to-peer computing, Access control, Distributed databases, Organizations, Law

I. INTRODUCTION

Data sharing has become a big concern regarding privacy and confidential issues, abusing data, and legal and ethical violations. The lack of a transparent and trustworthy framework for data trust hinders many data owners from sharing their data, which could be vital for many research purposes. Data sharing is not merely a big concern for data owners, but also data users are concerned about the trustworthiness and reliability of the provided data at the origin. Hence, trust is a two-way problem for both data owners and data users. Data trust is a fairly new concept that aims to facilitate data sharing by forcing data users to be transparent about the process of sharing and reusing data. Data trust entails legal, ethical, governance and organizational structure as well as technical requirements for enabling data sharing. Previous studies have suggested the potential of web observatory and institutional repositories for implementing data trust. Block chain technology has salient potential to effectively present the essential properties for creating a practical data . trust framework by transforming current auditing practices and automatic enforcement of smart contracts logic, without relying on intermediaries to establish trust. Many other studies have investigated block chain potential for data sharing, establishing trust and access control. However, those are mostly scattered studies that have focused on a particular step or specific aspect in data sharing or have taken one side of the parties in data sharing by addressing only data owners' concerns. Block chain can be used as a data trust interface between data controllers and data users. The distributed, secure and reliable nature of the block chain can reinforce the trustworthiness of the data trust framework

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II. RELATED WORK

The practical related work of the project "Data Trust Framework Using Blockchain Technology and Adaptive Transaction Validation" involves the implementation of an end-to-end framework for data trust to enhance trustworthy data sharing through blockchain technology. This framework focuses on promoting data quality by assessing input data sets' trustworthiness using parameters like data owner endorsement and reputation. Additionally , the project includes two modules - one for users and another for administrators. Users can input basic information, contact details, location, and choose a profile image to create an account. Administrators have access to an admin page where they can log in with specific credentials to manage the system

III. EXISTING METHOD

The disadvantages of existing systems in data sharing include limitations in establishing trust, transparency, and data quality. Many data owners hesitate to share their data due to the absence of transparent infrastructures for building trust, while data consumers express concerns about the accuracy and reliability of shared data. Current systems lack mechanisms to ensure the integrity and quality of shared data from its source to utilization, leading to trust issues for both data owners and consumers. These shortcomings highlight the need for a more robust and secure framework like the one proposed using blockchain technology and adaptive transaction validation, which aims to address these limitations and promote trustworthy data sharing practices

The disadvantages of existing systems in data sharing, as highlighted by the research, include:

Lack of Transparent Infrastructures: Many data owners are hesitant to share their data due to the absence of transparent systems for establishing data trust, leading to challenges in promoting data sharing

Concerns about Data Quality: Data consumers express concerns about the accuracy and reliability of shared data, indicating a lack of confidence in the quality of the data being exchanged

IV. PROPOSED METHOD

The advantages of the proposed trustworthy data sharing framework using blockchain technology and adaptive transaction validation are as follows:

Enhanced Data Quality: The framework promotes data quality by evaluating input data sets, ensuring that only reliable and high-quality data is shared among participants

Transparent Infrastructure: Leveraging blockchain technology, the framework offers a distributed and transparent administration that maintains consensus on an immutable ledger, enhancing transparency and trust in data sharing processes

Improved Access Control: The framework effectively handles access control, providing secure and fine-grained access management using blockchain features like transparency, auditability, and trust distribution

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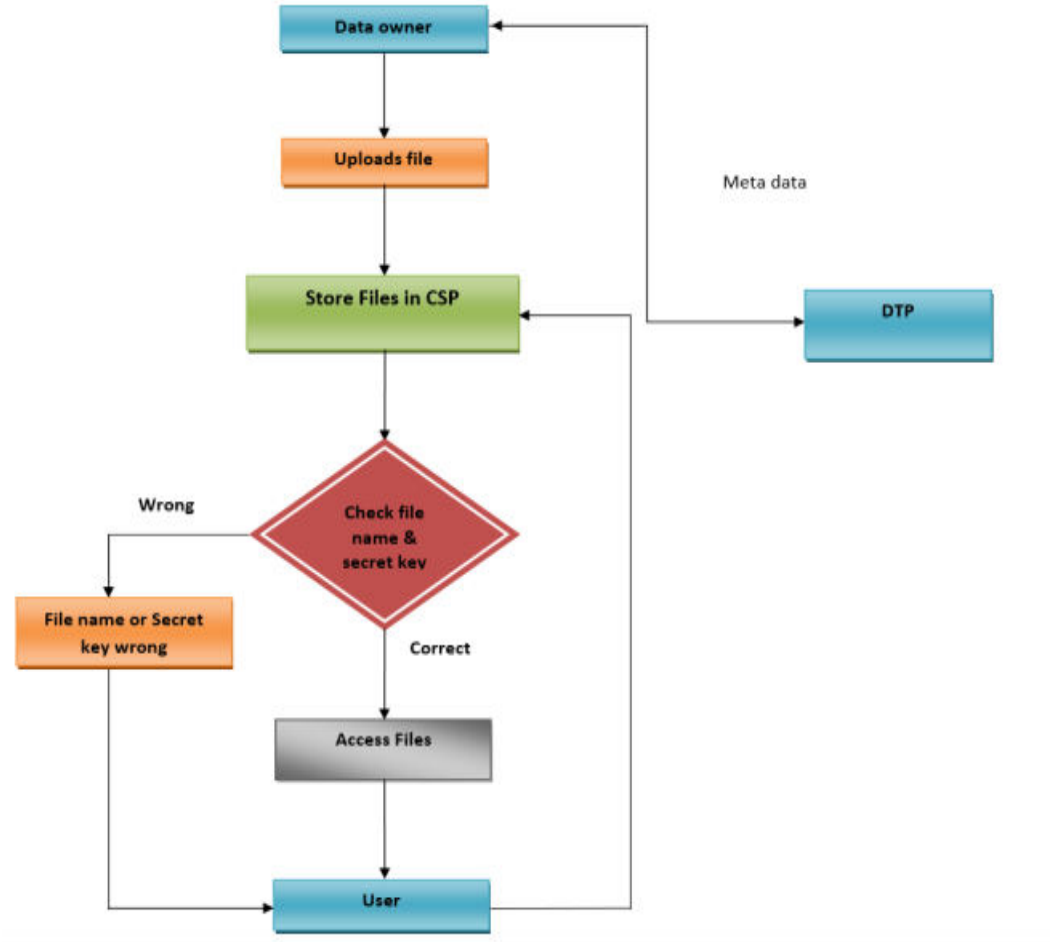

Fig 1: Flow Chart

V. SIMULATION RESULTS

The project you are inquiring about focuses on a trustworthy data sharing framework utilizing blockchain technology. Several research papers have explored this topic, highlighting the significance of blockchain in enhancing data trust and sharing. The framework aims to address challenges related to data accuracy, provenance, privacy implications, and fair incentives for data providers. Blockchain's properties like transparency, immutability, non-repudiation, and decentralization make it suitable for improving trust in data-sharing platforms. However, challenges such as performance limitations, scalability issues, and high costs hinder its effectiveness in handling big data.

Key points from the search results include:

- The proposed framework emphasizes enhancing data trust through blockchain technology
- Blockchain is recognized for its potential in ensuring trustworthy data sharing and addressing various challenges in data accuracy and privacy
- Research has highlighted the importance of blockchain in providing transparency, immutability, and decentralization to enhance trust in data-sharing platforms

These findings underscore the growing interest and importance of blockchain technology in establishing secure and reliable data-sharing frameworks**.**

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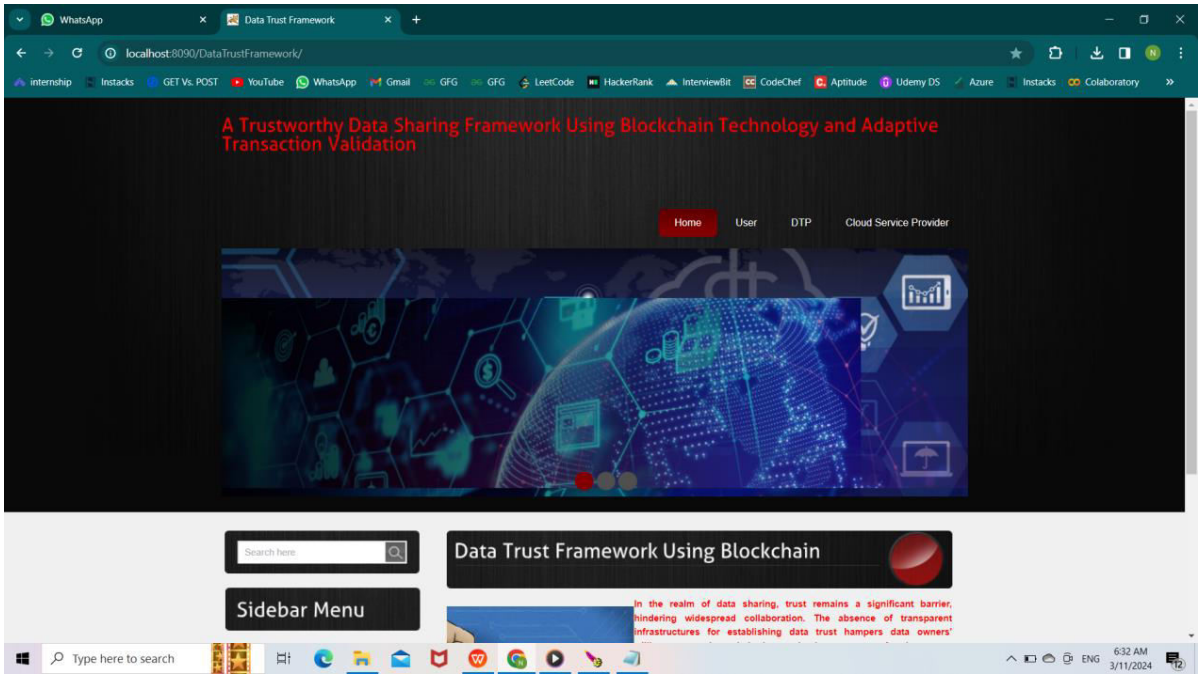

Fig 2.1: Home Page

Fig :2.2 :Home Page of Data Owner

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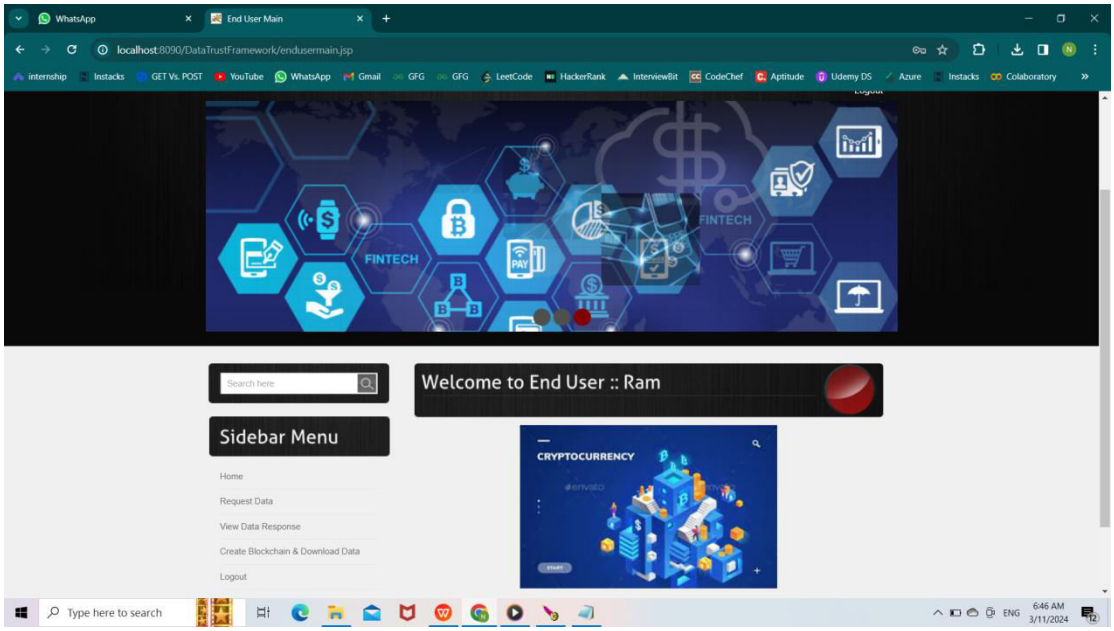

Fig:2.3:Home Page of End user

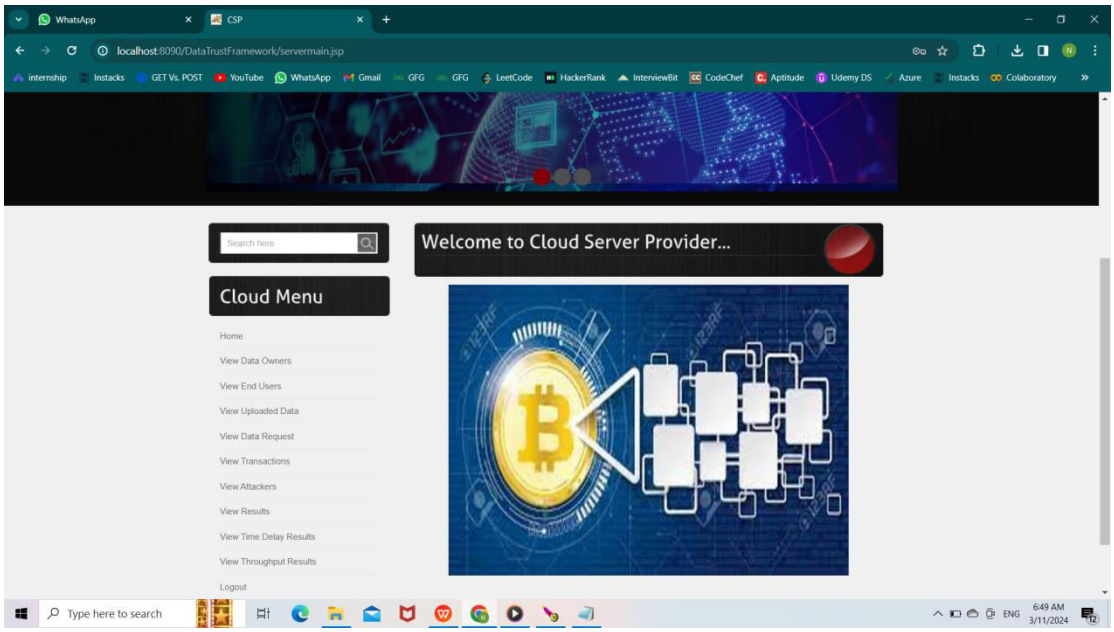

Fig:2.4: Home page of cloud Service Provider

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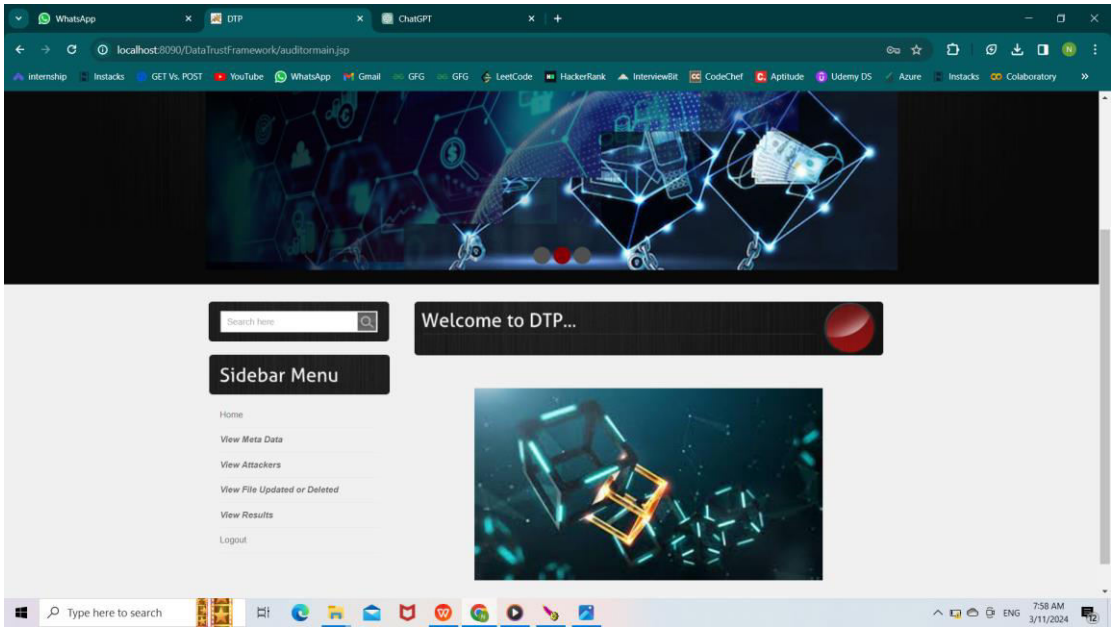

Fig :2.6 : Home Page of DTP

VI. CONCLUSION AND FUTURE WORK

The conclusion of a trustworthy data sharing framework using blockchain technology and adaptive transaction validation emphasizes the importance of establishing a transparent and reliable infrastructure for data trust. This framework aims to enhance trustworthy data sharing by addressing concerns related to data privacy, confidentiality, abuse, and ethical violations. By incorporating trust models, access control management, data asset validation, and adaptive transaction validation, the framework ensures the trustworthiness, security, and quality of shared data.

The proposed solution includes an end-to-end architecture that evaluates the credibility of input data sets based on factors like data owner reputation, data asset endorsement, and confidence in the provided data set. Through an adaptive approach to calculating the estimated trust value-based number of transaction validators, the framework ensures that only trusted data sets are validated. By assuring the reliability and quality of data at its source and promoting ethical and secure use, this framework addresses the concerns of both data owners and consumers.

Overall, the conclusion highlights that the suggested data trust framework leverages blockchain technology to provide a secure and transparent method for data exchange. It emphasizes the importance of trust models, access control mechanisms, and data asset validation in ensuring trustworthy data sharing practices while promoting ethical and secure usage of shared data

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