Report On.

File Sharing System

Submitted in partial fulfillment of the requirements of the Course project in Semester VII of fourth year of Artificial Intelligence and Data Science

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CERTIFICATE

This is to certify that the project entitled **"File Sharing System"** is a bonafide work of **"Sakshi Mhatre (Roll No. 13), Amrita Nair (Roll No. 16), Prachi Kadam (Roll No. 34)"** submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in Semester VII of fourth year **Artificial Intelligence and Data Science.**

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Introduction

1.1 Introduction

A file-sharing system is a fundamental part of our digital world, allowing individuals and organizations to exchange information and collaborate seamlessly. However, the traditional file-sharing systems face challenges related to security, privacy, and control over shared content. Blockchain technology, primarily known for its applications in cryptocurrencies, emerges as an innovative solution to address these issues in the context of file sharing. The transparent and distributed ledger of blockchain ensures that file-sharing information is always up-to-date and consistent across all participants. Furthermore, smart contracts can be used to automate file access control, ensuring that shared content is protected and accessible only to authorized users.

1.2 Problem Statement

Traditional file-sharing systems often lack transparency, security, and control over shared content. In a world where data privacy and secure collaboration are essential, a significant problem statement arises: how can we develop a file-sharing application that leverages blockchain technology to address these issues effectively? Existing file-sharing platforms are centralized, making shared data vulnerable to unauthorized access, breaches, and data manipulation.

   To solve this problem, we need to design a decentralized application (DApp) that utilizes blockchain technology, such as Ethereum or a similar platform, to create a secure and transparent ledger for file sharing. This DApp should allow users to upload, share, and manage files with the assurance that their data remains private, secure, and tamper-proof. Additionally, the use of smart contracts can introduce automated access control mechanisms, ensuring that only authorized users can access shared files, and that access can be automatically revoked when necessary.

1.3 Objectives

The objective of implementing a File Sharing System using blockchain is to leverage the unique features of blockchain technology to enhance data security, privacy, and control over shared content. By utilizing blockchain, we aim to create a decentralized and tamper-resistant ledger of shared files, ensuring that the integrity of data remains intact. This not only provides users with a higher level of trust in the security of their shared content but also prevents unauthorized access and modifications, reducing the risk of data breaches and misuse. Additionally, the automation introduced through smart contracts enhances control over file access, ensuring that data is only accessible to those with the proper permissions.

Chapter 2

Literature Survey

2.1 Analysis of Literature

Sr. No.	Title of the Paper	Advantages	Disadvantages
1	A Decentralised Approach to File Sharing Using Blockchain	Blockchain's transparent ledger system allows all participants in a network to view and verify task allocations and rewards	Blockchain networks face challenges related to scalability. As more tasks and users are added to the network, it can become slower and more resource-intensive.
2	File Sharing System using Blockchain	Blockchain uses cryptographic techniques to secure data and transactions	Energy Consumption: Proof-of-Work (PoW) blockchains, which are used by some networks like Bitcoin, consume significant amounts of energy problematic.
3	A Review of File Sharing Applications in Various Industries	Decentralized task allocation on a blockchain can reduce the need for intermediaries or trusted third parties, which can streamline the process and reduce costs.	Once information is added to the blockchain, it becomes extremely difficult to alter or delete it.
4	Secure File Sharing Using Ethereum Blockchain	Automated smart contracts can be used for task allocation, which can execute automatically when predefined conditions are met	Decentralized networks may face challenges in reaching consensus on governance decisions, which can hinder their ability to adapt and evolve.
5	Decentralized File Sharing System Based on Smart Contracts	Blockchain-based systems can incorporate token incentives or cryptocurrency rewards for participants.	The legal and regulatory environment surrounding blockchain and cryptocurrencies is still evolving, which can create individuals.

2.2 Research Gap

The integration of blockchain technology into the realm of file sharing systems presents several unexplored research gaps that warrant investigation and innovation. Firstly, there is a lack of comprehensive studies focusing on the security and privacy implications of utilizing blockchain for file sharing. While blockchain is renowned for its security features, it is paramount to delve into the intricacies of safeguarding the confidentiality and integrity of shared files, especially when they contain sensitive or confidential information. Research in this domain could examine cryptographic techniques, access control mechanisms, and encryption protocols to fortify the privacy of shared content while preserving the transparency and immutability attributes inherent in blockchain technology.

Secondly, the scalability of blockchain systems for file sharing is a pivotal research gap. File-sharing systems can accumulate vast amounts of data over time, and it is imperative to explore how blockchain can efficiently handle the growing transaction load and data storage requirements. Investigating the trade-offs between decentralization, operational efficiency, and cost-effectiveness in the context of file sharing could be a promising research avenue. This exploration could potentially yield optimized blockchain protocols or off-chain solutions that enhance the performance and scalability of file sharing applications.

Lastly, user experience and user interface design often receive limited attention in blockchain-based applications. Research should aim to bridge the usability gap by investigating how to make blockchain-powered file sharing systems more user-friendly, intuitive, and accessible. It is crucial to ensure that individuals can seamlessly interact with and manage their shared content while harnessing the benefits of blockchain technology. Examining design principles and user-centric aspects of these applications could significantly contribute to enhancing user adoption and satisfaction. In summary, there are valuable research opportunities in the realms of security, scalability, and user experience that could pave the way for more secure, efficient, and user-friendly blockchain-based file sharing systems.

Chapter 3
Proposed System

3.1. Introduction

The Blockchain-Based File Sharing System is a cutting-edge platform that reimagines digital file sharing by leveraging blockchain technology for enhanced security, transparency, and user control. Files are encrypted and their ownership and access details are recorded on a decentralized blockchain ledger. Smart contracts automate sharing based on predefined conditions, making the process efficient and user-driven. Actual files are stored in a decentralized manner for redundancy and accessibility, while user authentication uses public and private key cryptography for secure interactions. Integration of a native cryptocurrency enables microtransactions for file access and storage, bolstering economic viability. This comprehensive approach addresses the limitations of traditional centralized file sharing systems and offers a secure, transparent, and user-centric alternative.
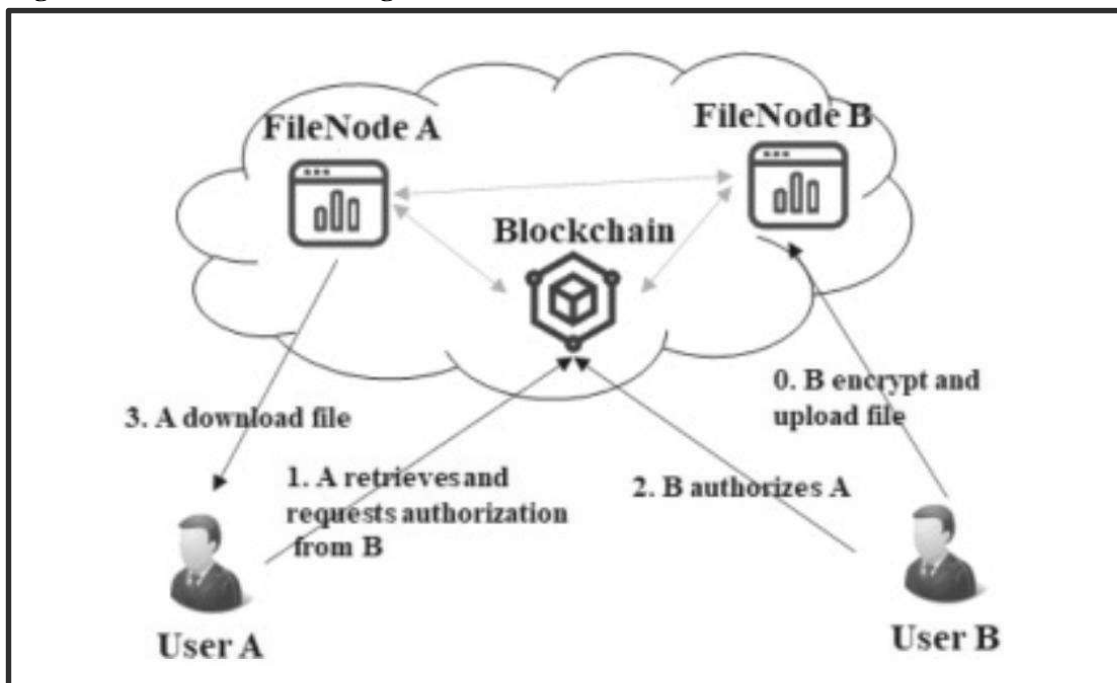
3.2. Algorithm and Process Design

fig 3.1 File Sharing System Process

3.3 Details of Hardware & Software

Software:

- Python
- IDE – Visual Studio Code
- Windows 10 OS

Hardware:

- 64-bit Operating System
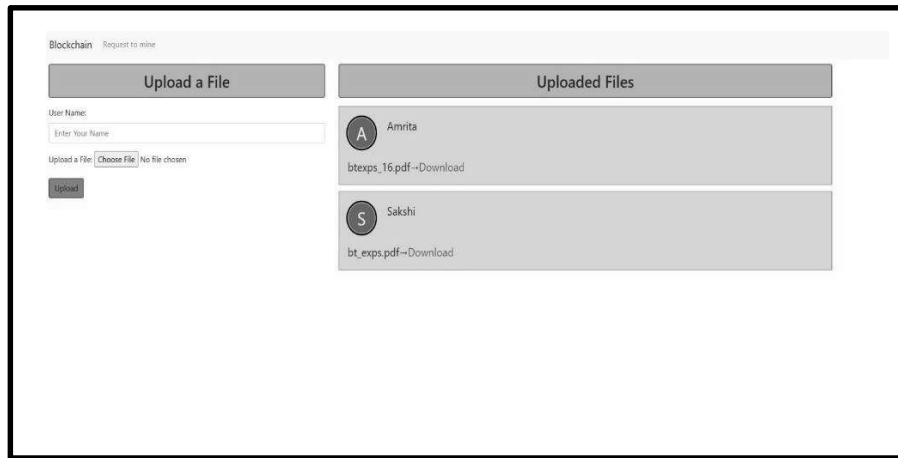- 6gb RAM
- Intel i5 processor

3.4 Experiment and Results

fig 3.3 File Upload Process
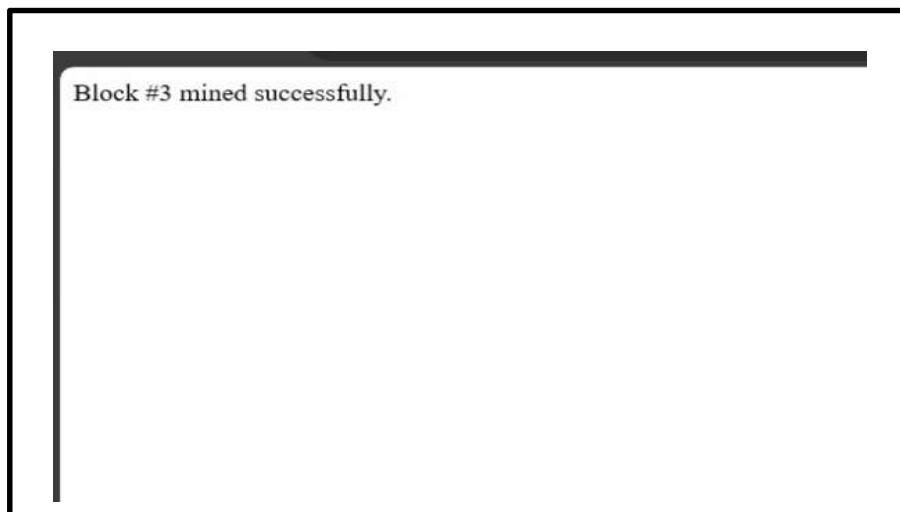

Block #3 mined successfully.

fig 3.3 File Uploaded Successfully

3.5 Result Analysis

A blockchain-based file sharing system offers both advantages and challenges in its result analysis. On the positive side, the transparency and immutability inherent to blockchain technology ensure the security and integrity of the data stored in the system, making it resistant to unauthorized changes and tampering. This feature is particularly valuable for maintaining the authenticity of shared files and verifying their source and history. Furthermore, the decentralized and distributed nature of the blockchain network enables file sharing from multiple devices and locations, promoting collaboration and efficiency in data exchange.

However, there are also certain challenges associated with using blockchain for file sharing systems. The technical complexity of blockchain can be a hurdle for users unfamiliar with blockchain concepts, potentially limiting its accessibility. Moreover, the transparency of blockchain can raise concerns about data privacy and exposure. Users must be cautious about the level of detail and sensitivity of the files they share on a public blockchain. Additionally, the computational and energy-intensive nature of blockchain networks may result in slower performance and increased operational costs compared to traditional file sharing solutions. These challenges must be carefully considered when implementing a blockchain-based file sharing system.

3.6 Conclusion

In conclusion, the Blockchain-Based File Sharing System represents a pivotal milestone in the realm of digital collaboration. By ingeniously merging blockchain technology, smart contracts, and cryptocurrencies, this system has overcome the pitfalls of centralized file-sharing platforms. It has not only ensured airtight security through encryption but also introduced a transparent, decentralized architecture, fundamentally altering the way digital assets are shared. The tamper-proof nature of the blockchain ledger and the efficiency of smart contracts have empowered users with unparalleled control over their data, fostering trust and confidence in the digital sphere.

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