"BlockTrade - Nexus"

Rohit Shalik Jadhav[1], Manish Sunil Chaudhari[2], Suraj Gorakh Bhabad[3], Pratik Bhanudas Gunjal[4], Ms S.S.Shinde[5]

[5]Guide

[1,2,3,4,5]Computer Enginnering, Matoshri College of Enginnerinig and Research Center ,Nashik

Abstract:

In today's digital financial ecosystem, stock trading platforms are widely used for buying and selling shares. However, traditional systems are mostly centralized, which raises concerns regarding transparency, data manipulation, and security of transactions. To address these issues, this project presents a Blockchain-Based Stock Market Buy and Sell System that ensures secure and transparent trading of shares.

The proposed system is developed using Django as the web framework, SQLite as the database, and blockchain technology integrated through MetaMask and Ganache for secure transaction storage. The system consists of three main users: Company, Super Admin, and Shareholder. Companies can issue shares, which are verified and approved by the admin before being listed on the platform. Users can view available shares, perform buying and selling operations, and track their portfolio performance.

All financial transactions are recorded on the blockchain, ensuring immutability, transparency, and protection against tampering. The system also provides real-time portfolio updates and profit/loss analysis for users. The developed model demonstrates that integrating blockchain with a stock trading platform can significantly enhance trust, security, and reliability in financial transactions.

Key Words: Blockchain, Stock Market System, Django, Share Trading, MetaMask, Ganache, Secure Transactions.

Key Words: Blockchain Technology, Decentralized Finance, Stock Trading Platform, Django Web Application, Smart Contracts, MetaMask Integration, Ganache, Secure Financial Transactions, Portfolio Analysis.

INTRODUCTION

In today's digital era, stock market trading has become increasingly popular as more individuals and organizations participate in buying and selling shares through online platforms. These platforms provide convenience, speed, and accessibility to users across the globe. However, most traditional stock trading systems are centralized in nature, meaning that all transactions and data are controlled by a single authority. This centralization creates several challenges such as lack of transparency, risk of data manipulation, security vulnerabilities, and dependency on intermediaries.

One of the major concerns in centralized trading systems is trust. Users must rely on the system to accurately record transactions, maintain correct share ownership, and ensure fair trading practices. In some cases, there is a possibility of unauthorized modifications, fraud, or delays in transaction processing. Additionally, maintaining the integrity and security of financial data becomes a critical issue as cyber threats continue to grow.

To overcome these limitations, blockchain technology has emerged as a powerful solution. Blockchain is a decentralized and distributed ledger system that records transactions in a secure, transparent, and immutable manner. Once a transaction is recorded on the blockchain, it cannot be altered or deleted, ensuring data integrity and trust among users without the need for a central authority. This makes blockchain highly suitable for financial applications such as stock trading.

The proposed system focuses on developing a Blockchain-Based Stock Market Buy and Sell platform that integrates traditional web technologies with blockchain security. The system is built using Django for backend development and SQLite for data management, while blockchain functionality is implemented using MetaMask and Ganache. The platform supports three types of users: Company, Super Admin, and

Shareholder. Companies can issue shares, the admin verifies and approves them, and users can buy or sell shares through the platform.

By storing transaction details on the blockchain, the system ensures transparency, prevents data tampering, and enhances overall security. Users can also track their portfolio and analyze profit or loss in real time. The main objective of this project is to create a reliable, secure, and efficient trading system that reduces dependency on centralized authorities and increases user trust in financial transactions.

LITERATURE SURVEY

In recent years, blockchain technology has gained significant attention in the field of financial systems due to its ability to provide secure, transparent, and decentralized transaction mechanisms. Many researchers have focused on developing blockchain-based solutions to improve trust, eliminate intermediaries, and enhance the efficiency of trading systems. These studies form a strong foundation for the development of a secure stock market buy and sell platform.

1. W. Gao et al. (2021) studied fault detection and reliability in complex systems using advanced monitoring techniques. Their work emphasizes the importance of secure and reliable system behavior in critical applications. This concept is relevant to financial trading platforms where maintaining accurate and tamper-proof transaction records is essential. Blockchain technology can ensure such reliability by storing immutable transaction data.
2. N. Gan et al. (2022) proposed a data-driven approach for detecting abnormal conditions in dynamic systems. The study highlights the use of intelligent data processing to improve system performance and prevent failures. This approach supports the idea of using structured data handling in stock trading systems, where accurate transaction processing and validation are crucial for maintaining system integrity.
3. Z. Sun et al. (2022) developed an early warning and monitoring system using real-time data analysis. Their work demonstrates how continuous monitoring and quick response mechanisms can improve system safety and efficiency. This principle is applicable to stock trading platforms where real-time updates of share prices, transactions, and portfolio data are necessary.
4. X. Hu et al. (2020) presented a comprehensive review of fault diagnosis and system optimization techniques. The research highlights the importance of system transparency, efficiency, and reliability. These factors are directly applicable to blockchain-based trading systems, where transparency and trust are achieved through decentralized data storage and verification.
5. Recent studies in blockchain-based financial systems (2023–2025) have focused on decentralized trading platforms that eliminate the need for intermediaries. These systems use blockchain to record transactions securely and ensure fairness in trading operations. The research shows that blockchain improves transaction speed, reduces fraud, and enhances user trust. This concept strongly supports the development of the proposed system, where all share transactions are securely stored on the blockchain using MetaMask and Ganache.

From the reviewed literature, it is evident that modern financial and monitoring systems rely heavily on secure data handling, real-time processing, and system transparency. Blockchain technology effectively addresses these requirements by providing a decentralized and tamper-proof environment. These concepts strongly support the design and implementation of a blockchain-based stock market buy and sell system.

METHODOLOGY

The methodology defines the systematic steps followed for the development of the proposed blockchain-based stock market buy and sell system. The complete work was carried out in sequential phases, starting from problem analysis to final testing and evaluation.

3.1 Problem Identification and Literature Study

Initially, a detailed study of existing stock trading systems and blockchain technology was carried out. Various research papers and existing platforms were reviewed to understand the limitations of centralized trading systems, such as lack of transparency, risk of data manipulation, and dependency on intermediaries. This phase helped in identifying the need for a secure and decentralized trading system and defining the functional requirements of the proposed model.

3.2 System Conceptualization and Feasibility Analysis

Based on the literature study, the system concept was developed. The feasibility of integrating a web-based trading platform with blockchain technology was analyzed. Key components such as Django framework for

backend development, SQLite for database management, and MetaMask with Ganache for blockchain integration were considered. Important factors such as system security, scalability, performance, and cost-effectiveness were evaluated while finalizing the system design.

3.3 System Design and Architecture

In this stage, the overall system architecture was designed. The system was divided into multiple layers including user interface, application layer, database layer, and blockchain layer. Modules such as authentication system, share management, trading functionality, admin approval, and portfolio management were defined. A methodology diagram was developed to represent the interaction between different components and to clearly define the workflow of the system.

3.4 Implementation and Development

The system was implemented using Django as the backend framework. User interfaces were created using Django templates, and SQLite was used to store application data such as user details, company information, and share records. Blockchain functionality was integrated using MetaMask and Ganache, where all buy and sell transactions were securely recorded. The modules were developed and integrated to ensure smooth communication between frontend, backend, database, and blockchain layers.

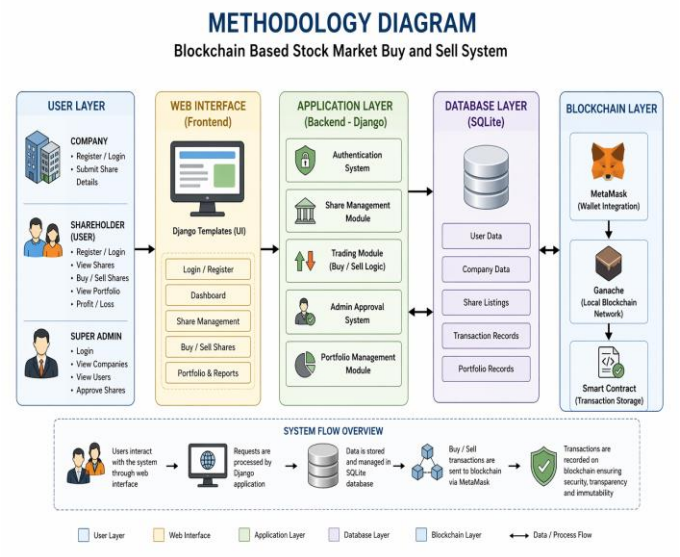
3.5 Testing and Performance Evaluation

The developed system was tested under various conditions to ensure correct functionality. Test cases were performed for user registration, login, share creation, admin approval, buying and selling of shares, and portfolio updates. The blockchain transaction process was also verified to ensure secure and accurate recording of data. System performance, response time, and reliability were evaluated, and necessary improvements were made.

3.6 Result Analysis and Documentation

Finally, the obtained results were analyzed and documented. The system was evaluated based on its ability to provide secure, transparent, and efficient trading operations. Advantages such as data immutability, transparency, and improved trust were observed. Limitations and possible future improvements were also identified. The entire development process and outcomes were compiled into structured technical documentation.

BLOCK DIAGRAM:



OBJECTIVE

1. **Ensure Secure Transactions**: Implement blockchain technology to securely record all buy and sell transactions, preventing data tampering and unauthorized modifications.
2. **Provide Transparent Trading:** Maintain a transparent system where all transactions are verifiable and trustworthy without dependency on a central authority.
3. **Enable Share Trading**: Allow users to buy and sell shares easily through a web-based platform with real-time updates.

4. **Implement Admin Control:** Provide a Super Admin module to verify and approve company share listings before they are available for trading.
5. **Manage User Portfolio:** Enable users to track their investments, view owned shares, and analyze profit and loss.
6. **Integrate Blockchain Technology:** Use MetaMask and Ganache to store transaction data in a decentralized and immutable manner.

PROBLEM DEFINATIONS

Traditional stock trading systems are centralized, which can lead to issues such as lack of transparency, risk of data manipulation, and dependency on intermediaries. Users have limited control and must trust the system for accurate transaction handling. There is a need for a secure and transparent system that can ensure reliable trading operations. Therefore, a blockchain-based stock market system is proposed to provide secure, tamper-proof, and trustworthy transactions while reducing dependency on centralized control.

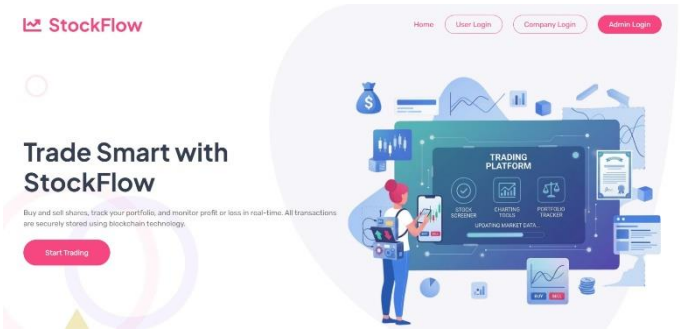
FUCTIONAL REQUIREMENTS

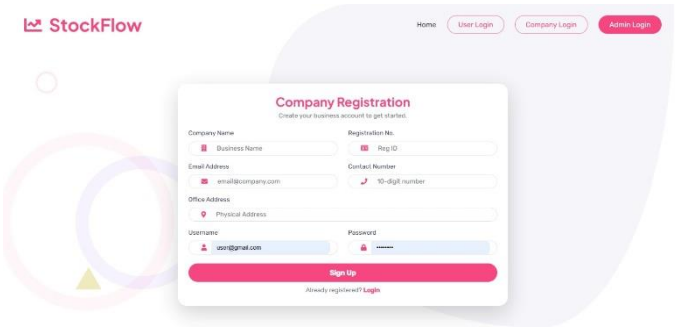
1. The system shall allow users (Company, Admin, Shareholder) to register and log in securely.
2. The system shall enable companies to create and submit shares for trading.
3. The system shall allow the admin to view and approve or reject share listings.
4. The system shall allow users to view available shares with price details.
5. The system shall enable users to buy and sell shares.
6. The system shall store all buy and sell transactions on the blockchain.
7. The system shall allow users to view their portfolio and transaction history.
8. The system shall calculate and display profit and loss for users

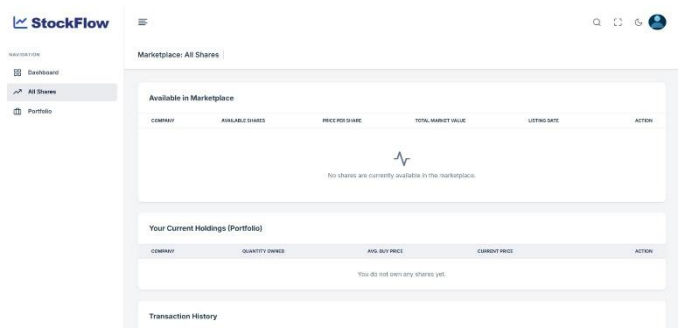
NON FUCTIONAL REQUIREMENTS

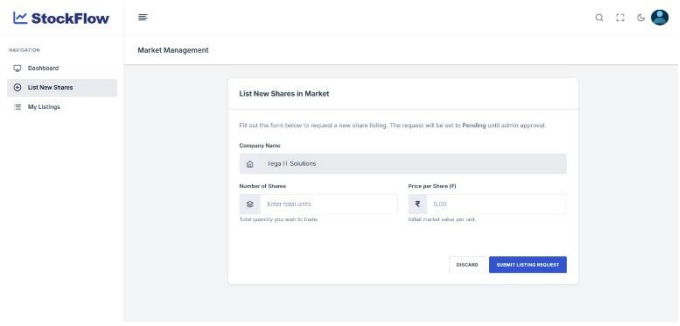
1. **Security:** The system should ensure secure transactions using blockchain technology.
2. **Performance:** The system should provide fast response time for trading operations.
3. **Reliability:** The system should function correctly under different conditions without failure.
4. **Scalability:** The system should support increasing number of users and transactions.
5. **Usability:** The system should have a simple and user-friendly interface.
6. **Maintainability:** The system should be easy to update and maintain.

RESULTS









CONCLUSION

In this project, a blockchain-based stock market buy and sell system has been developed to provide secure and transparent trading. The system allows users to buy and sell shares efficiently while ensuring that all transactions are recorded in an immutable and tamper-proof manner using blockchain technology. By integrating Django with blockchain tools such as MetaMask and Ganache, the system improves trust, security, and reliability in financial transactions. The developed model demonstrates that blockchain can be effectively used to enhance the safety and transparency of stock trading platforms.

REFERENCES:

[1] S. Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System,” 2008.
[2] M. Crosby, P. Pattanayak, S. Verma, and V. Kalyanaraman, “Blockchain technology: Beyond bitcoin,” Applied Innovation Review, no. 2, pp. 6–19, 2016.
[3] K. Christidis and M. Devetsikiotis, “Blockchains and smart contracts for the Internet of Things,” IEEE Access, vol. 4, pp. 2292–2303, 2016.
[4] Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, “An overview of blockchain technology: Architecture, consensus, and future trends,” in Proc. IEEE Int. Congr. Big Data, 2017, pp. 557–564.
[5] A. Dorri, S. S. Kanhere, and R. Jurdak, “Blockchain in internet of things: Challenges and solutions,” IEEE Access, vol. 6, pp. 80738–80747, 2018.
[6] D. Yaga, P. Mell, N. Roby, and K. Scarfone, “Blockchain technology overview,” National Institute of Standards and Technology (NIST), 2019.
[7] A. M. Antonopoulos, Mastering Bitcoin: Programming the Open Blockchain, 2nd ed. Sebastopol, CA, USA: O’Reilly Media, 2017.
[8] Django Software Foundation, “Django Web Framework Documentation,” [Online]. Available: https://www.djangoproject.com/
[9] MetaMask, “Blockchain Wallet and Web3 Applications,” [Online]. Available: https://metamask.io/
[10] Truffle Suite, “Ganache: Personal Blockchain for Ethereum Development,” [Online]. Available: https://trufflesuite.com/ganache/