

Trusted Crowd Funding Using Blockchain

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Abstract - Crowdfunding platforms have become an important mechanism for raising funds for social causes, startups, and community projects. However, most existing crowdfunding systems operate on centralized architectures where a single authority manages transactions and user data. This centralized control creates several challenges such as lack of transparency, risk of data manipulation, limited trust among donors, and vulnerability to cyberattacks or server failures. Donors often have no clear visibility into how their contributions are utilized, which reduces confidence in the system. To overcome these limitations, this research proposes a Trusted Crowdfunding Platform using Blockchain Technology. The proposed system leverages the decentralized nature of blockchain to ensure secure, transparent, and tamper-proof financial transactions. Each transaction is recorded as a block in a distributed ledger and linked through cryptographic hash codes, making the data immutable and verifiable across multiple nodes. The platform utilizes smart contracts implemented in Solidity and deployed on the Ethereum blockchain to automate key operations such as user registration, fund transfers, and transaction verification.

The system allows users to create blockchain accounts, add funds, transfer money to other blockchain users, and monitor transaction history in real time. Since the data is distributed across multiple nodes, any unauthorized modification can be easily detected through hash validation. This decentralized architecture eliminates the single point of failure present in traditional systems and enhances trust among donors and fundraisers. The proposed solution improves security, transparency, accountability, and reliability in crowdfunding platforms. By integrating blockchain technology with crowdfunding mechanisms, the system establishes a trustworthy environment where contributors can confidently track and verify how their funds are utilized.

Key Words: Blockchain, Crowdfunding, Smart Contracts, Ethereum, Decentralization, Transparency, Distributed Ledger, Secure Transactions.

1.INTRODUCTION

The rapid growth of internet-based platforms has significantly transformed the way individuals and organizations raise funds for various causes. Crowdfunding has emerged as a popular method for collecting financial support from a large number of contributors through online platforms. It is widely used to support startups, social initiatives, disaster relief, and innovative projects. However,

most existing crowdfunding platforms rely on centralized systems where all transactions and user data are controlled by a single authority. This centralized architecture raises concerns related to transparency, security, and trust among donors and fundraisers. With the increasing need for secure and transparent financial systems, blockchain technology has gained attention as a promising solution for addressing these challenges [1], [2]. Traditional crowdfunding platforms operate using centralized databases managed by a single organization. In such systems, donors contribute funds through an intermediary platform, which is responsible for managing and distributing the collected funds to project owners. Although this approach simplifies management, it creates several limitations. Donors often lack visibility into how their contributions are used, which can lead to trust issues and reduced participation. Moreover, centralized systems are vulnerable to cyberattacks, data manipulation, and system failures. According to previous studies, the absence of transparency and accountability remains a major challenge in existing crowdfunding platforms [2], [3].

Blockchain technology is a distributed ledger system that records transactions across multiple nodes in a network. Each transaction is stored as a block and linked to the previous block using cryptographic hash functions, creating an immutable chain of records. This decentralized architecture ensures that no single entity has complete control over the data, thereby improving transparency and security. Once a transaction is recorded on the blockchain, it cannot be modified without consensus from the network participants. Researchers have highlighted that blockchain can enhance trust in digital systems by providing secure, verifiable, and tamper-proof transaction records [4], [5]. Smart contracts are self-executing programs stored on the blockchain that automatically enforce predefined rules and conditions. These contracts eliminate the need for intermediaries by automating processes such as fund transfers, verification, and transaction validation. Platforms such as Ethereum enable developers to implement smart contracts using programming languages like Solidity. Smart contracts ensure that funds are transferred only when specific conditions are met, thereby increasing reliability and reducing the chances of fraud or misuse. Previous research has demonstrated the effectiveness of smart contracts in improving transparency and efficiency in financial applications [6], [7].

The integration of blockchain technology with crowdfunding platforms provides a decentralized approach that addresses

the limitations of traditional systems. By recording all transactions in a distributed ledger, donors can track the movement of funds and verify their usage in real time. The use of cryptographic techniques ensures data integrity, while smart contracts automate key operations such as user registration, fund transfers, and transaction verification. As a result, blockchain-based crowdfunding platforms offer improved transparency, security, and trust among stakeholders. Several studies have suggested that blockchain has the potential to revolutionize crowdfunding by providing a reliable and accountable financial ecosystem [8]–[10].

2. PROPOSED SYSTEM

The proposed system introduces a Blockchain-based trusted crowdfunding platform designed to overcome the limitations of traditional centralized crowdfunding systems. In this approach, all transactions related to fundraising, fund transfers, and user activities are recorded on a distributed blockchain ledger, ensuring security, transparency, and immutability. By leveraging blockchain technology and smart contracts, the system eliminates the need for a central authority to manage financial transactions and data storage. The system allows users to create blockchain accounts, deposit funds, send money to other blockchain users, and monitor their transaction history. Every transaction performed within the platform is stored as a block that is linked to the previous block using cryptographic hash functions, ensuring that once a transaction is recorded, it cannot be altered or deleted, thereby providing a tamper-proof transaction history.

The architecture of the proposed system is based on a decentralized blockchain network where multiple nodes maintain copies of the distributed ledger. Each node verifies and validates transactions before adding them to the blockchain, which removes dependency on a single central server and prevents failures caused by server crashes or cyberattacks. The blockchain network ensures that every transaction is verified through consensus mechanisms, making it difficult for unauthorized users to manipulate data. Since all participants share the same ledger, transparency and accountability are significantly improved. The system further incorporates smart contracts written in Solidity and deployed on the Ethereum blockchain, which automate key operations such as user registration, fund transfer, and transaction validation. When a user performs a transaction, the smart contract automatically verifies the conditions and executes the operation if all requirements are satisfied, eliminating manual intervention and reducing the possibility of fraud or errors while maintaining verifiable transaction records. The user module provides functionalities that enable participants to interact with the platform by creating accounts, managing blockchain wallets, and performing secure financial transactions. Users can register, log in, access a dashboard that displays account balance and transaction details, deposit funds into their blockchain

account, transfer money to other users, view complete transaction history, update their profile information, and securely log out of the system. All financial transactions are recorded on the blockchain as immutable blocks containing details such as sender address, receiver address, transferred amount, and a unique hash code. Before a transaction is confirmed, it is validated by the blockchain network, and once verified, it is permanently added to the blockchain, ensuring transparency and auditability. The system also incorporates strong security and transparency mechanisms, including an immutable ledger that prevents data modification, distributed storage that eliminates single points of failure, cryptographic hashing to maintain data integrity, real-time transaction tracking for users, and automated smart contracts that ensure accurate and secure execution of all operations.

3. IMPLEMENTATION DETAILS

The implementation of the proposed Trusted Crowdfunding System using Blockchain focuses on integrating blockchain technology with a web-based platform to provide secure, transparent, and tamper-proof financial transactions. The system combines blockchain networks with modern web technologies to enable users to perform crowdfunding activities such as registering accounts, transferring funds, and monitoring transaction records. By storing transaction data on a distributed blockchain ledger, the system ensures that all records are immutable and verifiable by network participants. The implementation involves developing smart contracts, designing an intuitive user interface, and integrating blockchain transactions with the backend application. The development of the system is carried out using a combination of blockchain frameworks and web technologies. The frontend is designed using HTML, CSS, and JavaScript to create an interactive and user-friendly interface. The backend is implemented using Python-based frameworks such as Flask or Django, which handle communication between the user interface and the blockchain network. The blockchain component is built on the Ethereum platform, which supports decentralized applications and smart contracts. Smart contracts are written in Solidity and deployed on the Ethereum blockchain to automate operations such as user registration, transaction verification, and fund transfers. Tools such as Truffle and Ganache are used for developing and testing smart contracts in a local blockchain environment before deployment. Smart contracts form the core of the system as they manage and control crowdfunding operations automatically. These contracts execute predefined rules without requiring manual intervention, ensuring that all transactions follow secure and verified conditions. The smart contracts handle key functionalities such as registering users, managing wallet addresses, transferring funds between accounts, and recording transaction data on the blockchain. Each transaction initiated by a user is verified through the smart

contract before being added to the blockchain, reducing human error and preventing unauthorized activities.

The user interface is designed to provide a simple and accessible platform for donors and fundraisers to interact with the system. Users can register, log in, view their account balance, and perform transactions without needing technical knowledge of blockchain technology. The interface includes essential pages such as registration, login, dashboard, fund deposit, fund transfer, transaction history, and profile management. Each component communicates with the backend server, which interacts with the blockchain through smart contract calls, ensuring secure and seamless operation. The system follows a structured workflow for processing blockchain transactions. When a user initiates a transaction, the request is processed by the backend application, which then communicates with the smart contract deployed on the Ethereum blockchain. The blockchain network verifies the transaction based on predefined conditions, and once validated, the transaction is recorded as a block in the blockchain ledger. Each block is linked to the previous one using cryptographic hash codes, ensuring immutability. After successful processing, the system updates the user interface and stores the transaction details in the transaction history.

Security is a fundamental aspect of the implementation. Blockchain technology ensures data integrity through cryptographic hashing and decentralized storage. Each block contains a unique hash that secures the chain and prevents data modification. The decentralized network eliminates the risk of a single point of failure, as multiple nodes maintain copies of the ledger. Even if one node is compromised, the integrity of the system remains intact. Additionally, smart contracts enforce strict validation rules, ensuring that only authorized transactions are executed. These features collectively enhance the security, transparency, and reliability of the proposed crowdfunding platform.

4. RESULTS AND PERFORMANCE ANALYSIS

The proposed Trusted Crowdfunding System using Blockchain was successfully implemented and tested to evaluate its functionality, security, and transparency. The system demonstrates how blockchain technology can be used to manage crowdfunding transactions in a decentralized and reliable manner. During testing, multiple users were able to register on the platform, deposit funds into their blockchain accounts, transfer funds to other users, and verify transaction history in real time. The experimental results show that the system effectively records every transaction on the blockchain ledger, ensuring data integrity and preventing unauthorized modifications.

The implemented platform provides a user-friendly interface that allows users to interact with blockchain technology without requiring technical knowledge of decentralized systems. Users can securely log into the system, access their

dashboards, and perform financial operations such as depositing funds or transferring money to other blockchain users. The use of smart contracts ensures that each transaction is automatically validated and recorded on the blockchain network. This process improves reliability and eliminates the need for manual verification by administrators. The system also improves transparency by providing a complete transaction history for each user. All transactions performed in the platform are stored as blocks in the blockchain ledger and can be viewed by the users through the transaction history page. Because blockchain records are immutable, once a transaction is confirmed it cannot be altered or deleted. This ensures trust between donors and fundraisers by allowing them to verify how funds are transferred and used within the platform.

Performance evaluation of the system indicates that blockchain-based transaction management improves security and reduces the risk of fraud or data tampering. The decentralized architecture eliminates the single point of failure commonly found in centralized crowdfunding platforms. Even if one node in the network fails, the remaining nodes maintain the integrity of the distributed ledger. Additionally, cryptographic hashing mechanisms ensure that any attempt to modify transaction data can be easily detected.

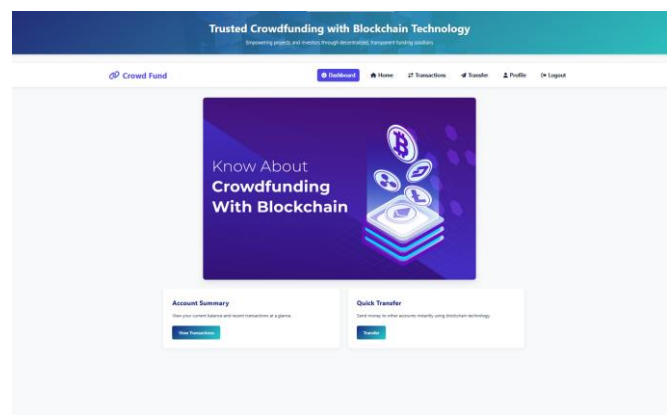


Fig. 1. User Dashboard of the Blockchain Crowdfunding Platform

Figure 1 shows the User Dashboard Interface of the Blockchain Crowdfunding Platform. The dashboard provides an overview of the user's account details, available balance, and navigation options for performing financial transactions such as depositing funds or transferring money to other users. This interface allows users to manage their blockchain accounts efficiently while maintaining secure interaction with the blockchain network.

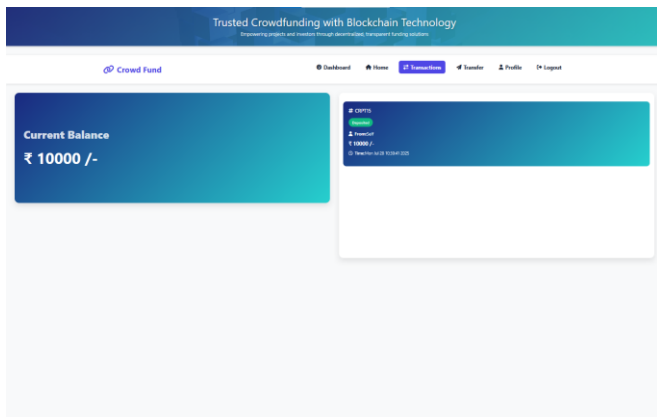


Fig. 2. Transaction History Showing Blockchain-Based Fund Transfers

Figure 2 shows the Transaction History Page of the System, which displays detailed records of all transactions performed by the user. The page includes information such as the transaction source, amount transferred, and timestamp. This feature demonstrates the transparency provided by blockchain technology, as users can verify all their financial activities directly from the system interface.

The results confirm that the proposed blockchain-based crowdfunding platform successfully provides secure fund management, transparent transaction tracking, and reliable decentralized operation. The system demonstrates the potential of blockchain technology in improving trust, accountability, and efficiency in online crowdfunding platforms.

5. CONCLUSIONS

In this research, a Trusted Crowdfunding Platform using Blockchain Technology has been proposed and implemented to address the limitations of traditional centralized crowdfunding systems. Existing platforms often suffer from issues such as lack of transparency, risk of data manipulation, limited trust between donors and fundraisers, and vulnerability to single points of failure. The proposed system leverages blockchain technology to create a decentralized and secure environment where all financial transactions are recorded on an immutable distributed ledger. By integrating Ethereum-based smart contracts, the system automates essential operations such as user registration, fund transfers, and transaction verification. This automation eliminates the need for intermediaries and reduces the chances of fraud or human error. Each transaction is stored as a block in the blockchain and linked using cryptographic hash codes, ensuring that transaction data cannot be modified once it has been recorded.

The implementation results demonstrate that the proposed platform provides improved security, transparency, and reliability compared to traditional crowdfunding systems. Users can monitor their transaction history in real time,

verify fund transfers, and securely interact with the platform through a user-friendly interface. The decentralized architecture also eliminates the single point of failure, making the system more resilient to cyberattacks and system crashes. Overall, the proposed blockchain-based crowdfunding platform successfully enhances trust and accountability among donors, fundraisers, and platform operators. The system highlights the potential of blockchain technology in transforming digital fundraising platforms by providing a transparent, secure, and efficient method for managing financial transactions.

6. FUTURE WORK

Although the proposed Blockchain-based Trusted Crowdfunding System provides improved transparency, security, and reliability, there are several opportunities for further enhancement and development. Future work can focus on improving the scalability, functionality, and real-world applicability of the system. One potential improvement is the integration of advanced blockchain networks and scalability solutions to support a larger number of users and transactions. Technologies such as Layer-2 scaling solutions or alternative blockchain platforms can be explored to reduce transaction costs and increase system performance. This would make the platform more suitable for large-scale crowdfunding applications. Another important direction for future work is the implementation of real-time monitoring and analytics tools. These tools can provide detailed insights into fundraising activities, donation trends, and project performance. Such analytics can help fundraisers better understand donor behavior and improve the effectiveness of crowdfunding campaigns. Future research can also explore the integration of identity verification mechanisms to enhance security and prevent fraudulent activities. Technologies such as digital identity systems or Know Your Customer (KYC) verification can be incorporated to ensure that users on the platform are authenticated and trustworthy. In addition, the system can be extended to support mobile applications so that users can access the crowdfunding platform through smartphones and other portable devices. A mobile interface would improve accessibility and allow donors to contribute to projects more conveniently. Another possible enhancement is the incorporation of Artificial Intelligence and Machine Learning techniques to detect suspicious transactions and predict fraudulent activities. Intelligent models could analyze transaction patterns and automatically flag unusual behavior, thereby strengthening the security of the crowdfunding platform.

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