



A Blockchain-Based Framework for Secure and Transparent Crowdfunding

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Abstract— Traditional crowdfunding platforms rely on centralized servers to manage user funds and transaction records, making them vulnerable to data manipulation, lack of transparency, and misuse of funds. To address these challenges, this project presents a Trusted Crowdfunding System based on Blockchain Technology, which replaces centralized control with a decentralized and tamper-resistant infrastructure. Contributors often have limited visibility into how their money is utilized, and any internal compromise of the server can lead to loss or alteration of critical financial information. Smart contracts developed using Solidity manage core functionalities such as user registration, transaction recording, fund transfers, and account balance updates. Once deployed on the blockchain, these contracts ensure that all operations are transparent, verifiable, and resistant to unauthorized modification. The proposed system leverages the Ethereum blockchain to securely store user and transaction data in the form of immutable blocks linked through cryptographic hash values. The system supports essential modules including user signup and login, adding funds to a blockchain wallet, linking bank accounts, transferring funds to other blockchain users, and viewing detailed transaction statements. Every financial operation is permanently recorded on the blockchain, allowing users to track fund usage and transaction history with full accountability. A web-based application built using the Django framework enables users to interact with the blockchain seamlessly. This approach minimizes the risk of fund misuse, eliminates single points

of failure, and encourages greater user confidence in digital crowdfunding ecosystems. By integrating blockchain decentralization with a user-friendly interface, the proposed crowdfunding platform enhances trust, security, and transparency.

Keywords— Blockchain, Crowdfunding, Ethereum, Smart Contracts, Solidity, Decentralized System, Transaction Transparency, Immutable Ledger, Django, Secure Fund Management.

I. INTRODUCTION

The rapid growth of crowdfunding systems has transformed the way innovative ideas, entrepreneurial ventures, healthcare needs, and charitable initiatives receive financial support by enabling individuals to contribute funds through online platforms [2], [23]. Despite its widespread adoption, crowdfunding faces serious concerns related to trust, transparency, and security, which significantly affect user confidence and platform reliability [5], [8]. Most conventional crowdfunding applications operate on centralized architectures, where all user data and financial transactions are managed by a single authority. This centralized control exposes the system to risks such as data manipulation, unauthorized access, internal fraud, and single-point failures, increasing the likelihood of fund misuse and loss of critical financial records [1], [11].



Centralized databases can be altered by administrators or compromised through cyber-attacks, undermining data integrity and accountability [3], [6]. Furthermore, contributors often lack reliable mechanisms to verify how, when, and where their funds are utilized, highlighting a major transparency gap in existing crowdfunding platforms [4], [12], [24]. These challenges emphasize the need for a secure, decentralized, and tamper-resistant system that ensures complete visibility of transactions while maintaining data integrity for all stakeholders involved.

Blockchain technology offers a promising solution to these limitations by introducing decentralization, immutability, and cryptographic security [7], [13], [16]. In a blockchain-based system, transactions are recorded as blocks distributed across multiple nodes in the network. Each block is linked using unique hash values, making transaction records tamper-proof and easily verifiable. Any attempt to modify transaction data at a single node is automatically detected through consensus mechanisms, thereby establishing trust without relying on a central authority [11], [14].

By integrating blockchain technology with crowdfunding platforms, transparency in fund utilization can be significantly enhanced while preventing fraud and unauthorized data manipulation [22]. Smart contracts enable the automatic execution of predefined rules governing user registration, fund addition, transfers, and balance updates, ensuring transparency and eliminating human intervention [3], [6], [25]. The proposed trusted crowdfunding system leverages the Ethereum blockchain and smart contracts written in Solidity to securely automate all crowdfunding operations.

Additionally, a Django-based web interface provides a user-friendly environment for interacting with the blockchain, supporting features such as blockchain wallet funding, bank account linkage, peer-to-peer fund transfers, real-time transaction monitoring, and detailed transaction history tracking. This decentralized approach not only enhances security and accountability but also builds a high level of trust between fundraisers and contributors, making the system suitable for modern, transparent, and reliable crowdfunding applications [1], [7], [22].

II. RELATED WORK

Blockchain-based crowdfunding introduces a more secure and transparent alternative by eliminating centralized control and ensuring reliable fund management [1], [7], [11]. Modern crowdfunding platforms involve three key participants: the project

creator, the contributors, and the platform that connects them [23]. The proposed work implements a secure crowdfunding application that protects user data using lattice-based cryptographic encryption and verifies user identity through zero-knowledge proofs, enhancing resistance against cyber-attacks and data tampering [14], [22]. This model supports a wide range of initiatives, including startups, healthcare, creative works, and social enterprises [2], [5]. Additionally, machine learning techniques are applied to predict campaign success, helping contributors make informed investment decisions and improving overall trust in the crowdfunding process [20], [21].

Crowdfunding is a financing model in which funds are collected from a large number of individuals to support projects or business ideas through online platforms [23]. Although numerous crowdfunding platforms exist, many suffer from issues such as lack of transparency, false commitments, and inadequate accountability, which significantly reduce investor trust [8], [11]. Prior studies indicate that a higher volume of updates related to external certifications, marketing activities, or team-related information may be associated with an increased risk of venture failure [12]. Unlike earlier research that primarily focused on campaign performance during fundraising, recent findings reveal that offering a larger equity share is positively correlated with post-campaign survival [16]. Conversely, campaigns characterized by numerous large individual investments or excessive progress updates exhibit a higher probability of failure [12].

Further analysis suggests that campaigns highlighting the chief executive officer's educational background and providing frequent business-oriented updates tend to experience a lower likelihood of failure, supporting earlier research on effective fundraising signals [24]. However, these findings also suggest that crowd investors may rely on misleading indicators, raising concerns regarding rational decision-making in crowdfunding environments [12]. The analysis is based on a manually compiled dataset of 88 equity crowdfunding campaigns conducted on Companisto, a leading German platform, encompassing over 64,000 individual investments and 742 campaign updates [12]. Post-campaign performance is evaluated based on venture survival, enabling a comprehensive assessment of the effectiveness of signalling mechanisms in equity-based crowdfunding [16].

The primary objective of this study is to examine the challenges faced by the crowdfunding sector using a descriptive research approach based on secondary data sources such as research articles, official websites, and published reports [2], [8]. In the Indian



context, participation in crowdfunding is regulated by the Securities and Exchange Board of India (SEBI), which restricts participation primarily to eligible and accredited investors, such as high-net-worth individuals, to mitigate financial risk and protect investor interests [2], [5]. Crowdfunding, a form of crowdsourcing introduced in the early 2000s, has since expanded globally with numerous platforms operating across international markets.

By lowering entry barriers, crowdfunding enables young and aspiring entrepreneurs to launch and scale their ventures while offering investors alternative investment opportunities and portfolio diversification [9], [10]. Recent studies highlight the significant challenges faced by crowdfunding platforms during the COVID-19 pandemic, emphasizing its socio-economic impact across various sectors [5]. SEBI has identified several regulatory factors that influence the structure and functioning of crowdfunding in India, aiming to balance investor protection with economic growth while minimizing systemic risks.

This blockchain-based approach fundamentally differs from conventional solutions by providing a highly secure, transparent, and reliable crowdfunding platform [1], [3], [6]. The system incorporates advanced features such as a donor voting mechanism and an automated alert service that notifies users via email when blockchain gas fees are low, improving usability and cost efficiency [25]. By leveraging Ethereum-based smart contracts, all financial transactions and operational rules are executed automatically and securely, ensuring fund protection, transparency, and accountability throughout the crowdfunding lifecycle [3], [22].

III. DATASET DETAILS

This information is recorded at the time of user registration through the signup module and remains permanently stored on the blockchain. The dataset primarily consists of user-related data and transaction-related data stored through smart contracts developed using Solidity and deployed on the Ethereum blockchain. User data includes unique user identifiers, usernames, authentication credentials (stored in encrypted or hashed form), and associated blockchain wallet addresses.

Unlike traditional datasets stored on centralized servers, this dataset is distributed across multiple blockchain nodes and is immutable due to cryptographic hash linking of blocks. The dataset used in the Trusted Crowdfunding with Blockchain Technology project is generated and maintained within a decentralized blockchain environment,

ensuring integrity, transparency, and security of all records.

Each transaction is stored as a separate blockchain entry and is validated across multiple nodes, preventing unauthorized modification. Transaction data forms the core of the dataset and includes details such as transaction ID, sender blockchain address, receiver blockchain address or linked bank account, transferred amount, transaction purpose, timestamp, and transaction type (deposit, withdrawal, or peer-to-peer transfer).

This decentralized dataset ensures high reliability, traceability of funds, and complete transparency for both fundraisers and contributors. All data entries are created in real time through user interactions with the Django-based web application and are accessed programmatically using Python by referencing the deployed smart contract address. Statement records are dynamically retrieved from the blockchain to display complete transaction histories for individual users. Additionally, the dataset includes bank linkage records, which map a user's blockchain wallet to their registered bank account details in a secure manner.

IV. PROPOSED METHODOLOGY

In this project, a decentralized blockchain framework is used where all user information and transaction records are stored as immutable blocks across multiple network nodes. Smart contracts developed using Solidity are deployed on the Ethereum blockchain to manage core functionalities such as user registration, fund addition, peer-to-peer transfers, bank account linkage, and transaction history maintenance. Each transaction is linked with a unique cryptographic hash, enabling instant detection of any unauthorized modification. These contracts automatically enforce predefined rules without the involvement of intermediaries.

Every financial activity is permanently recorded on the blockchain and can be viewed through a statement module that displays complete transaction details along with the purpose of each transfer. To enable user interaction with the blockchain, a Django-based web application is developed using Python. New users can register and log in, deposit funds into their blockchain wallet, transfer money to linked bank accounts, or send funds to other blockchain users. By integrating decentralized blockchain storage with smart contracts and a web interface, the proposed methodology ensures secure fund management, full transparency, and enhanced user trust in crowdfunding platforms.



In conventional crowdfunding systems, all user details and financial transactions are maintained on a single centralized server, which makes the platform vulnerable to data manipulation, fund misuse, and lack of transparency. To overcome these limitations, the proposed work adopts blockchain technology to ensure secure, transparent, and tamper-proof crowdfunding operations. Crowdfunding is a digital fund-raising approach in which multiple users contribute small amounts of money through online platforms to support business ideas, social causes, or personal projects. Contributors often do not have clear visibility into how their funds are utilized, leading to reduced trust in such platforms.

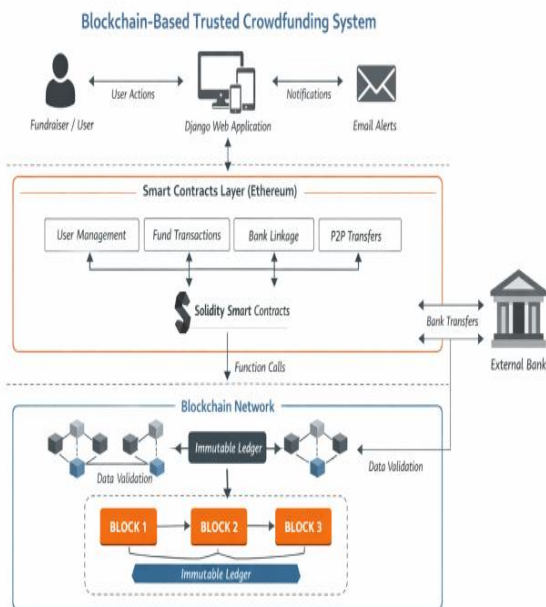


Figure 1: Work Flow of Trusted Crowdfunding

V. RESULT AND DISCUSSION

The system begins with the User Signup module, where new users register by providing their details. These registration details are securely stored in the blockchain using smart contracts, ensuring immutability and preventing unauthorized modification. The Trusted Crowdfunding with Blockchain Technology system is implemented with multiple functional modules to ensure secure, transparent, and tamper-proof fund management.

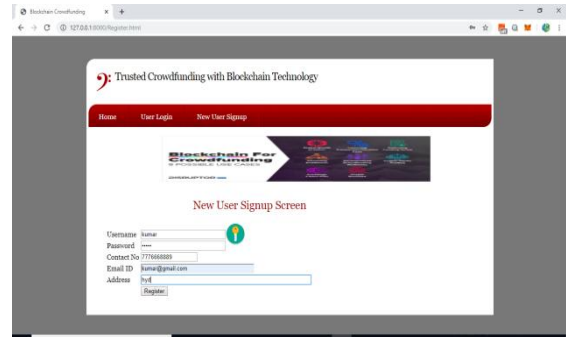


Figure 2: Web Page of User Signup for Trusted Crowdfunding with Blockchain Technology

After user sign up, we will login as a user those password and user name in blockchain. Then Add Money to Blockchain module allows users to deposit funds into their blockchain wallet, & the deposited money is recorded as a blockchain transaction with a unique hash value.

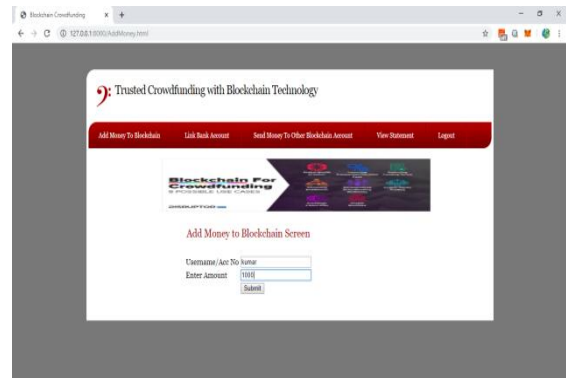


Figure 3: Add Money to Blockchain

The system also provides a Link Bank Account module, which enables users to transfer funds from their blockchain wallet to a linked bank account. After transferring funds, the blockchain balance is automatically updated, and the transaction is reflected in the statement. The View Statement module displays complete transaction details retrieved directly from the blockchain. This includes deposits, transfers, and withdrawals, ensuring full transparency.

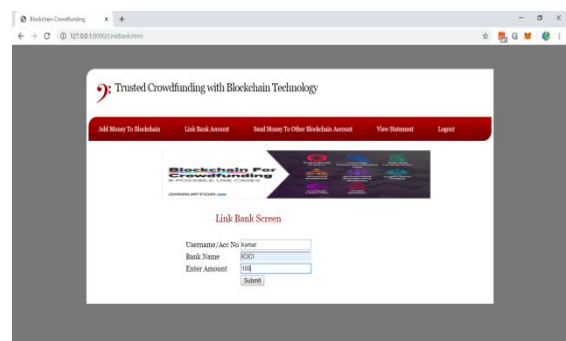




Figure 4: Link Bank Account

Transaction No	Username	Transaction Amount	Transaction Date	Available Balance	Transaction Purpose
1	umar	1000	2022-03-13	1000.0	Deposit to link account
2	umar	100	2022-03-13	900.0	Transferred to link account

Transaction No	Username	Bank Name	Transaction Amount	Transaction Date	Available Balance	Transaction Purpose
3	umar	BKCI	100	2022-03-13	100.0	Received from Blockchain account

Figure 5: View Statement

When a user selects a receiver and enters the transfer amount, the smart contract validates the transaction and updates both sender and receiver balances. This operation is recorded immutably on the blockchain, allowing both parties to verify the transaction history. Another important feature is the Send Money to Other Blockchain Account module, which supports peer-to-peer fund transfers between registered users.

Send Money to Other Blockchain Account Screen

Sender Username (Acc No)

Receiver Username

Enter amount

Figure 6: Send Money to Other Blockchain Account

Like that we can transfer money one account to another or account to bank and also we can see all transaction. All data like user name, password and all truncation saved in Blockchain securely.

DISCUSSION

Once a user signs up, their information is permanently recorded through smart contracts, preventing any post-registration data alteration. This enables users to verify their transaction history at any time, significantly improving transparency and trust. From the experimental observations, it is evident that storing user registration and transaction details on the blockchain ensures immutability and traceability. Similarly, every financial operation such as adding funds, transferring money to another

blockchain account, or linking funds to a bank account is recorded as a separate blockchain transaction.

The proposed system overcomes these issues by leveraging blockchain technology, where all user and transaction data is distributed across multiple nodes and protected using cryptographic hash mechanisms. The proposed system overcomes these issues by leveraging blockchain technology, where all user and transaction data is distributed across multiple nodes and protected using cryptographic hash mechanisms. The implementation of the Trusted Crowdfunding with Blockchain Technology system clearly demonstrates how decentralization can effectively address the major limitations of conventional crowdfunding platforms.

These results suggest that blockchain-based crowdfunding platforms can serve as a robust and scalable alternative to centralized fundraising systems, especially in applications where trust and transparency are critical. The system successfully detects and prevents fund misuse, ensures accountability, and builds user confidence. Overall, the discussion indicates that the integration of Ethereum smart contracts with a Django-based web application provides a secure and user-friendly environment for crowdfunding activities.

The bank linkage feature further extends system usability by allowing real-world fund withdrawals while maintaining a transparent on-chain record of such transactions. Funds are transferred directly between users through smart contracts, reducing dependency on third-party authorities and minimizing operational risks. The peer-to-peer fund transfer module highlights the strength of blockchain in eliminating intermediaries.

VI. CONCLUSION

Integration with a Django-based web application allows users to interact with the blockchain easily while maintaining a user-friendly interface. The use of Ethereum smart contracts developed in Solidity enables automated and reliable execution of core crowdfunding operations such as user registration, fund deposits, peer-to-peer transfers, bank account linkage, and transaction history management. Every operation is permanently recorded on the blockchain with unique hash values, ensuring immutability and complete traceability of funds. The ability to view detailed transaction statements and purposes further enhances user trust. Overall, the proposed blockchain-based crowdfunding platform offers a robust, secure, and transparent solution that can significantly improve confidence in online fundraising systems and serve as a reliable



alternative to conventional centralized crowdfunding models. Experimental results confirm that the system effectively prevents unauthorized data modification, improves accountability, and provides users with real-time visibility of fund usage.

In existing systems, fund management relies on a single server, which increases the risk of data manipulation, lack of transparency, and misuse of funds. By adopting a decentralized blockchain-based approach, the proposed system ensures secure, transparent, and tamper-proof handling of user and transaction data. This project successfully demonstrates the design and implementation of a Trusted Crowdfunding System using Blockchain Technology to overcome the limitations of traditional centralized crowdfunding platforms.

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