

Crowdfunding Using Blockchain

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Abstract

Crowdfunding has emerged as a powerful mechanism for raising funds for startups, social initiatives, and creative projects. However, traditional crowdfunding platforms are centralized, relying on intermediaries to manage funds and transactions, which often leads to issues such as lack of transparency, high service fees, delayed fund release, and potential fraud. To address these limitations, this paper proposes a decentralized crowdfunding system using blockchain technology. By leveraging smart contracts, the proposed system enables trustless, transparent, and secure fund management without the need for a central authority. All transactions are recorded on an immutable distributed ledger, ensuring accountability and real-time tracking of funds. Smart contracts automatically enforce campaign rules, including funding targets, deadlines, and refund mechanisms, thereby reducing human intervention and operational costs. The decentralized approach enhances security, prevents fund misuse, and builds greater trust between project creators and contributors. This system demonstrates how blockchain can revolutionize crowdfunding by creating a transparent, efficient, and reliable funding ecosystem.

Keywords: Blockchain, Decentralized Crowdfunding, Smart Contracts, Cryptocurrency, Transparency, Distributed Ledger, Ethereum, Fundraising, Trustless Systems.

1. INTRODUCTION

Crowdfunding is an innovative fundraising method that enables startups, entrepreneurs, social organizations, and individuals to raise funds by collecting small contributions from a large number of people through digital platforms. It has gained significant popularity due to its ability to support innovation, social causes, creative projects, and emergency needs without relying on traditional financial institutions.

However, most existing crowdfunding platforms follow a centralized model, where a single authority manages campaigns, controls fund flow, and verifies transactions.

This structure leads to several challenges such as lack of transparency, high transaction and platform fees, delayed fund disbursement, and potential fund misuse or fraud. Contributors often have limited visibility and control over how their funds are utilized, which can reduce trust in the system.

To address these limitations, Blockchain Technology introduces a decentralized crowdfunding approach that operates without intermediaries. By using a distributed and immutable ledger, blockchain ensures that all fundraising transactions are secure, transparent, and tamper-proof. Additionally, Smart Contracts automate the crowdfunding process by enforcing predefined

rules such as funding targets, deadlines, and refund mechanisms, ensuring fair and trustworthy execution.

Decentralized blockchain-based crowdfunding empowers contributors by giving them greater control and visibility over their investments. Unlike traditional platforms, contributors can independently verify transactions, monitor real-time fund flow, and ensure that their contributions are used strictly for the intended purpose. The use of cryptographic security further protects user data and financial assets from unauthorized access. By combining decentralization, automation, and transparency, blockchain-based crowdfunding not only improves trust between contributors and project creators but also encourages wider participation in global, borderless fundraising ecosystems.

The decentralized crowdfunding using blockchain provides a secure, transparent, and efficient fundraising ecosystem that enhances trust, accountability, and fairness, making it a promising solution for modern digital and financial applications.

2. LITERATURE SURVEY

Crowdfunding has emerged as a popular method for raising funds by collecting small contributions from a large number of people through online platforms. Traditional crowdfunding systems rely on centralized platforms, which often suffer from problems such as lack of transparency, high transaction fees, fraud, and limited trust. To overcome these issues, researchers have proposed integrating blockchain technology into crowdfunding systems. Blockchain is a decentralized and distributed ledger technology that ensures transparency, immutability, and security. The combination of crowdfunding and blockchain has gained significant attention in recent years due to its potential to improve trust and efficiency in fundraising systems.

Traditional Crowdfunding Systems earlier studies analyze popular platforms like Kickstarter and GoFundMe, which function under centralized control. These platforms are responsible for handling user registration, payment processing, and fund distribution. While they simplify fundraising, literature identifies several drawbacks such as non-transparent fund utilization, dependency on third-party intermediaries, high platform and transaction fees, and the risk of fake or fraudulent projects. Additionally, centralized platforms may impose geographical and banking restrictions, limiting global participation. These limitations motivated researchers to investigate decentralized crowdfunding alternatives. Emergence of Blockchain Technology is described in the literature as a distributed ledger system where transactions are validated by multiple nodes rather than a single authority. Researchers emphasize key blockchain characteristics such as decentralization, immutability, cryptographic security, and transparency. These features make blockchain highly suitable for financial and trust-sensitive applications. Several studies conclude that blockchain significantly reduces data manipulation, enhances system reliability, and increases participant confidence in digital transactions. Blockchain-Based Crowdfunding Models numerous researchers have proposed blockchain-based crowdfunding frameworks where smart contracts control the entire fundraising lifecycle. Smart contracts are self-executing programs deployed on the blockchain that automatically enforce predefined rules. According to the literature, these smart contracts can automatically collect contributions, verify funding targets, release funds when conditions are met, and refund contributors if the campaign fails. This automation improves system reliability, reduces human intervention, and eliminates the need for intermediaries. Research Gap based on the surveyed literature, it is evident that although many conceptual models and prototype systems have been proposed, real-world implementations of blockchain-based crowdfunding platforms remain limited. There is a significant research gap in developing systems that balance usability,

scalability, and regulatory compliance. Future research should focus on hybrid architectures, user-friendly interfaces, and secure, scalable smart contract frameworks to ensure wider adoption.

3. METHODOLOGY

The methodology of the focuses on designing and implementing a decentralized crowdfunding platform using blockchain technology to address the limitations of traditional centralized crowdfunding models. The development process begins with a detailed analysis of existing crowdfunding systems to identify issues related to transparency, security, centralized control, and manual fund management. Based on this analysis, system requirements and objectives are clearly defined.

Campaign Creation & Verification

Campaign Creation and Verification is the first and most important stage in a decentralized crowdfunding system using blockchain. In this phase, a fundraiser, which can be an individual or a non-governmental organization (NGO), creates a crowdfunding campaign by providing essential details such as the campaign title, funding goal, purpose of fundraising, and campaign duration. Once these details are submitted, a smart contract is automatically generated and deployed on the blockchain. The smart contract verifies the validity of the campaign information by checking predefined rules such as minimum funding limits, campaign duration, and data completeness. After verification, the campaign is listed on the platform and becomes visible to donors. Since the campaign details are stored on the blockchain through the smart contract, they cannot be altered or manipulated later. This immutability ensures transparency, prevents fraudulent campaign modifications, and builds trust among donors, as they can be confident that the campaign rules and objectives will remain unchanged throughout the fundraising process.

Smart Contract-Based Fund Management

Smart Contract-Based Fund Management is a core component of the decentralized crowdfunding system that ensures secure, automated, and transparent handling of funds. In this approach, all contributions made by donors are directly transferred to and stored within a smart contract deployed on the blockchain, rather than being controlled by a centralized authority. The smart contract acts as an autonomous escrow that holds the collected funds until predefined conditions are satisfied. These conditions may include achieving the minimum funding goal within a specified time or completing predefined project milestones. Once the conditions are met, the smart contract automatically releases the funds to the campaign owner without any manual intervention. In the case of milestone-based funding, the total amount is released in stages after verification of progress, ensuring responsible utilization of funds. If the conditions are not fulfilled, the smart contract can automatically refund the contributors. This mechanism eliminates human interference, reduces the risk of fund misuse or fraud, and guarantees transparency and trust in the crowd funding process.

Fraud Prevention & Security

Fraud Prevention & Security is a crucial aspect of a decentralized crowdfunding system using blockchain technology. In this system, all transactions and campaign records are stored on an immutable blockchain ledger, meaning that once data is recorded, it cannot be altered or deleted. This immutability prevents fund manipulation, unauthorized changes, and false reporting by campaign owners. Smart contracts further enhance security by automatically

enforcing predefined rules for fund collection, storage, and release, thereby eliminating human intervention and reducing the risk of fraud. Cryptographic techniques used in blockchain ensure secure transactions and protect user identities and funds from unauthorized access. Additionally, the transparency of blockchain allows donors to verify every transaction, which increases accountability and discourages fraudulent activities. Overall, these security mechanisms create a trustworthy environment where funds are protected and used only for their intended purposes.

Donor Contribution

Donor Contribution is the process through which contributors participate in the decentralized crowdfunding system using blockchain technology. In this stage, donors connect their Web3 wallets, such as MetaMask or WalletConnect, to the crowdfunding platform. After selecting a campaign, they contribute funds in the form of cryptocurrency, which is sent directly to the campaign's smart contract. Each donation is verified by the blockchain network and permanently recorded on the distributed ledger, making the transaction transparent and tamper-proof. This peer-to-peer contribution model eliminates intermediaries, reduces transaction costs, and allows donors from anywhere in the world to securely support campaigns while maintaining full visibility of how their contributions are handled.

Real-Time Fund Tracking & Transparency

Real-Time Fund Tracking & Transparency is a key feature of a decentralized crowdfunding system enabled by blockchain technology. Since all transactions are recorded on the blockchain, donors can monitor fund movement in real time, including the total amount collected, funds released, and remaining balance. This transparent ledger allows contributors to verify how and when their donations are used. Additionally, campaign owners are required to submit proof-of-utilization, such as progress reports or expense records, which are stored on-chain or in decentralized storage. This ensures accountability, builds donor trust, and minimizes the risk of fund misuse by providing complete visibility into the fundraising and fund utilization process.

Decentralized Governance & Decision-Making

It is a system where decisions are made collectively by users instead of a central authority. Using blockchain and smart contracts, participants can vote transparently and securely. This ensures fairness, trust, and community control over the system.

4. PROPOSED PLAN OF WORK

The proposed plan of work describes a systematic and phased approach adopted for the design, development, and evaluation of the blockchain-based crowdfunding system. Each phase is carefully structured to ensure smooth execution of the project and successful achievement of research objectives.

Phase I – Requirement Analysis and Problem Identification

The first step of the proposed plan of work involves identifying the limitations of traditional centralized crowdfunding platforms, such as lack of transparency, high service fees, dependency on third-party intermediaries, and increased risk of fraud. During this phase, detailed requirements of the system are gathered by studying existing crowdfunding models and blockchain-based solutions. Functional requirements such as campaign creation, donation processing, fund tracking, and refund mechanisms are defined, along with non-functional

requirements like security, scalability, and reliability. This phase helps in clearly understanding the problem and forming the foundation for a decentralized solution.

Phase II – System Design and Architecture Planning

In this phase, the overall system architecture of the decentralized crowdfunding platform is designed. The architecture includes a blockchain network, smart contracts, decentralized storage, and a user-friendly interface. Smart contracts are planned to automate campaign creation, donation handling, fund release, and refund operations. The blockchain layer ensures immutability and transparency, while the front-end allows users to interact with the system easily. Proper data flow diagrams and architectural models are prepared to visualize interactions between users, blockchain, and smart contracts.

Phase III – Smart Contract Development

The third phase focuses on the development of smart contracts using blockchain platforms such as Ethereum. Smart contracts are programmed to define the rules and conditions of crowdfunding campaigns, including funding targets, deadlines, and fund distribution policies. Once deployed on the blockchain, these contracts execute automatically without human intervention. This ensures trust among participants, as the contract code is transparent and cannot be altered. Smart contracts also handle automatic refunds to contributors if the campaign fails to reach its funding goal.

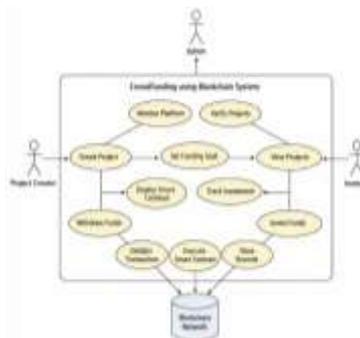
Phase IV – Campaign Creation and User Registration

In this phase, the system enables campaign creators to register and create fundraising campaigns by submitting project details, funding goals, and campaign duration. Each campaign is linked to a smart contract and recorded on the blockchain, ensuring data integrity and tamper-proof storage. User authentication mechanisms such as digital wallets are integrated to securely identify campaign creators and donors. This step ensures that only valid users can participate in the crowdfunding process.

Phase V – Implementation

Transparency, Security & Deployment phase ensures that the decentralized crowdfunding system operates in a trustworthy and reliable manner. All transactions such as campaign creation, donor contributions, fund transfers, and refunds are recorded on the blockchain, providing complete transparency and real-time fund tracking for all users. Blockchain's immutable ledger prevents data manipulation and ensures accountability. Strong security mechanisms including cryptographic hashing, digital signatures, and smart contract automation protect the system from fraud and unauthorized access.

5. USECASE DIAGRAM



6. BENEFITS AND ADVANTAGES

Transparency: In a blockchain-based crowdfunding platform, every transaction is recorded on a public, distributed ledger. This means that all contributions, fund transfers, and withdrawals are visible to everyone on the network. Contributors can track in real time how much money has been raised, who contributed (through wallet addresses), and when funds are released. Because this information is shared across multiple nodes, no single entity can secretly change or hide transaction data.

Trustless System: A trustless system in blockchain-based decentralized crowdfunding means that participants do not need to rely on trust in a central authority, platform, or even the project creator, because trust is replaced by technology. In this system, all crowdfunding rules—such as funding goals, deadlines, fund release conditions, and refund policies—are encoded into smart contracts that automatically execute on the blockchain. These smart contracts operate transparently and cannot be altered once deployed, ensuring that funds are handled exactly as promised. Transactions are verified by a decentralized network using cryptographic consensus, not by a single controlling entity, which prevents manipulation, misuse of funds. As a result, contributors can confidently participate knowing that outcomes depend on predefined rules and verifiable code rather than human decisions, making the crowdfunding process fair, secure, and reliable.

Elimination of Middlemen: The elimination of middlemen in blockchain-based decentralized crowdfunding allows contributors to send funds directly to project creators without banks or centralized platforms. This reduces transaction fees, avoids delays, and ensures more funds reach the actual project, making the crowdfunding process faster, cheaper, and more transparent.

Global Accessibility: Global accessibility in blockchain-based decentralized crowdfunding means that anyone, anywhere in the world can participate in fundraising without geographical or banking restrictions. As long as a person has internet access and a digital wallet, they can contribute or raise funds. This removes barriers such as currency exchange issues, bank approvals, and regional limitations, allowing projects to reach a worldwide audience and enabling inclusive participation from unbanked or underbanked communities.

Security: Security in blockchain-based decentralized crowdfunding ensures that funds and data are protected using cryptographic encryption and decentralized storage. Transactions are tamper-proof, immutable, and resistant to hacking, making the system safe and reliable for contributors and project creators.

Faster Transactions: Faster transactions in blockchain-based decentralized crowdfunding occur because funds are transferred directly between users without banks or intermediaries. Transactions are processed automatically by the blockchain network and smart contracts, reducing delays caused by manual approvals, paperwork, or cross-border banking procedures. As a result, funds are settled quickly and efficiently, improving the overall speed of the crowdfunding process.

Smart Contract Automation: Smart contract automation in blockchain crowdfunding means the rules of fundraising run automatically. Money is sent to the project only when goals or

milestones are met, and refunds happen automatically if not. This makes the process fair, reduces mistakes, and works without anyone managing it manually.

Reduced Fraud & Scams: Reduced fraud and scams in blockchain-based decentralized crowdfunding means that all transactions are recorded permanently on the blockchain, making them transparent and tamper-proof. Contributors can verify projects, track funds, and see transaction history, which makes it very difficult for fake projects or dishonest creators to cheat. This increases trust and ensures a safer crowdfunding environment.

7. CHALLENGES AND LIMITATIONS

Legal Issues: One of the biggest challenges of blockchain-based crowdfunding is that laws regulating blockchain and cryptocurrencies vary widely across countries, and in many places, they are still unclear. Unlike traditional banking or fundraising systems, most governments have not fully defined rules for how blockchain projects, digital tokens, or crypto-based fundraising should operate.

Technical Difficulty: Technical difficulty means using blockchain crowdfunding can be hard for beginners. Contributors need to understand wallets, private keys, and crypto transactions, while project creators must handle smart contracts and coding. Mistakes or bugs can cause lost funds, making it tricky for non-technical users.

Smart Contract Risks: Smart contract risks in blockchain crowdfunding occur when errors or bugs in the code cause funds to be lost, locked, or stolen. Since smart contracts automatically execute and blockchain transactions are irreversible, mistakes cannot be easily fixed. Proper testing, auditing, and secure coding are essential to prevent financial loss and protect contributors.

Dependence on Technology: Dependence on technology means blockchain crowdfunding relies on internet access, digital devices, and wallets. Technical issues like network outages, software bugs, or device problems can delay or block contributions, making the system inaccessible for some users, especially in areas with limited technology.

Lack of Awareness: as they may not understand wallets, smart contracts, or how to contribute safely, limiting the reach and adoption of such fundraising platforms.

No Dispute System: No dispute system means that blockchain-based crowdfunding has no central authority to resolve problems. If contributors face issues like project failure, fund misuse, or mistakes in transactions, there is no one to intervene, and participants must rely on smart contracts and pre-set rules, which may not cover all possible disputes.

8. FUTURE SCOPE

The future of blockchain-based decentralized crowdfunding is very promising as it continues to evolve with technology and adoption. It has the potential to redefine fundraising by making it more transparent, secure, and accessible globally.

Wider Adoption – As awareness of blockchain grows, more people and businesses will participate in decentralized crowdfunding, increasing contributions and supporting innovative projects worldwide.

Integration with AI and IoT – Combining blockchain with artificial intelligence and Internet of Things (IoT) can automate fund management, improve project monitoring, and provide real-time verification of milestones.

Global Inclusivity – Blockchain crowdfunding can expand to underserved or unbanked regions, allowing people without traditional banking access to contribute and raise funds.

Improved Smart Contracts – Advanced smart contracts with better security, auditability, and automation will reduce risks, improve trust, and make crowdfunding safer and more efficient.

Tokenization of Assets – Projects may offer token-based rewards or equity, giving contributors more flexibility and creating new investment opportunities.

Decentralized Governance – Future platforms may allow contributors to vote or have a say in project decisions, making crowdfunding more democratic.

9. CONCLUSION

Blockchain-based decentralized crowdfunding is a secure, transparent, and efficient way to raise funds for projects, startups, and social initiatives. By eliminating intermediaries, using smart contracts, and enabling global participation, it builds trust, fairness, and accountability. Despite challenges like legal uncertainty and technical complexity, its future potential is vast, offering faster transactions, wider adoption, and more inclusive fundraising opportunities worldwide. It represents a major step toward innovative, trustworthy, and decentralized fundraising systems

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