

Crowd Help: Blockchain based Crowdfunding Platform using SHA-256 Algorithm

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Abstract— This research delves into the practical application of blockchain technology in the context of crowdfunding. Crowdfunding has emerged as a widely embraced method for securing project funding, allowing individuals and businesses to amass capital through online platforms from a diverse range of investors and donors. Nevertheless, conventional crowdfunding platforms encounter several challenges, including exorbitant fees, a lack of transparency, and susceptibility to fraudulent activities. This study aims to explore how blockchain technology can be implemented to address these challenges and elevate the crowdfunding experience by harnessing decentralized networks and smart contracts.

Index Terms— Blockchain, Decentralized network, Smart Contracts, SHA-256

I. INTRODUCTION

Blockchain operates on a decentralized peer-to-peer network, ensuring the validation and security of information or data within the blocks. This innovative approach to crowdfunding introduces a more secure and trustworthy environment for both project creators and backers. The utilization of blockchain technology in crowdfunding not only enhances the security aspects but also brings transparency to the forefront, mitigating potential risks associated with fraud or mismanagement. As a result, this research explores the transformative impact of blockchain on crowdfunding, emphasizing its potential to revolutionize the dynamics of fundraising in a secure and decentralized manner.

A. Overview

Crowdfunding has become a prevalent approach to gather financial support from a collective of investors or individuals, catering to diverse needs like kick starting businesses, meeting educational goals, or covering medical expenses. Established crowdfunding platforms such as Kickstarter and GoFundMe have played a pivotal role in facilitating this fundraising model. However, this study seeks to optimize the crowdfunding experience by integrating block chain technology.

B. Challenges

Crowdfunding platforms encounter numerous challenges, particularly in relation to inexperienced investors and fraudulent activities. Inexperienced investors may inadvertently back fraudulent projects or become targets of scams. Fraudulent entities exploit compromised personal information to conduct illegitimate fundraising and

engage in deceptive investments. Trust poses a substantial issue in crowdfunding platforms, as investors often question the legitimacy of projects and the proper handling of funds. The prevalence of false and misleading information online amplifies these challenges. Establishing investor trust, ensuring transparency, and implementing robust measures for financial control and management emerge as pivotal aspects demanding attention within the crowdfunding ecosystem.

C. Objective

The aim of this study is to conduct an extensive examination of current blockchain-based crowdfunding platforms, with a specific emphasis on their appropriateness for investment and fundraising endeavors. Within blockchain-based crowdfunding platforms, the central objective is to instill trust among investors regarding their investments in diverse ideas and projects, all while guaranteeing the secure and accurate recording of every transaction history.

D. Background

Modern crowdfunding platforms offer funding for startups, but challenges persist with unexpected charges and fraud affecting both investors and fundraisers. In the past, even reputable platforms have faced security concerns due to cyber-attacks stemming from increased fraudulent activities.

E. Research Gap

Despite the abundance of crowdfunding platforms today, there is a notable gap in the integration of emerging blockchain technology. Blockchain-based crowdfunding holds the potential to accelerate the growth of both investors and fundraisers by addressing security concerns. This technology offers comprehensive solutions for various aspects of crowdfunding, effectively mitigating the risks associated with scams.

F. Scope

This paper employs surveys of relevant literature on blockchain technology and crowdfunding to explore the establishment of secure crowdfunding platforms. It incorporates various hashing algorithms and cybersecurity concepts, providing valuable insights for the development of robust crowdfunding platforms.

G. Expected Outcome

The expected outcome of this paper is to propose a blockchain-based crowdfunding platform that is secure, trustworthy, and reliable, benefiting all stakeholders involved. Additionally, this study will highlight the limitations and challenges of existing crowdfunding platforms, paving the way for the development of a more robust and dependable crowdfunding solution. The findings and recommendations of this paper can serve as a valuable reference for educators and trainers interested in exploring blockchain technology and its application in crowdfunding.

II. RELATED WORKS

[1] Crowdfunding, initially conceived as an online fundraising strategy, has evolved into a means for individuals to contribute to public causes and support creative projects. However, existing crowdfunding platforms grapple with challenges such as the absence of a clear payer-grantee policy and limited control over donated funds. To address these shortcomings, this paper proposes the integration of blockchain technology into crowdfunding, presenting a secure, transparent, and reliable solution. The research endeavors to introduce an iterative campaign creation process that streamlines donation and approval requests for campaign creators and donors. Through blockchain utilization, all transactions can be securely recorded and stored as blocks, ensuring transparency and preventing tampering. This incorporation of blockchain technology holds the promise of transforming the crowdfunding landscape, providing an enhanced and accountable platform for stakeholders engaged in fundraising activities.

[2] To address challenges of high fees, lack of transparency, and vulnerability to fraud, this paper advocates for the integration of blockchain technology into crowdfunding platforms. By leveraging the decentralized and transparent nature of blockchain, this implementation aims to mitigate fraud risks, reduce fees, and enhance overall transparency in crowdfunding processes. The research delves into the potential of blockchain to provide a secure and efficient framework for conducting crowdfunding transactions globally, fostering trust among participants and fostering a more robust crowdfunding ecosystem. The findings of this study are expected to contribute valuable insights to industry stakeholders, platform developers, and policymakers seeking to optimize crowdfunding practices through technological innovation.

[3] The rapid growth of crowdfunding can be attributed to both the 2008 financial crisis and technological advancements. Crowdfunding involves raising funds for ideas, businesses, or organizations online, providing contributors with monetary or non-financial incentives. Blockchain technology establishes a decentralized ledger that securely and transparently records transactions, with bitcoin being the earliest and most well-known digital currency. The transaction value of crowdfunding has surged into the billions and is expected to continue growing. While the United States dominates blockchain investments, China leads in transaction value. Although there are numerous blockchain-based crowdfunding platforms, sustaining them remains a challenge. Approaches like the pay-it-forward model, exemplified by WHIRL, hold promise for sustainability and positive impact in the blockchain crowdfunding space.

The COVID-19 pandemic posed challenges for organizations seeking to raise funds to support government initiatives and aid those in need. Trust became a pivotal factor for funders, fundraising platforms, and organizers engaged in these endeavors. This study delved into the application of blockchain technology and smart contracts in key crowdfunding processes. The results suggest that incorporating blockchain-based smart contracts can be a successful strategy in crowdfunding operations. This integration offers a prospect to elevate transparency, security, and trust within the crowdfunding ecosystem. Through the utilization of blockchain, organizations can enhance the efficiency and reliability of their fundraising initiatives.

Crowdfunding initially emerged as an online avenue for garnering modest donations to support young entrepreneurs. However, the existing approach lacks assurance from third-party intermediaries and deprives investors of control over their contributions. This paper introduces a blockchain-based crowdfunding platform designed to guarantee confidentiality, security, and a dedicated approach. Through blockchain, smart contracts operate collectively without the need for central authority, ensuring transparency. The security of blockchain is fortified by peer-to-peer communication and validation from a majority of nodes. Project creation and contributions become universally accessible through an internet connection. Transactions are managed by smart contracts, securely holding funds within the contracts. Blockchain empowers project managers and participants, enabling fractional contributions from donors while upholding transparency.

In the financial sector, crowdfunding supports small businesses and entrepreneurs, contributing to a country's economic competitiveness. The World Bank predicts a \$100 billion investment revenue by 2025, with an anticipated 2,260,230 global campaigns by 2020. Developing countries boast an estimated 350 million low-income families investing in public enterprises. The U.S. Small Business Administration forecasts a significant increase in the value of individual fundraising campaigns from 178,500 in 2018 to 216,230 by 2020. The traditional crowdfunding market shows steady monthly growth, with investors increasing from 5.6 million to 14.06 million between February 2017 and January 2021. Therefore, enhancing the basic structure of crowdfunding with blockchain technology is crucial for creating a transparent, secure, reliable, and conducive environment for forward-thinking nations.

Crowdfunding, initially designed to facilitate small-scale public donations for creative endeavors, has evolved into a method of internet fundraising. This project specifically concentrates on the development of a smart contract for crowdfunding utilizing blockchain technology, aiming to establish a secure, transparent, and dependable environment. The primary objective is to furnish interactive features for campaign creation, donation, monitoring, request approval, and finalization.

Students have the opportunity to trade their prospective revenue entitlements on the platform with global investors, converting investments into tokens. The technology meticulously monitors both investors and students, ensuring data precision. The initiative champions a decentralized and interoperable architectural framework tailored to meet the needs of learners, educational institutions, and prospective investors. As a proof of concept, a prototype was developed using Java 8 SE.

Crowdfunding stands out as an innovative financing method spanning commercial, cultural, and social ventures. It involves the request for financial support in exchange for future products, services, or equity. The transformative influence of social media and the internet has redefined how entrepreneurs interact with investors and collaborators during fundraising efforts. Technology, particularly the internet and social media, plays a crucial role in facilitating crowdfunding activities, expanding the outreach of entrepreneurs and nonprofit organizations to a wider audience. The emergence of novel crowdfunding platforms further broadens fundraising possibilities.

Crowdsourcing stands as a widely adopted fundraising method, yet it grapples with numerous challenges and impediments. Information asymmetry, marked by disparate access levels to information among stakeholders, is a prevalent issue in crowdfunding. This research seeks to bolster contributor trust by harnessing blockchain technology to amplify transparency and mitigate information asymmetry within a crowdfunding platform. The study delves into the implications of implementing blockchain, particularly Ethereum smart contracts, in the

context of a crowdfunding system. The examination is concentrated on comprehending the outcomes and advantages associated with the integration of blockchain technology into the crowdfunding process

The growing interest in blockchain-based solutions is driven by their secure, trustworthy, and decentralized features, which bring increased efficiency compared to conventional methods. However, traditional approaches face issues related to network complexity and inadequate security measures. The incorporation of blockchain technology in various industries addresses these challenges, providing enhanced security, transparency, efficiency, and reduced fraud risks. Despite these benefits, there is a slow adoption rate due to limited awareness and understanding of blockchain technology. This paper aims to highlight the differences between traditional crowdfunding platforms and their blockchain-based counterparts, emphasizing the advantages of integrating blockchain networks.

Crowdfunding is categorized into three types: donation-based, equity-based, and reward-based. In a blockchain system, each block encompasses the hash of the preceding block, transaction data, nonce value, and a block hash, ensuring secure payment methods on crowdfunding platforms. Permissioned blockchains mandate authorized users to publish blocks, whereas permissionless blockchains permit anyone to publish without seeking approval from authorities. Key features of blockchain include SHA-256 encryption, public and private keys, a distributed public ledger, proof of employment, and mining.

Trust is crucial in corporate partnerships, and blockchain technology offers a novel means to enhance trust and streamline processes. Sectors like finance, healthcare, supply chains, and crowdfunding have seen transformation through accessible and reliable data. Blockchain-based crowdfunding systems enable secure and transparent transactions by eliminating intermediaries. To trace and ensure the proper use of donations, this article proposes establishing a reliable blockchain system.

TABLE I-LITERATURE SURVEY

Sr. No.	Publication Year	Paper Name	Review/Technique Use
1	2019	Crowd funding using blockchain	The system leverages the Ethereum blockchain, utilizing ReactJs, Next Js, and Semantic-UI for front-end development. A Campaign Factory is designed to efficiently construct new campaigns, incorporating modules for campaign generation, request submission and approval, as well as transaction completion. The existing platforms face challenges as they lack a Donor Guarantee Policy and provide users with insufficient control over their donated funds. The implementation of the mentioned technologies aims to address these issues and enhance the overall user experience in the crowdfunding system.
2	2019	Blockchain based crowdfunding Systems	The system incorporates ReactJS, NodeJS, and Solidity in its technology stack. Contracts are transformed into ABI code using the solc npm package. User interaction is facilitated through the Metamask cryptocurrency wallet. The system utilizes the Rinkeby testnet, and Infura serves as the connection to the Ethereum network. Users can perform various actions on Etherscan, including creating campaigns, making contributions, generating and approving spending requests, and reviewing transaction details. This comprehensive tech stack ensures a robust and secure environment for crowdfunding activities on the Ethereum blockchain.
3	2019	Blockchain-Based Crowdfunding: A 'Pay-it-Forward' Model of WHIRL	WHIRL, a crowdfunding platform, aims to cultivate a cycle of generosity and giving through its unique approach. In a pay-it-forward model, users support other projects before launching their own. The platform is expanding its capabilities to include cash deposits alongside various cryptocurrencies. Users' funding caps for their own projects are determined by the karma points earned through their contributions. To increase the chances of successful funding, WHIRL strategically focuses on showcasing a limited number of campaigns at any given time, creating a more concentrated and impactful crowdfunding experience.
4	2020	Smart Contract and Blockchain forCrowdfunding Platform	Library research methodology is used. In order to improve data verification, get rid of reliance on third parties, and speed up the submission and disbursement of funds, considering the potential application of smart contracts and blockchain technology.

5	2020	Venturing Crowdfunding using smart Contracts in Blockchain	A voting system, spending requests, and project creation are all handled by the smart contract. The smart contract is created in Solidity and then compiled and deployed using Metamask for transactions on the Ethereum blockchain.
6	2020	Bit Fund: A blockchain-based crowdfunding platform for future smart and connected nation	Blockchain is used in the suggested decentralised crowdfunding paradigm to securely store confidential project materials. To maintain data integrity, authenticity, and developer reputation, it uses cryptographic hash functions, digital signatures, and a consensus algorithm (Proof of Virtual Voting).
7	2020	Application Of Blockchain Technology of Crowdfunding Using Smart Contract	The proposed algorithm provides a systematic guide for creating and deploying smart contracts, interacting with campaigns, contributing funds, and approving spending requests. Furthermore, it details the installation and configuration steps for essential tools like the MetaMask wallet, Infura key, Atom code editor, and Ethereum platform.
8	2020	TEduChain: a blockchain-based platform for crowdfunding tertiary education	The TEduChain platform is employed for educational fundraising, utilizing a mining method to generate revenue for students. It employs SHA-256 hashing to link blocks, ensuring the integrity of the blockchain. The platform distributes contract information to stakeholders, validating the blockchain in the process. Notably, it allows modifications to personal information while preserving the immutability of contract conditions
9	2021	Role of Blockchain Technology in Crowdfunding (International Banking and Finance)	The outcome is a comprehensive article that combines descriptive and analytical elements to explore the impact of crowdfunding. It delves into the limitations of existing platforms, highlighting their drawbacks. Moreover, the article contemplates the potential intersection of blockchain technology with crowdfunding, providing insights into how blockchain could address the challenges faced by current platforms.
10	2021	Applying Ethereum Smart Contracts Blockchain-Based Crowdfunding System to Increase Trust and Information Symmetry	Bantu is a web-based crowdfunding mechanism crafted with blockchain technology, specifically utilizing Ethereum smart contracts for secure and traceable transactions. The system is built on the Solidity programming language, integrating MetaMask for user interface interactions and Infura for seamless connectivity with the Ethereum network.
11	2021	Decentralized Crowdfunding Platform Using Ethereum Blockchain Technology	The suggested approach builds a decentralised crowdfunding platform using the Ethereum blockchain and smart contracts. Compared to conventional crowdfunding techniques, it improves security, efficiency, and fraud protection while giving contributors control over their money.
12	2021	Decentralized Funding Platform Based on Blockchain Technology	The proposed technique makes use of Java to create the blockchain, the Flask frontend framework, and MySQL to store meta-information. It offers decentralisation, security, and transparency, enabling funders to track their transactions and ensure the funds are directed to the right campaigners.
13	2021	Blockchain solution to improve trust in crowdfunding systems	Smart contracts are used to lock donations in, and they can only be used after being approved by legitimate sources. Registration, validation, publication, donation, fulfilment of stakeholder requests, and donation monitoring are all parts of the process. all included in the proposed
14	2022	Block Chain Base CrowdFunding using Ethereum	The study involves library research and references international and national periodicals. The crowdfunding flow process includes registration, donation, and disbursement stages, with variations such as All-or-Nothing, Keep-It-All, and Stretched Goals schemes.

III. TECHNOLOGIES USED

1.MetaMask: MetaMask, a highly utilized browser extension, plays a crucial role in the essential functionality of blockchain-based crowdfunding platforms. functioning as a protocol, MetaMask enables users to interact effortlessly with the Ethereum blockchain and decentralized applications (dapps) built on it. through the secure storage and management of private keys, MetaMask ensures a reliable and user-friendly experience for individuals engaging in crowdfunding campaigns.

2.Stellar: Stellar, an alternative blockchain platform, offers another avenue for crowdfunding with its notable features such as rapid transaction speeds and low transaction fees. Developers exploring crowdfunding options may find Stellar to be a viable choice due to its efficient transaction processing capabilities. Additionally, Stellar has its native token known as lumens (XLM), which can be leveraged within crowdfunding campaigns.

3. *EOS*: EOS, a blockchain platform designed explicitly for decentralized application (dApp) development, features a unique consensus mechanism called delegated proof of stake (DPoS). This consensus algorithm facilitates swift transaction processing and maintains low transaction fees, making EOS an appealing choice for crowdfunding ventures. By utilizing EOS, users have the capability to generate and release tokens on its blockchain, presenting these tokens for purchase to potential investors. This functionality within the EOS ecosystem streamlines the crowdfunding process, creating an environment conducive to efficient project funding and increased investor participation.

4. *Ethereum*: Ethereum, a widely acknowledged blockchain platform, plays a pivotal role as the underlying infrastructure for decentralized applications (dapps) within the crowdfunding domain. Developers can capitalize on its robust framework, employing the Solidity programming language to craft bespoke smart contracts tailored to the unique requirements of crowdfunding initiatives. These smart contracts, by design, enable secure and transparent transactions, thereby establishing a dependable foundation for the success of crowdfunding campaigns.

IV. ALGORITHM /TECHNIQUES

The Crowd Help crowdfunding platform relies on the SHA-256 cryptographic hash function to uphold the security and integrity of transactions and data. SHA-256, a widely adopted and highly secure hashing algorithm, produces a fixed-size, unique hash value for any given input. This algorithm is employed within the CrowdHelp platform to hash various transactional data, such as user information, donation amounts, and campaign details. The resulting hashed data is securely stored in blocks on the blockchain, ensuring the information's immutability and integrity. Any attempt to modify the data would generate a distinct hash value, effectively preventing alterations without detection.

In comparison to other SHA algorithms, such as SHA-1 or SHA-512, SHA-256 provides distinctive advantages. Its larger 256-bit hash size enhances resistance against collision attacks, where different inputs yield the same hash output. This significantly reduces the likelihood of collisions, thereby strengthening the security of the CrowdHelp platform. Additionally, SHA-256 is computationally efficient, enabling faster hashing performance. This equilibrium between security and efficiency makes SHA-256 well-suited for applications like CrowdHelp, where both speed and security are critical.

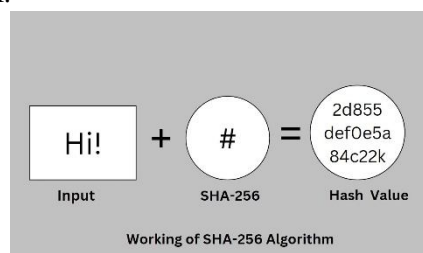


Figure 1. Working of SHA-256 Algorithm

V. SYSTEM ARCHITECTURE AND WORKING OF CROWD-HELP PLATFORM

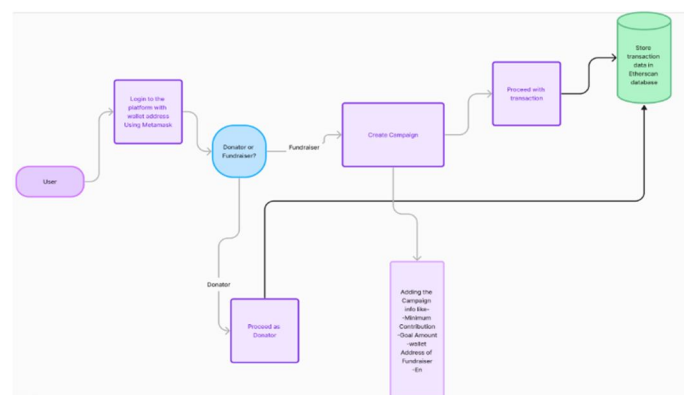


Figure 2. Crowd-Help platform system architecture.

User Login

1. *MetaMask Integration*: Users log in to the crowdfunding platform using their MetaMask accounts, ensuring a secure and decentralized connection.
2. *Wallet Address Linking*: After logging in, users link their MetaMask wallet addresses to the crowdfunding platform, enabling seamless and secure transactions.

Fundraiser

1. *Campaign Creation*: Users can choose to become fundraisers and create new campaigns by providing essential details.
2. *Campaign Information*: Fundraisers specify campaign details, including the minimum contribution amount, campaign expiry date and time, fundraising goal, and a description of the campaign.
3. *Banner URL (Optional)*: Fundraisers have the option to add a banner URL to enhance the visibility and appeal of their campaigns.
4. *Gas Fee Payment*: Fundraisers pay the necessary gas fee for transaction processing, ensuring the inclusion of their campaign details in the blockchain.
5. *Campaign Addition to Homepage*: After successful creation and payment, the new campaign is added to the platform's homepage for visibility to potential contributors.

Donator

1. *Campaign Selection*: Donators browse through the available campaigns on the platform and choose the one they want to contribute to.
2. *Contribution Amount*: Donators select the amount they wish to contribute to the chosen campaign, providing flexibility in their support.
3. *Transaction Process*: The selected contribution is transferred to the campaign, and the transaction runs until completion or the campaign expiry date.

Etherscan

1. *Transaction Visibility*: All transactions, including sender and receiver details, are transparently recorded and accessible on Etherscan.
 2. *Transaction History*: Users can view their transaction history on Etherscan, ensuring complete transparency and traceability of their contributions and campaign activities.
- By following these steps, users can seamlessly engage with the crowdfunding platform, whether as fundraisers creating campaigns or as contributors supporting various causes. The integration with Metamask and Etherscan adds an extra layer of security and transparency.

VI. CONCLUSION

The investigation conducted in this study delves into the potential applications of blockchain technology within crowdfunding platforms. A thorough analysis of previous research has provided valuable insights into how blockchain can significantly transform crowdfunding, elevating its dependability, security, and transparency for investors. It's important to acknowledge that, being a relatively new technology, blockchain might initially disrupt current models, and its ongoing evolution could give rise to a more inclusive ecosystem that incorporates both centralized and decentralized approaches. As blockchain continues to progress, additional research and practical implementation will be essential to fully leverage its advantages in the context of crowdfunding platforms.

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