Fund Mela: A Donation based Crowdfunding Podium through Blockchain

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Abstract

Crowdfunding is a transformative fundraising method, enabling the collection of small contributions from a large audience, often facilitated through online platforms. This approach, leveraging the collective support of a diverse crowd, offers individuals, entrepreneurs, and organizations an alternative to traditional financial intermediaries for financing their projects. Recently, crowdfunding has become a potent tool for funding innovative ventures, yet faces challenges related to transparency and security. In response, this system proposes a blockchain-based crowdfunding platform, employing smart contracts, decentralized identity, and a tokenized system to enhance transparency and trust. The platform's key features include smart contracts governing the crowdfunding process, a user-friendly interface for campaign creation with details on proposed system goals, and seamless integration with cryptocurrency payment gateways, ensuring a transparent and trustworthy ecosystem for both project creators and backers.

Keywords: blockchain, crowdfunding, cryptocurrency, smart donations.

1.   Introduction

Crowdfunding, a method of aggregating capital through small contributions from a vast online audience, has fundamentally transformed the funding landscape for entrepreneurs and innovators. By sidestepping traditional financial institutions, crowdfunding has democratized access to funds, enabling a more extensive reach. This research introduces an innovative crowdfunding platform that harnesses the capabilities of blockchain technology, redefining the dynamics of funding and managing creative projects. Traditional crowdfunding platforms grapple with issues of trust, transparency, and security. The proposed platform addresses these challenges by integrating blockchain—a decentralized and immutable ledger—creating a secure and transparent environment for both project creators and backers.

Blockchain technology not only addresses critical issues faced by traditional platforms but also democratizes access to capital, a fundamental advantage of blockchain-based crowdfunding. The

proposed platform leverages smart contracts, ensuring automatic and transparent execution of agreements between project creators and backers. This not only diminishes the reliance on intermediaries but also establishes accountability by releasing funds exclusively upon achieving predetermined project milestones.

The research delves into the potential impact of blockchain-based crowdfunding on creative industries, empowering entrepreneurs, artists, and innovators. By eliminating barriers to funding and fostering a sense of community engagement, the platform promotes a more inclusive and diverse landscape for creative ventures. Entrepreneurs and startups worldwide, irrespective of their location or background, can access a global pool of investors and backers, encouraging innovation and creativity. Furthermore, blockchain-based crowdfunding introduces tokenization, representing assets or project shares as digital tokens on the blockchain. These tokens can be seamlessly traded on cryptocurrency exchanges, establishing a fluid market.

2.   Literature Survey

cities. Li and Li [1] proposed a blockchain-based crowdfunding system that incorporates a reputation-based mechanism for managing crowdfunding projects. Their system addresses the challenge of information asymmetry in crowdfunding by employing reputation scores for project creators. The authors argue that utilizing reputation scores enables backers to make more informed decisions, reducing the risk of fraud. However, the system falls short in addressing transparency and accountability challenges, as it lacks mechanisms to ensure project creators are held accountable for fund usage, providing backers limited control. Additionally, potential vulnerabilities to manipulation exist if project creators can inflate their reputation scores. Yurtsever and Karaçalı [2] propose a blockchain-based crowdfunding platform incorporating a token system for investment. They posit that tokens enhance investment liquidity and diminish fraud risk. While the system allows investors to purchase tokens with cryptocurrency and trade them on exchanges, it may prove less user-friendly for individuals unfamiliar with cryptocurrency. The introduction of tokens adds complexity, potentially discouraging some investors from participating. Kshetri[3] explores the application of blockchain technology in supply chain management, emphasizing transparency and security benefits. Blockchain enables participants to trace products from origin to destination, mitigating counterfeit risks and reducing fraud. In crowdfunding, blockchain can enhance transparency and diminish intermediation costs. However, adoption hurdles include technical challenges and the need for regulatory frameworks and interoperability standards. Laporte et al. [4] propose a blockchain-based crowdfunding system emphasizing transparency and reduced intermediation costs. By eliminating intermediaries like banks, payment processors, and crowdfunding platforms, costs can be minimized. Their system involves project creators creating a smart contract specifying funding goals, project details, and deadlines. Funds are held in escrow until the goal is reached, returning to backers if not achieved. Kshetri et al. [5] advocate for blockchain in crowdfunding, particularly highlighting the benefits of smart contracts for automated fund allocation. Smart contracts reduce the need for intermediaries, increase transparency, and enable automatic fund distribution based on pre-defined conditions. Additionally, blockchain-based crowdfunding platforms can integrate voting mechanisms for democratic decision-making.

Eyal and Sirer [6] focus on the regulatory challenges of Initial Coin Offerings (ICOs). They suggest using blockchain to enhance transparency and security in ICOs, tracking token sales to prevent fraud and inform backers fully. Yao et al. [7] propose a smart contract-based crowdfunding platform using blockchain for transparency and automation. Backers contribute to projects via cryptocurrency, and funds are automatically released or returned based on the fulfilment of funding goals within a specified timeframe. However, their system lacks a mechanism for backers to vote on project milestones,

potentially limiting accountability. Medeiros and Santos [8] advocate for a decentralized crowdfunding platform using blockchain, emphasizing increased transparency and reduced reliance on intermediaries. While their decentralized architecture is an advantage, the system does not address automated fund allocation or voting on project milestones, potentially impacting accountability and democratic decision-making.

Tsygankov et al. [9] discuss blockchain-based crowdfunding platforms, highlighting transparency, reduced intermediation costs, and faster transactions. Their proposed platform includes smart contracts and a reputation system. However, the system does not incorporate voting on project milestones, potentially limiting backers' influence. Hock et al. (2021) [10] offer a comprehensive review of blockchain's potential in sustainable development. They identify areas such as supply chain management, energy, finance, governance, healthcare, and environmental protection where blockchain can enhance transparency, accountability, and traceability. Shrestha et al. (2021) [11] systematically review blockchain's potential in healthcare, emphasizing electronic health records, clinical trials, medical supply chains, and patient-generated data. Blockchain is seen as enhancing security, privacy, transparency, and traceability in these areas. Chai et al. (2020) [12] provide a systematic review of the intersection between blockchain technology and big data. They outline contributions in data privacy, provenance, sharing, and quality, emphasizing improved security and transparent data sharing across organizations. Guo et al. (2019) [13] review the use of blockchain for IoT, identifying contributions in security, privacy, interoperability, and scalability. Blockchain's decentralized, tamper-proof ledger is seen as addressing security concerns, while also providing solutions for privacy-preserving data sharing, interoperability, and scalability in IoT. Adebisi et al. (2019) [14] examine blockchain's role in cybersecurity and privacy, emphasizing secure data storage, sharing, identity management, and communication. Blockchain is proposed as a solution for tamper-proof data storage, secure data sharing through smart contracts, decentralized identity management, and encrypted, authenticated communication.

3.   Challenges In The Existing System

In the realm of technology, new information emerges every day. Over the past few years, there has been a surge of interest in blockchain technology, which is now experiencing a significant boom.

In [1], blockchain is described as an emerging framework for securely creating and storing transactions in distributed ledgers. The paper introduces a blockchain-based platform designed to facilitate the creation and storage of contracts between students and their higher education sponsors, with intermediary brokers known as fundraisers. These sponsorships may take various forms, such as scholarships, donations, or loans, and are managed by a group of competitive fundraisers who hold the distributed ledgers and serve as miners in the blockchain network. In [2], the concept of crowdfunding is explored as an online fundraising technique initially intended to enable individuals to support innovative ventures by contributing small amounts of money. However, a significant issue with current crowdfunding methods is the lack of assurance for investors regarding the use of their funds. To address this concern, the paper proposes blockchain-based crowdfunding, offering a private, secure, and decentralized approach. Through smart contracts, investors gain control over their contributions, ensuring transparency and accountability in project funding.
The following are identified as an open Problems in Existing Crowdfunding Systems:

(i)   **High Expenses:**
● Crowdfunding platforms have become a popular choice for startups to raise funds, but the associated expenses can be a significant drawback.

- The charges vary across platforms and may be a substantial amount or a percentage of the total funds raised.
- Startups, often operating on tight budgets, may find these fees prohibitive, hindering their ability to secure the necessary funds.
- Entrepreneurs need to carefully evaluate the costs associated with different crowdfunding platforms before deciding which one to use.

(ii) Scam Campaigns:
- Despite being a valuable source of funding, crowdfunding platforms carry the risk of scam campaigns.
- Deceptive campaigns can appear on these platforms, leading to investors losing their entire investment.
- Such incidents not only harm the affected investors but also tarnish the reputation of crowdfunding platforms as a whole.

(iii) Lack of Transparency:
- Transparency is crucial in any financial transaction, including those on crowdfunding platforms.
- In some cases, transactions on these platforms lack transparency, making it difficult to trace the source and use of funds.This lack of transparency raises concerns for investors who want clear visibility into how their money is utilized.
- Crowdfunding platforms should ensure that all transactions are transparent, with clear documentation and disclosure of fund flow.

(iv) Centralized Authority:
- The presence of a centralized authority that controls and manages information is a significant concern.
- This centralized control makes data vulnerable to theft and loss in the event of a cyberattack or backup failure.
- Centralized authority poses risks for both investors and startups, as it places their data and investments in the hands of a single entity.
- Decentralized solutions or enhanced security measures may be required to mitigate these risks and ensure the integrity of the crowdfunding ecosystem.

4.   Proposed System

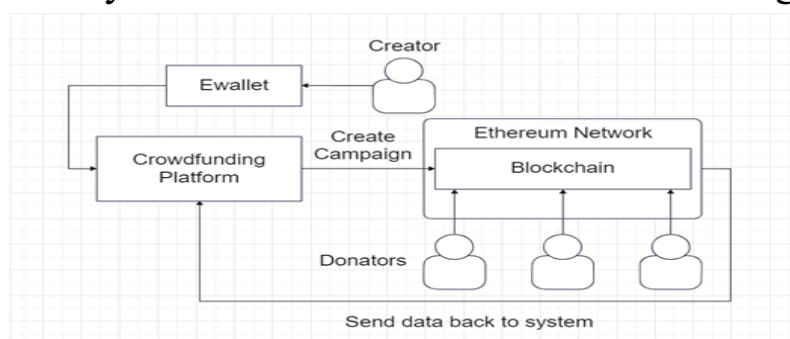The proposed system architecture is shown in below figure 1.

Figure 1: Proposed System Architecture

The Campaign Creation**:**

Users can initiate a campaign by connecting their MetaMask wallet to the web application. After wallet connection, they can create a unique campaign by entering details such as Campaign Title, Campaign Photo, Campaign Details, and Fundraising Amount. The contract code, written in Solidity, facilitates sending the agreement to the blockchain platform. The creation of a new campaign involves generating an instance of the Campaign factory. Each transaction incurs a specific gas fee for processing, representing the cost for making the transaction valid. When users click the "Create Campaign" button, a new campaign is generated with associated gas charges. After a brief processing time, the transaction completes, and a new block with the agreement address is added to the blockchain. Once created, the campaign is displayed on the website's homepage, allowing interaction from other users. After campaign creation and blockchain addition, an E Wallet such as MetaMask is required to manage associated transactions.

Dashboard:
The dashboard section enables users to view all campaigns present on the platform. Users can search for specific campaigns and make donations to those aligning with their interests.

Withdrawal of Funds:

Patrons who contribute above a certain amount, known as approvers, have the authority to approve or deny withdrawal requests. This process ensures funds are utilized as agreed upon by the investor community. Fund withdrawals require approval from at least 50% of the approvers. Once approved, funds transfer to the specified destination. All transaction details are securely stored in the blockchain, ensuring transparency and preventing tampering. This transparency and community involvement add an extra layer of security, making crowdfunding more reliable for startups.

User Interface:

Intuitive and user-friendly interface accessible via browsers and mobile devices. User can create campaigns, back projects, and monitor the progress of campaigns. Build a robust community through social media, forums, and events. Implement governance mechanisms allowing community participation in platform decisions for increased transparency.

5.   Methodology And Implementation Result

The proposed system implemented through the following software tools. They are
RESTful APIs:
 Develop APIs to facilitate communication between frontend and backend components, handling requests for user registration, campaign management, and payment processing.

Blockchain Integration:
 Blockchain Interfacing Layer: Use Web3.js or similar libraries to interact with smart contracts on the blockchain, facilitating communication between the backend application and the Ethereum network.

Payment Gateway Integration:
 Payment APIs: Integrate payment gateways for backers to contribute using fiat currencies.

Cryptocurrency Wallets:
 Enable cryptocurrency contributions, implementing wallets for different cryptocurrencies, securing private keys for seamless transactions.
The proposed system implemented using the following sequential steps.

Step1: Dashboard:

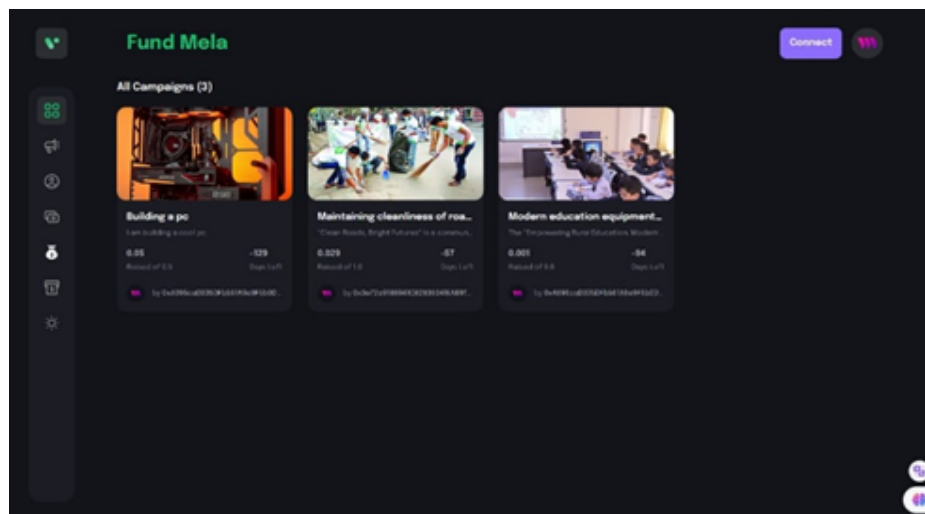The dashboard provides visibility into all available campaigns on the platform (Fig 2).

Figure 2: Dashboard

Step2: Connect to E Wallet:

Linking the campaigns to electronic wallet service allowing donors to easily and securely transfer funds from their digital wallets(Fig 3).
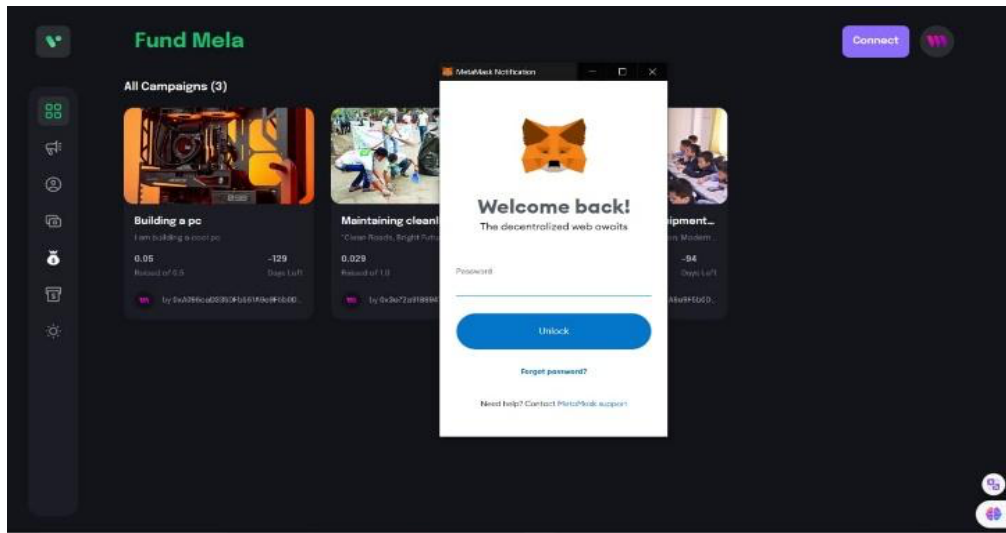
Figure 3: E Wallet

Step3: Campaign Creation:

Creation of campaign to give information about the initiatives and its goals to get funds from people across internet(Fig 4).
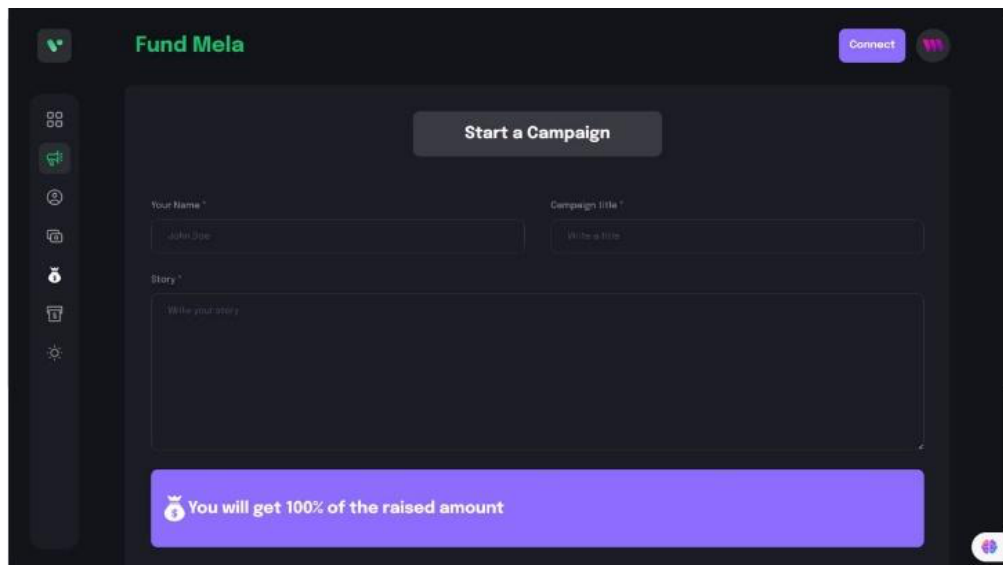

Figure 4: Campaign Creation

Campaign Details:

Accessibility to comprehensive details about the campaign, including the total number of backers, raised funds, campaign story and remaining time(Fig 5).
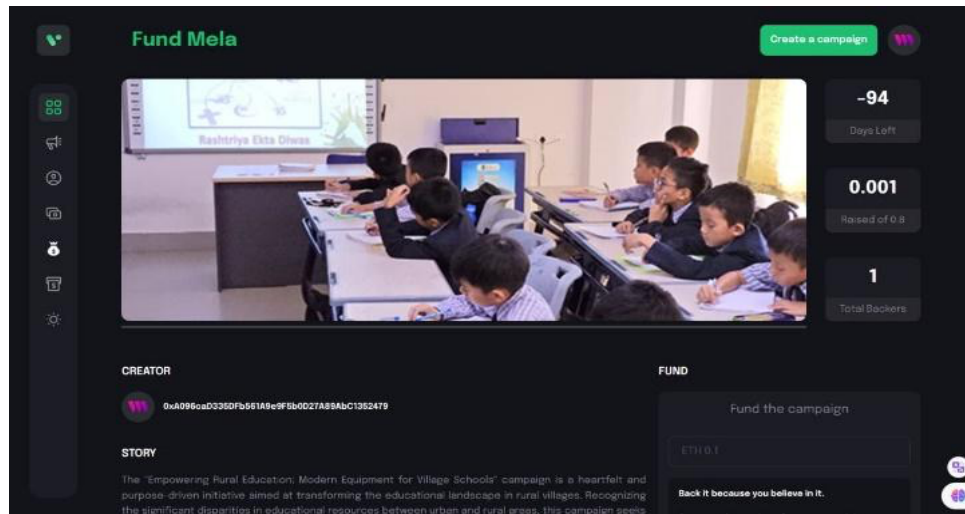
Figure 5: Comprehensive Campaign Details

Step4: Donate to Campaign:
Individuals interested in a specific campaign can contribute to it using Ethereum. The Fund Transaction of the Campaign is shown in Fig6.
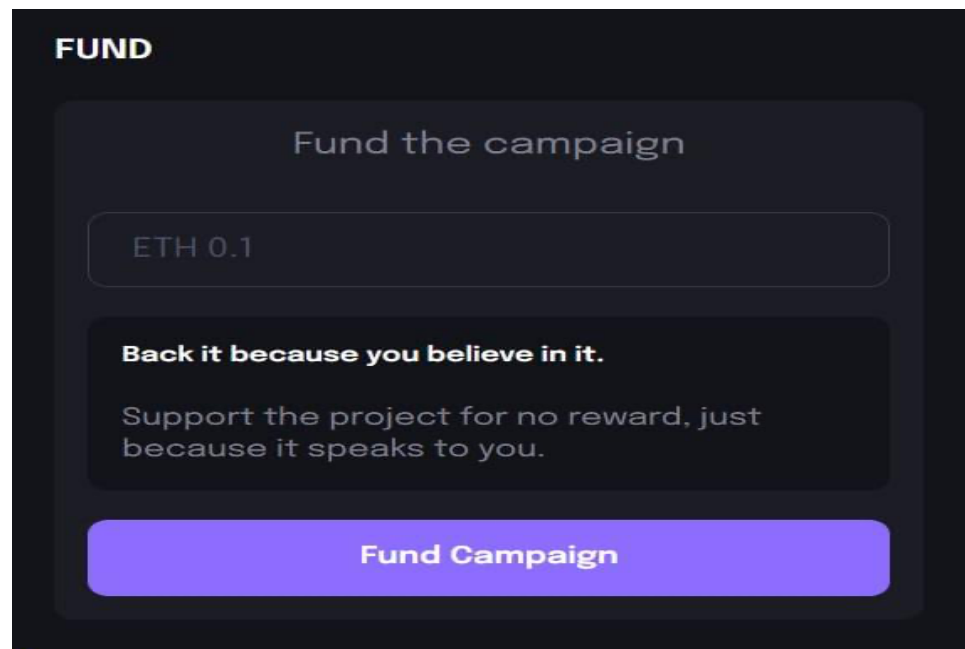

Figure 6: Fund Transaction of Campaign

Step5: Continuous Development and Improvement:

Regularly update the platform based on user feedback and technological advancements. Stay informed about blockchain developments, integrating upgrades to enhance functionality and security.

6.   Conclusion

In conclusion, our exploration into the intersection of crowdfunding and blockchain technology has revealed the potential for a more secure, transparent, and efficient method of raising funds for projects and businesses. The key features of blockchain, such as decentralization and smart contracts, offer new possibilities for enhancing the crowdfunding experience. By combining crowdfunding and blockchain, we can create a system that minimizes fraud, increases transparency, and streamlines the fundraising process. The benefits such as enhance security through multi-signature wallets and encryption techniques to protect sensitive user data, capable of handling expected transaction volumes and user bases. Implement layer-2 solutions like state channels or sidechains for improved scalability. However, challenges such as regulatory hurdles and the risk of scams need to be addressed for the successful implementation of blockchain-based crowdfunding. Despite these challenges, we encourage further exploration of crowdfunding using blockchain and staying informed about the latest developments in this field. The future work in this domain could involve integrating APIs to retrieve data about different cryptocurrencies and incorporating real-time statistical charts to enhance the user experience.

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