A Comprehensive Review of Blockchain Based Crowdfunding Platform

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***Abstract*—The development of blockchain has been very dynamic, and as a result, many industries such as finance, supply chain and healthcare have benefited. This work is a project plans to improve crowdfunding process with assistance of blockchain properties. There are problems associated with traditional crowdfunding platforms including; privacy and accuracy of information, fraudulence and high platform costs charges. These are avoided in this project since the users are able to create and fund campaigns directly through a decentralized application (dApp). This paper outlines the technical architecture, development methodology, and observed benefits of implementing the blockchain based application.**

***Index Terms*—Blockchain, Crowdfunding, Web3, MERN Stack, MetaMask, Decentralized Application (dApp), Ethereum, Authentication, JWT, Smart Contracts.**

I. INTRODUCTION

Crowdfunding is now used as an indispensable instrument for people and organizations in order to find the necessary amount of money for their creative initiatives, social project, initiatives, and business start-ups. However, traditional invest platforms have issues like high fees, no transparency or tend to be fraudulent. These problems affect the relations between those who start a campaign and their supporters in a way that compromises crowdfunding.

The challenges described above are addressed in this project, entitled "Blockchain based crowdfunding Web3 application with MERN authentication". Thus, using the Ethereum blockchain in connection with the MERN stack, the platform provides decentralized, safe, and transparent organizational processes for campaign management. The four apparent aspects include; user sign-up, campaign initiation, funding through a MetaMask wallet, and daily tracking of the campaign progress, giving a reliable and effective crowdfunding experience.

A. Synergy between Blockchain and Crowdfunding

In today's fast-paced world, individuals and investors seek immediate and tangible outcomes from their contributions. The upcoming generation of investors is shifting from being passive donors to active participants. They prefer to track the progress of organizations, evaluate their performance, and provide guidance to ensure that goals are being met. To facilitate this level of involvement, transparency and access to accurate financial data regarding project activities are essential. Blockchain technology addresses this needs effectively.

Blockchain operates as an independent and transparent system, minimizing uncertainty among parties exchanging value. It provides a tamper-proof record of transactions, fostering trust and reliability. Although blockchain is a relatively new technology, its application in real-world scenarios, such as crowdfunding, demonstrates its immense potential. Successful crowdfunding campaigns often rely on the trust of investors and the credibility of campaign creators. Blockchain strengthens these aspects by ensuring transparency and providing immutable records.

Transparency and unchangeable records are among the key advantages of blockchain, making it an ideal solution for modern crowdfunding platforms. This synergy between blockchain and crowdfunding enhances trust, accountability, and efficiency, paving the way for a more credible and impactful crowdfunding environment.

B. Problem Statement

The conventional crowdfunding models lack transparency, accountability, and safeguards, resulting in the misappropriation of funds and limited

visibility for backers on how their contributions are utilized.rephrase. The lack of real-time updates and control over fund allocation generates skepticism, reducing trust and involvement. In order to tackle these problems, a solution is required that ensures transparent transactions, automates the distribution of funds, and promotes comfortable, accountable interactions between fundraisers and supporters, ultimately restoring trust and maximizing the potential of crowdfunding.

C. Motivation

Crowdfunding as a concept has revolutionized how people and organizations source for finances for certain projects in the perception that the projects are sponsored by many people. However, initial traditional crowdfunding platforms are centralized which brings the following problems, high transaction fees, low transparency and trust problems. Such obstacles always discourage possible sponsors and slow down the development of new concepts and social initiatives.

An excellent direction towards the resolution of these issues can be provided by the use of blockchain technologies – a decentralized, virtually free approach that is fully transparent and very secure. The purpose of this project is to incentivize the campaign owners and supporters with an unalterable and transparent blockchain transaction. This idea aims to use blockchain technology combined with the current MERN web technologies to develop the optimal crowdfunding application that will increase the trust between the team gathered and the backers, decrease the expenses connected with funding, and encourage people to create new initiatives through accessible funding.

D. Future Scope

The future of blockchain-based crowdfunding is filled with great possibilities. Decentralized autonomous organizations (daos) have the potential to fully manage crowdfunding projects, utilizing smart contracts to handle fund allocation, ensuring transparency, and eliminating intermediaries. Blockchain technology facilitates micropayments and micro-investments, empowering small-scale investors to participate in crowdfunding, making investment opportunities more accessible. In the realm of renewable energy, blockchain technology can enable fractional ownership of solar or wind farms, with platforms like wepower providing energy tokens as a form of investment. Moreover, the gaming sector can gain advantages from blockchain technology, particularly in terms of funding, where investors can acquire in-game tokens or nfts through platforms like enjin, opening up fresh prospects for both game developers and supporters.

II. LITERATURE REVIEW

Taha Bouhsine, “Design and Full Stack Development Of A Crowdfunding Platform,” 2020 Bouhsine (2020) provides practical insights into designing a full-stack crowdfunding platform, focusing on technical frameworks and implementation strategies. This work serves as a guide for building a crowdfunding platform in the current research [7].

“Blockchain Integrated Crowdfunding Platform for Enhanced Secure Transactions” discussed integrating smart contracts to enhance security in crowdfunding. This strengthens the robustness and transparency of the crowdfunding process [5].

K. Christidis and M. Devetsikiotis explored the use of smart contracts and blockchain for IoT, emphasizing automation and transparency in transactions. This could be applied in crowdfunding to ensure secure and trustworthy fund distribution [1].

Y. He et al. proposed a blockchain-based incentive mechanism for P2P systems, emphasizing reward systems to prevent fraud. This approach can be applied in crowdfunding platforms to incentivize honest participation and penalize fraudulent campaigns [2].

Ajay K. Agrawal et al., Christian Catalini et al., and Avi Goldfarb identified failures and litigation as major challenges for equity crowdfunding. They suggested that market inefficiencies could be corrected through innovation and regulation, while online platform data could help improve the crowdfunding model [10].

H. L. Gururaj et al., “Decentralized Application for Crowdfunding Using Blockchain Technology,” September 2021, Gururaj et al. (2021) explore the development of a decentralized crowdfunding application using blockchain. Their work highlights how blockchain enhances security, efficiency, and

trust, which can be applied to improve security in the proposed platform [8].

Y. Hu et al. presented a delay-tolerant payment system on Ethereum to ensure reliability under network congestion. This concept could be useful for maintaining transaction consistency during high traffic on crowdfunding platforms [3].

Nikhil Yadav and Sarasvathi V, "Venturing Crowdfunding Using Smart Contracts in Blockchain," October 2020, Yadav and Sarasvathi (2020) examine the use of smart contracts in crowdfunding, focusing on automating fund releases. Their approach ensures transparency and accountability, which is relevant for implementing smart contracts in the crowdfunding system of this research [9].

"Blockchain-Based Crowdfunding Application" outlined how blockchain can improve transparency and security in crowdfunding, emphasizing the decentralized nature of transactions. This aligns with incorporating blockchain to ensure secure and tamper-proof transactions in crowdfunding [4].

"Blockchain-Based Crowdfunding: A Trust Building Model" focused on using blockchain for trust-building through transparency and cryptographic assurance, making it an ideal solution for reducing fraud in crowdfunding environments [6].

III. LIMITATIONS OF EXISTINNG SYSTEM

- High Fees: Startups have found crowdfunding platforms to be a popular method for obtaining funding.Rephrase Nevertheless, one notable disadvantage is the varying fees imposed by different platforms. These fees can either be a set amount or a percentage of the total funds collected. For startups, which typically have limited financial resources, these fees can present a significant obstacle in obtaining the required funds. Entrepreneurs need to thoroughly assess the fee structures of various crowdfunding platforms before choosing the one that aligns with their requirements.
- Risk of Fraudulent Campaigns: While crowdfunding platforms provide valuable funding opportunities, they also carry certain risks, including the potential for fraudulent campaigns. Some dishonest individuals may create fake campaigns, leading investors to lose their money. This risk can damage the trust investors have in crowdfunding platforms and undermine the overall credibility of the crowdfunding industry.
- Lack of Transparency: Transparency is a critical aspect of financial transactions, and it is equally important in crowdfunding platforms. Unfortunately, some platforms may lack transparency, making it difficult for investors to trace where their funds are going or how they are being used. This can create concerns for investors who want assurance regarding the proper use of their contributions. Crowdfunding platforms must prioritize transparency, providing clear documentation and disclosures about the flow of funds to maintain trust.
- Centralized Control: A significant issue with many crowdfunding platforms is the centralized authority that manages and controls user data. This centralized control means that a single entity has the power to alter or manipulate data, making it vulnerable to cyberattacks, data theft, or loss due to system failures. For both investors and startups, this centralization represents a security risk, as it places sensitive data and investments in the hands of one entity.

IV. OBJECTIVES

The project objectives encompass a comprehensive exploration of technical elements within the blockchain and crowdfunding domain:

1. Facilitate fundraising for creators:
- Increase the discoverability of projects by providing a platform for creators to showcase their ideas and connect with potential backers.
- Offer various funding models (all-or-nothing, flexible goals) to cater to different project needs and creator preferences.
- Provide user-friendly tools and resources to simplify the fundraising process for creators, including campaign creation, management, and communication with backers.

2. Foster trust and transparency:
- Implement robust security measures to protect financial information and ensure secure transactions between creators and backers.

- Encourage clear and transparent communication from creators by requiring detailed project information and regular updates for backers.
- Establish mechanisms to address potential conflicts between creators and backers, promoting fairness and trust within the platform.

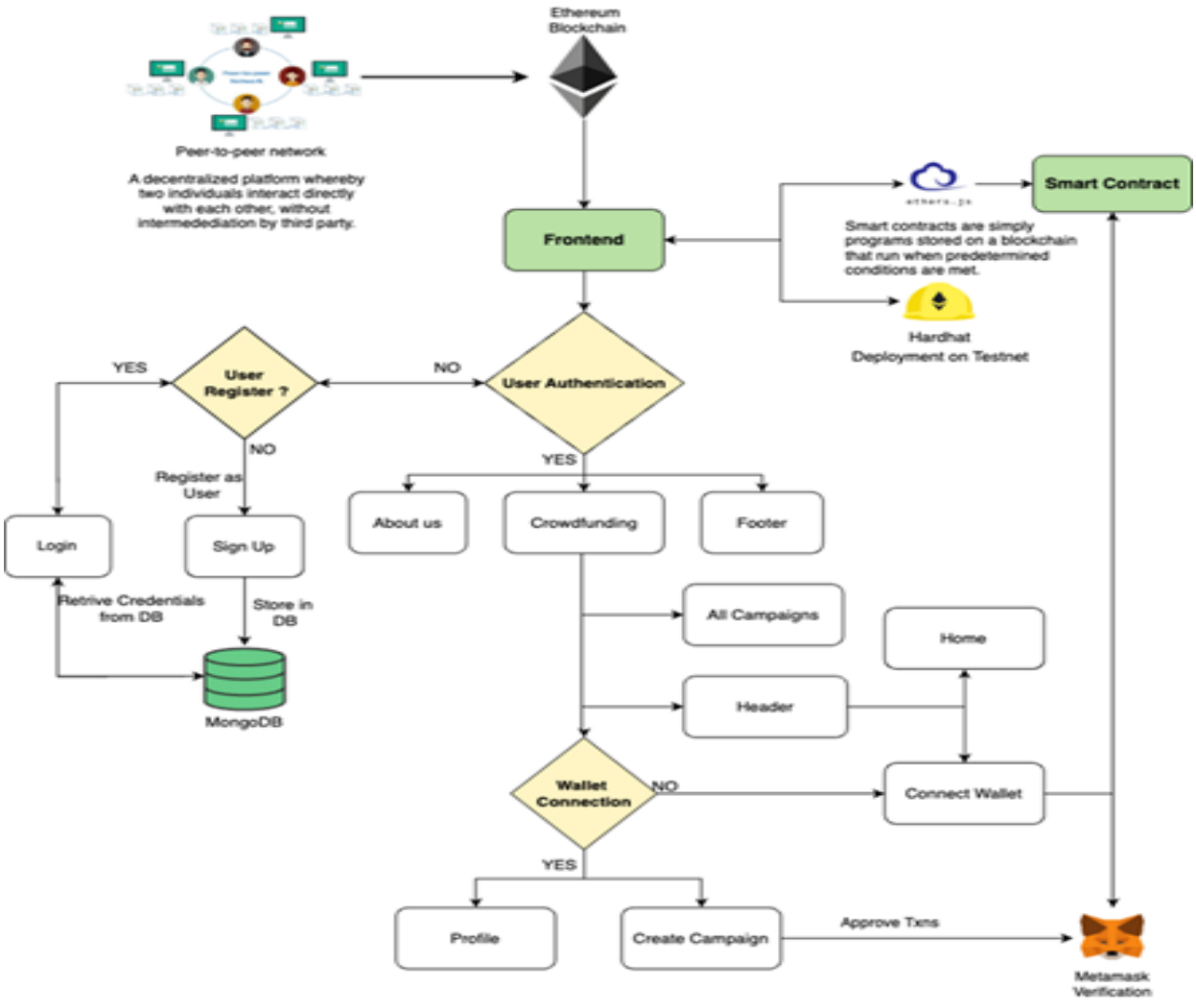
3. Empower backers and encourage investments:

- Offer a diverse range of projects for backers to explore and invest in, catering to various interests and risk tolerances.
- Foster a sense of community among backers, allowing them to connect with other backers and creators, share ideas, and participate in discussions.
- Provide opportunities for backers to potentially earn returns on their investments through successful projects (profit-sharing models, tokenized rewards).

4. Intuitive and user-friendly web-based interface:

- Create a website that is easy to navigate for both creators and backers, with clear menus, search functions, and user guides.
- Ensure the website is accessible and functions seamlessly across different devices (desktop, mobile, tablets).
- Integrate accessibility features like screen reader compatibility, clear font styles, and alt text for images to cater to users with disabilities.
- Integrate secure and user-friendly payment gateways for both creators and backers to facilitate smooth transactions.

V. SYSTEM ARCHITECTURE



VI. FUTURE SCOPE

1 Integration of Decentralized Identity (DID):
Incorporating decentralized identity solutions can enhance user authentication and eliminate reliance on traditional identity verification methods. By leveraging blockchain-based digital identities, fundraisers and backers can prove their credibility without exposing sensitive personal information. This would improve platform trustworthiness and reduce fraud risks, enabling a more secure and privacy-focused ecosystem.

2 Advanced Smart Contract Customization:
Future enhancements could allow fundraisers to design customizable smart contracts tailored to their specific needs, such as multi-phase funding, escrow mechanisms, or conditional fund releases tied to AI-verified milestone completions. These advanced contracts could enable backers to contribute with greater confidence, knowing their funds are protected by programmable rules.

3 Cross-Chain Interoperability:
Developing cross-chain compatibility would enable the platform to support multiple blockchain networks, such as Ethereum, Binance Smart Chain, or Solana. This would broaden user access, allowing backers and fundraisers to transact in their preferred blockchain ecosystem while maintaining seamless interaction and transparency across chains.
4 AI-Powered Fraud Detection:

Integrating AI-driven analytics to monitor and analyze transactions for irregularities or potential fraud in real-time could further secure the platform. Machine learning models could flag suspicious campaigns, abnormal transaction patterns, or deviations from expected fund usage, ensuring funders' trust in the platform.

VII. DATA FLOW DIAGRAMS

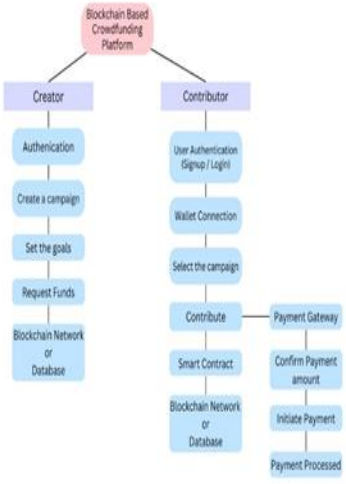
- DFD Level 1

Level - 0 DFD
Blockchain based Crowdfunding Platform

- DFD Level 1

Level - 1 DFD

- DFD Level 2



Level - 2 DFD

VIII. CONCLUSION

Therefore, the decentralised crowdfunding application on the blockchain has the capacity of transforming every crowdfunding business by eliminating brokers and cutting costs on transactions. The smart contract management opens crowdfunding platforms based on the blockchain, which significantly reduces the likelihood of disputes and other errors in the process of creating crowdfunding transactions with a set of predefined operating conditions.

To a great extent the goal of being a transparent, anti-fraudulent, and decentralised platform has been achieved. This project has occupied the gaps of general crowdfunding platforms to give reason to the process of crowdfunding and to trust people may they give their money to causes they want to see funded without duty free fearing they'll be scammed.

In summary, a Decentralised crowdfunding App based on blockchain technology has the capability to refurbish and recast the crowdfunding domain, so that more challengers can achieve fund for their project or business. It was rather inspiring the kind of change which might bring in new opportunities for a more open and liberal society with equal access to economic agents.

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