

(Research Article)

Crowd Funding using Blockchain Technology

Animesh Ghosh^{1*}, Debrupa Pal², Debangana Paul Chowdhury³, Sudipta Kumar Dutta⁴^{1*2}Department of Computer Application, Narula Institute of Technology Agarpara, Kolkata, West Bengal, INDIA³Department of Computer Application, JIS University, Agarpara, Kolkata, West Bengal, INDIA⁴Department of Computer Science and Engineering, JIS University, Agarpara, Kolkata, West Bengal, INDIA

Abstract

Crowdfunding serves as a method for individuals or organizations to gather funds for projects through small contributions from a large number of people, typically facilitated online, as exemplified by platforms like Kickstarter. The adoption of crowdfunding platforms has simplified the connection between business owners and a global audience willing to support their initiatives. However, the current crowdfunding system faces challenges such as high maintenance costs, limited system openness, and a lack of user confidence. Addressing these issues, a proposed project introduces a blockchain-based solution with an immutable ledger recording every transaction. Utilizing a peer-to-peer network, each system serves as both a client and a server. The project incorporates features like a voting mechanism for donors and an alert system for low gas prices, enhancing transparency through blockchain technology and fundamentally distinguishing itself from existing solutions. By leveraging smart contracts, the project aims to ensure the protection of funds and provide users with enhanced transparency and trust in the crowdfunding process.

Keywords: Blockchain technology, ERC20 tokens, e-commerce, Wallets

1. Introduction

A blockchain is a shared distributed database or ledger between computer network nodes. A blockchain serves as an electronic database for storing data in digital form [1-2]. Bitcoin, ether, Solana, and other cryptocurrencies are a significant application of blockchain technology.

Blockchain technology has been developing and finding more and more uses in recent years, making it one of the most popular topics in the world. Numerous nations have begun to plan the national development of blockchain after realising the vast potential applications of the technology [3]. Every teacher has probably, at some point, utilised a "bribe" of food, entertainment, or an alternate incentive to get students to perform a task or adhere to a rule, such as staying quiet during class [4]. The behaviour will end when the reward no longer exists. Rewards and incentives certainly have a purpose, but it's important to use them wisely.

Promoting the idea that "learning is earning" would also help by giving learners incentives for their beneficial contributions. This might also lessen the chance of free-riding in settings for

group learning. The customized token project provides solutions for a number of crucial issues facing institutions and their students. The custom token project has the potential to have an enormously beneficial effect on universities and their student populations by offering a safe and dependable method of transacting, encouraging economic inclusion and incentivization, stimulating innovation, and offering flexibility and adaptation. will lose interest, annoyed that you have failed to get started The bespoke token project offers a fascinating chance to investigate fresh, cutting-edge approaches to satisfy the shifting demands of both students and universities as the higher education sector continues to change.

One notable limitation of crowdfunding using blockchain technology is the potential for increased regulatory challenges and legal uncertainties. While blockchain offers transparency and decentralization, the lack of standardized regulatory frameworks for blockchain-based crowdfunding projects can create a complex and ambiguous legal environment. This ambiguity may deter both project organizers and potential investors, as they face uncertainties regarding compliance, investor protection, and the enforceability of contracts. Additionally, the irreversible and pseudonymous nature of blockchain transactions could pose challenges in addressing fraud or resolving disputes, potentially undermining investor confidence. As the regulatory landscape continues to evolve, achieving a balance between innovation and investor

*Corresponding Author: e-mail: dppalit@gmail.com,

Tel: +91-6290312341, +91-7003534302

ISSN 2320-7590 (Print) 2583-3863 (Online)

© 2024 Darshan Institute of Engg. & Tech., All rights reserved

protection remains a key challenge for the widespread adoption of blockchain-based crowdfunding. Approaches vary widely, however the following approach can produce an effective introduction.

2. Usage of Blockchain

In its simplest form, blockchain technology is a method for digitally storing data electronically. A peer-to-peer network called blockchain is dispersed across the internet. In what are referred to as the blocks, the data is kept. A blockchain's blocks are transparent and unchangeable. Blockchain's complete decentralization, which results from its lack of reliance on any centralized network, is another key aspect. A few years ago, cryptocurrencies were made using blockchain technology. Bitcoin, one of the most well-known cryptocurrencies in existence today, was created by Satoshi Nakamoto in 2008. A wide range of sectors have begun to recognize the true potential of blockchain technology and incorporate it into their goods [5-7]. Blockchain is becoming more and more popular because it may offer exceptional safety and transparency. Each of the interlinked blocks in a blockchain is made up of a hash function produced by a cryptographic algorithm as shown in Figure 1. Except for the genesis block, each block includes the hash of the preceding block.

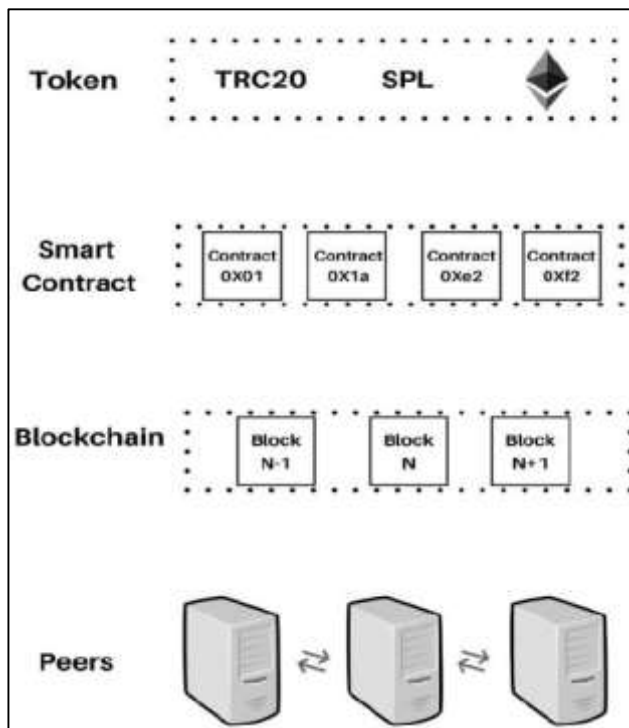


Figure 1. Functionality of crowd funding platform

2.1 Decentralization: Blockchain is decentralized because there isn't a centralized network to approve transactions. Additionally, data is not kept on a single server or storage facility. A decentralized network could render the data readily accessible to all users across the network rather than having a

central authority. Additionally, because there is no centralized network for tracking each transaction, authentication would happen relatively faster during transactions.

2.2 Transparency: A decentralized network enables users to easily perceive transactions. Blockchain technology guarantees that each person on the network has an exact duplicate of the ledger, allowing these ledgers tamper-proof and increasing transparency.

2.3 Privacy: People can set up an individual network and limit access to it to other blockchain network members in order to safeguard their privacy. This is usually done within a single organization or a collection of related organizations.

2.4 Security: It is one of the key characteristics of the blockchain. Numerous researchers have been working on improving the integrity of the blocks in a blockchain and continue to do so. Any part or product a business creates today needs to have an excellent degree of security. Blockchain is becoming highly popular because of this. The provision of the prize is one of the key components of the suggested solution. Thus, paying a bounty to the appropriate account holder is essentially a transaction that is secured by blockchain technology.

2.5 Consensus technique: The consensus mechanism and smart contracts are two of the key components that make blockchain secure for transactions. The consensus mechanism is what keeps the blockchain in a single state at all times. Let's assume there are five nodes in a network for the sake of clarity. The blockchain will be identically copied on each of these nodes, and it will all be in the same condition. Say one of the nodes mines a brand-new block. The state of the blockchain must be the same across all nodes when a new block is added to an already existing blockchain. We have this idea of a consensus process to make sure of that. Numerous algorithms implement consensus mechanisms.

2.6 Smart contract: In order to understand smart contracts, it is first important to review what a contract is in terms of transactions. An agreement between two parties by which transactions are carried out is referred to as a contract. Contracts are often paper papers that require the two parties to the transaction to sign them. Conventional contracts have the drawback of having easily modifiable terms. Currently, let's discuss smart contracts. Smart contracts are electronic contracts in which the terms of a transaction are expressed in one or more programming languages. Only then will the requirements specified in smart contracts be carried out by the smart contracts, assuming that the circumstances are met.

Consider the following scenario from the real world: You are a customer who has purchased an item from an online retailer. How confident are you that the business will deliver your order? Let's assume that the business received the money and distributed a portion of it as a commission to deliver the

product to the client. There is currently a problem with trust on the part of the business. Therefore, automating the transactions is one approach to this issue. This is where the automation could be done. The company won't get paid for the product until it's delivered to you, and the delivery service won't get paid until the thing is delivered.

3. Proposed Solution

Blockchain technology plays a pivotal role in the realm of cryptocurrency by serving as the underlying decentralized and distributed ledger system. Its core features, such as immutability, transparency, and cryptographic security, contribute to the trust and integrity of digital currencies like Bitcoin and Ethereum. Through a consensus mechanism, blockchain ensures the validation and recording of transactions across a network of nodes, eliminating the need for a central authority. This not only enhances security by preventing tampering or fraud but also fosters a high level of transparency, as every transaction is visible to participants in the network. Additionally, blockchain technology facilitates smart contracts, self-executing contracts with coded terms, further expanding the functionalities and potential applications of cryptocurrencies in various industries.

This platform serves as an interface for investors to engage with initiatives of interest and for entrepreneurs to secure

funding. Entrepreneurs can raise funds by offering tokens for sale to interested investors, ensuring the tokens remain unalterable and immune to counterfeiting. Smart contracts are employed to mitigate risks for both businesses and investors. Unprecedented in other crowdfunding sites, the project incorporates gas fee warning methods to address issues effectively. Leveraging the transparency of the Ethereum blockchain network, the project extensively utilizes smart contracts for secure and transparent transaction processing. Additionally, the platform introduces decentralized autonomous organizations (DAOs) governed by predefined rules, enhancing transparency. With an intuitive and flexible user interface, a dedicated support section for end users, and the innovative Voting Mechanism for Debating, the project aims to provide a unique user experience not seen on other platforms.

Figure 2 illustrates the functionality of the envisioned crowdfunding platform created by the project. It outlines the process wherein end users access the platform, peruse published projects, and decide on their interest, subsequently triggering the alert function for users keen on contributing funds during reduced prices. Additionally, it depicts the integration of smart contracts and MetaMask within the crowdfunding platform, accompanied by a concise overview of the voting mechanism being implemented. [10-12].

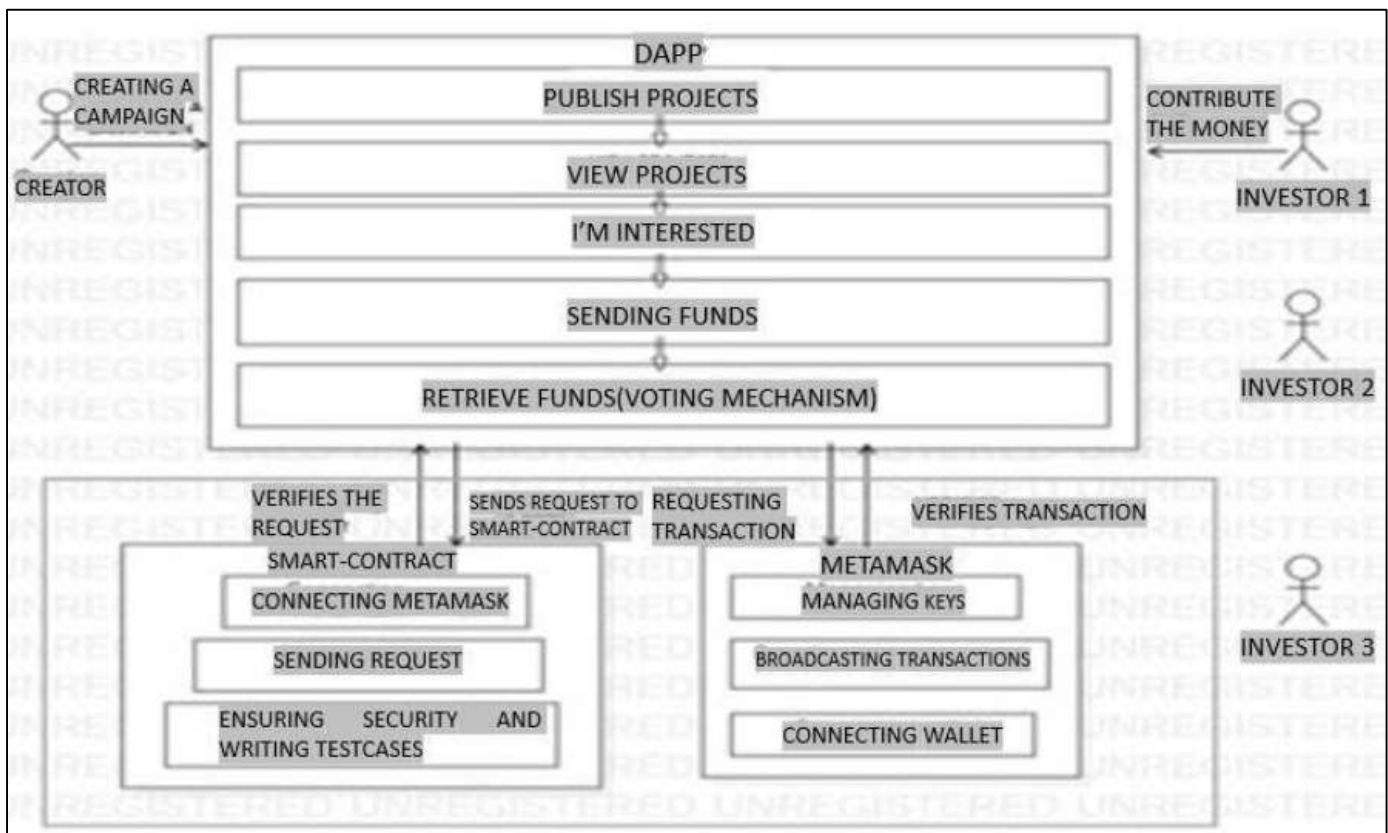


Figure 2. Crowd funding platform functionality

The proposed module is split up in several points.

3.1 Ensuring security for the platform: Developing a smart contract to enhance portal security and reduce reliance on intermediaries.

3.2 Connecting the meta task: A link is established between the thoroughly tested and well-constructed smart contract and Metamask, a virtual wallet. The module provides guidance on the Solidity code method for connecting the smart contract with Metamask.

3.3 Front end development: The user can view the design and website in this section. This module was created using WEB3.JS, and the front end will be integrated with a smart contract.

3.4 Performing transactions: The module contains the functionality for carrying out transactions and updating both the front-end and the solidity code. This module will cover every step of contributing, retrieving, mailing, donating, etc.

3.5 Voting mechanism: The module where donors can vote for merchants to withdraw money is the project's main benefit.

3.6 Alert functions: The user will be informed when the petrol price is low via this module, which plays with the cost of petrol. The idea entails providing the user instant mail.

4. Implementation

The crowdfunding decentralized app's goal is to establish an environment where anybody can easily launch or support a campaign intended to develop new goods or services. By offering long-term incentive sharing mechanisms on the "internet of value," the crowdfunding decentralized software offers a platform for crowdsourced capital raising.

The Crowdfunding decentralized app is broken down into different tasks that users can complete on the platform. Anyone visiting the portal has the ability to browse through all the campaigns featured and learn more about each one. Java-script libraries are heavily utilized by the programme to create the user interface, manage user input, and connect to the Ethereum network. The programme was created using a model view controller design, which makes it easy to distinguish between the duties of each layer. The purpose of UI is to make using the platform and achieving goals as easy as possible for the developer and investor. In this network, several account kinds can be established and hosted as shown in Figure 3.



Figure 3. Account information

5. Conclusions

Overall, the fake news expectation model serves as a useful tool for detecting and prioritizing false news reports. However, it is not without limitations and shortcomings. For example, the model overlooks the context of an article, a crucial factor in assessing the presence of false information. Furthermore, the model's reliance on a limited dataset raises concerns about its applicability and transferability to larger datasets. The future of crowdfunding is poised for a transformative shift with the integration of blockchain technology. By leveraging blockchain's decentralized and transparent nature, crowdfunding platforms can enhance trust and security in fundraising processes. Smart contracts, programmed on blockchain networks, enable automated and tamper-proof execution of agreements, ensuring that funds are allocated as intended and reducing the risk of fraud. Additionally, blockchain facilitates global participation by providing a borderless and efficient means for backers and project creators

to engage in crowdfunding campaigns. Tokenization of assets on the blockchain introduces new possibilities, allowing backers to receive tradable digital assets representing their contributions. This evolution not only democratizes access to funding but also fosters a more inclusive and interconnected global economy through decentralized crowdfunding ecosystems.

References

- [1] S. Zad, Z. Khan, T. Warambhe, R. Jadhav, and V. Alone, "Crowdfunding Using Blockchain Technology," *SSRN Electronic Journal*, 2023, doi: 10.2139/ssrn.4330476.
- [2] A. Menon, K. Kadam, P. Kumar, and S. K. Shah, "Decentralized Crowdfunding Using Blockchain," *SSRN Electronic Journal*, 2023, doi: 10.2139/ssrn.4324640.
- [3] N. K. Sahdev, "Crowdfunding Meets Blockchain," *SSRN Electronic Journal*, 2017, doi:

- 10.2139/ssrn.3047682.
- [4] H. Zhao and C. P. K. Coffie, "The Applications of Blockchain Technology in Crowdfunding Contract," *SSRN Electronic Journal*, 2018, doi: 10.2139/ssrn.3133176.
- [5] S. K. Panda, "Fraud-Resistant Crowdfunding System Using Ethereum Blockchain," in *Bitcoin and Blockchain*, CRC Press, 2020, pp. 237–276.
- [6] Q. Xia, J. Gao, D. A. Worae, I. A. Obiri, and K. O. Asamoah, "A Secure Data-Sharing Blockchain-Based Crowdfunding System," in *Attribute-based Encryption (ABE): Foundations and Applications within Blockchain and Cloud Environments*, 1st ed., Wiley, 2023, pp. 229–245. doi: <https://doi.org/10.1002/9781119989387.ch14>.
- [7] Q. Xia, J. Gao, D. A. Worae, I. A. Obiri, and K. O. Asamoah, "Subscriber Data Management System Based on Blockchain," in *Attribute-based Encryption (ABE): Foundations and Applications within Blockchain and Cloud Environments*, 2023, pp. 215–228. doi: <https://doi.org/10.1002/9781119989387.ch13>.
- [8] U. S. Pinjarkar, R. D. Gupta, T. S. Patil, A. S. Todkar, and S. K. R. Yadav, "Crypto's Fund Hub: Crowd Funding Platform Using Blockchain," *NOLEGEIN Journal of Operations Research & Management*, 2023, doi: 10.37591/njorm.v6i2.1208.
- [9] J. R. Rich, Ed., "How Crowd Funding Works: The Basics," in *The Crowd Funding Services Handbook*, 1st ed., Wiley, 2014, pp. 1–14. doi: 10.1002/9781118915493.ch1.
- [10] P. Basu, "Digital Transformation - Indian Startup Ecosystem and Blockchain Platform for Crowd Funding," *The Management Accountant Journal*, vol. 55, no. 11, p. 64, Nov. 2020, doi: 10.33516/maj.v55i11.64-69p.
- [11] N. Panchal, "Crowd funding through block chain," *South Asian Journal of Marketing & Management Research*, vol. 8, no. 12, p. 11, 2018, doi: 10.5958/2249-877X.2018.00041.3.
- [12] J. R. Rich, Ed., "Preplanning Your Crowd Funding Campaign," in *The Crowd Funding Services Handbook*, 1st ed., Wiley, 2014, pp. 51–64. doi: 10.1002/9781118915493.ch4.

Biographical notes



Animesh Ghosh is a student in Department of Computer Application in Narula Institute of Technology, West Bengal, India.



Debrupa Pal is pursuing his Ph.D. from NIT Durgapur in Electronics and Communication Engineering and is an Assistant Professor in Narula Institute of Technology.



Debjyoti Debnath is a student in Department of Computer Application in JIS University, West Bengal, India.



Sudipta Kumar Dutta is an Assistant Professor in Department of Computer Science and Engineering in JIS University, West Bengal, India.