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Easy-Starter : An Online Crowdfunding Website Using Blockchain

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ABSTRACT

Crowd funding is a method of internet fundraising that started out as a way for the general public to contribute small sums of money to support the initiatives of creative individuals. Crowdfunding allows individuals to invest in start-up businesses by going via a middleman, like a broker-dealer. The present websites have an issue in that they don't offer the Donor Guarantee Policy and they don't have authority over the funds that donors donate. In this paper, we propose to use blockchain technology for crowdfunding. By doing this, we are able to offer a transparent, safe, and safe crowdfunding process. This article aims to facilitate the creation and funding of campaigns by offering interactive forms for campaign designers and funders to easily construct and approve initiatives. The money that was donated to them can be tracked by the donor. Every transaction will be captured by the blockchain and stored as a block. There are costs involved, a chance of failure, and crowd fundraising is not a charity. This is where blockchain technology comes in to offset the possible dangers associated with the traditional fundraising approach. By using a decentralized approach to crowd funding, we can completely eliminate any dangers associated with the traditional crowdfunding model.

Keywords : Crowdfunding, Blockchain, Campaign, Smart Contracts, Request-Approval, Consensus Segmentation, Digital Wallet

I. INTRODUCTION

The blockchain serves as an immutable electronic register that documents each transaction. Being a decentralized system, all the data is stored in every node across the network. Ethereum enables the execution of applications known as Smart Contracts on the blockchain. These Smart Contracts operate on the Ethereum Virtual Machine.

The issue lies with the existing crowdfunding companies that impose high fees and occasionally fall victim to scams. The process of raising funds is not a simple task as it necessitates trust among multiple

parties, including funders, intermediaries, and organizations serving as temporary fund custodians until the funds are received by the intended recipients. This trust serves as the primary asset for fundraising organizations to attract funders and encourage them to contribute their funds to the intended recipients.

Introducing a blockchain-based crowdfunding strategy can effectively address these concerns. By incorporating Peer-to-Peer smart contracts for crowdfunding, the conventional transaction fees can be eliminated. Our project aims to develop a dependable online crowdfunding application utilizing blockchain technology.

The secure and decentralized network of the Ethereum blockchain guarantees that all data pertaining to campaigns, contributions, and transactions is stored in a decentralized application. This ensures transparency as all users have access to this information. By eliminating the reliance on centralized servers, the process becomes more streamlined and less prone to fraudulent activities.

Creating a campaign is a quick and simple task, allowing individuals to effortlessly promote their projects and attract contributions from a vast network of supporters. The incorporation of smart contracts adds an extra layer of security, making this crowdfunding solution truly groundbreaking in its innovation.

II. BACKGROUND

Traditional crowdfunding platforms face a significant obstacle in terms of transparency and accountability when it comes to the allocation and management of funds. The involvement of intermediaries and centralized systems in transactions often results in backers having limited insight into the utilization of their contributions. This lack of visibility raises concerns regarding the potential mismanagement, fraud, and improper use of funds. Moreover, these platforms frequently encounter issues such as high transaction fees, delays in payments, and geographic limitations, which impede the overall efficiency and accessibility of the fundraising process.

Crowdfunding offers a significant benefit in terms of swiftly accumulating the required funds. This advantage stems from the widespread usage of the Internet and social media platforms by a large number of individuals in contemporary society. Consequently, project owners can efficiently connect with the public through these networks within a short span of time. Additionally, the inclination towards crowdfunding arises due to the challenges associated with securing loans from banks or other investors, as the loan application process tends to be time-consuming. As supported by various research studies, crowdfunding also presents non-financial advantages.

In addition, crowdfunding platforms, despite their numerous advantages, also have several flaws that need to be addressed. One of the major issues in traditional crowdfunding platforms is the occurrence of fraud cases. Studies have shown that online crowdfunding exposes contributors to fraud because the usual legal and reputational security measures may not be effective. Researchers have identified several issues in crowdfunding, including significant delays in receiving rewards, lack of communication from campaign organizers after an unmet delivery date for more than six months, and failure to deliver the promised product with no full refunds for the backers. To mitigate these problems, the integration of smart contracts into a crowdsourcing system can be a viable solution. By implementing smart contracts, a contract can be established to hold onto a contributor's funds until a specific deadline or objective is achieved. Depending on the outcome, the funds will either be released to the project owners or safely returned to the contributors.

III. LITERATURE VIEW

[1] is an Ethereum-based Decentralized Autonomous Organization (DAO) that enables registered users to share various forms of content such as songs, drawings, videos, and advertisements. Users can engage with the posts by liking, commenting, or tipping the post owner using a custom Ethereum ER 20 token called Likoins, which can be obtained through Initial Coin Offerings (ICOs). Each interaction rewards the post owner with a certain amount of Likoins. These Likoins tokens can be shared among users, fostering a sense of community and collaboration.

[2] takes a modular approach to crowdfunding, providing a platform for campaign creators to showcase their project ideas or fundraising programs for purposes like medical, educational, or other causes. The platform operates on the Ethereum network and utilizes the Solidity programming language and a consensus protocol to ensure secure and transparent transactions. It caters to both individuals and organizations, although it may pose challenges for some users due to its reliance on blockchain technology and the use of the Rinkeby test network, which was deprecated on October 5, 2022. Despite these limitations, the platform offers a distinctive and innovative means for individuals and organizations to raise funds and bring their ideas to fruition.

Blockchain Based Crowdfunding Md Nazmus Saadat et al [3] proposed a Blockchain based crowdfunding system where the fundraisers will receive money from the blockchain based on the voting approval of the investors. The fundraiser can create the campaign and the investors can contribute to the campaign. In order to specify how the funds raised will be utilised, the fundraisers may also create requests. The donors cast a vote for or against the request, determining whether the costs are appropriated. Money will be paid to the vendors in the form of ether if it is authorised by the majority of supporters. A smart contract is used to do this, and it will handle the ether transaction between fundraisers, investors, and vendors. The system has a network connection to Ethereum. Users' transactions are encouraged in this system via the use of a proof-of-authority blockchain called the Rinkeby network.

[4]Venturing Crowdfunding Using Smart Contracts Vikas Hasijja proposed Venturing crowdfunding using Smart Contracts in Blockchain, a base paper which speaks about the advantages of integrating crowdfunding technique with blockchain. It first explains about the different types of crowdfunding and then why crowdfunding using Blockchain stands out from the other types of crowdfunding. Crowdfunding is a way of raising money from a large number of individual investors. The investors who invest in a campaign can gain their profit if that campaign gets successful. But still in certain crowdfunding platforms, they receive money from investors and run away with a chunk of money. In order to build trust between the investors and the platforms, a Smart contract is introduced. And the Smart contract automates the transactions which removes the need for a manager to handle this process. Blockchain thus solves the problem of spending more on a campaign as there is no need for any central or trusted authority.

[5] is a crowdfunding application that, unlike other application, only allows people to deposit their money, but this platform also recognizes backers whose returns will be guaranteed. The app will also provide transparency between backers and startups, so backers can track the progress of the various initiatives they've invested in. If the project does not continue midway, the money is returned to the sponsors. This will be a multi-user application with three different user types: Admin, Supporter, and Startup. Administrators can agree to start a public service. Start-ups can view the status of their operations and their revenue over time. Supporters can see the progress of the projects they have funded and general information about other projects listed in the application.

Traditional crowdfunding platforms [6] are vulnerable to data breaches, high transaction and platform fees, and rampant fraud that occurs due to the anonymity of user identity, i.e. users cannot be identified when they commit cybercrime. These are attempts to solve these existing problems using a digital identity management system with a Blockchain underlying system. A digital identity management system is an alternative to the Know Your Customer (KYC) system that organizations use to verify the identity of customers. The cost of running an organization using a digital identity management system is much lower than the cost of KYC systems. By implementing blockchain into a digital identity management system, malicious users can be identified and action taken against them. The use of blockchain in a digital identity management system secures the system against centralized architecture attacks such as DDoS and data breaches.

The [7] is a crowdfunding platform that leverages the power of blockchain technology and an auction mechanism to bring together the most suitable developers and investors. The platform utilizes the Ethereum network and Solidity programming language to create smart contracts, and it employs the Proof of Work consensus algorithm to ensure the security and integrity of transactions. The platform is designed to cater to both individual users and organizations, but it does have the limitation of relying on the Rinkeby test network, which was discontinued on October 5, 2022. Despite this limitation, the platform offers a unique and innovative way for developers and investors to connect and collaborate on projects, and it has the potential to revolutionize the crowdfunding industry.

[8] The primary challenge facing the existing global crowdfunding sector lies in its lack of regulation, leading to instances of fraudulent campaigns. Furthermore, certain projects have experienced significant delays in their execution. This project seeks to tackle these issues by incorporating smart contracts within the crowdfunding platform. These smart contracts will enable full automation, thereby mitigating the risk of fraud and other related concerns. [9] This study created a blockchain-based crowdfunding platform using IPFS, Polygon ,Metamask, Next.js, and Node.js. Users of the platform can set up and contribute to crowdfunding campaigns utilizing cryptocurrencies. The findings of this study point to the possibility of blockchain-based crowdfunding as a transparent, safe, and affordable replacement for current crowdfunding techniques. The platform is decentralized, secure, and effective because to the usage of smart contracts, IPFS, and the Polygon network.

[10]This project has given a significant outcomes which includes a simple and easy to use user interface. Using the Ethereum wallet, its easy to do transaction as well.Using this interface, the user can donate the funds to the organization who have started the crowdfunding platform. By entering funds in the field available, the amount entered gets verified by the details entered in the smart contract. If the smart contract allows, the request for confirmation of transaction can be seen in the interface of the metamask wallet and can be confirmed and rejected based on user's choice. After confirmation amount gets deducted from user's account and credit can be seen in the account of organization who has created this platform.

[11] A campaign investor, a person who comes to the platform in order to invest, are all enabled by crowdfunding dapp smart contracts created on blockchain platform. For instance, if an investor wants to put some money into a given campaign that appeals to him, he makes a transaction which is then broadcasted on Blockchain network with supplementary transaction charges.

IV. PROPOSED SYSTEM

The proposed system for the "Easy Starter: An online crowdfunding website using cryptocurrency" project aims to revolutionize the traditional crowdfunding landscape by harnessing the capabilities of cryptocurrency and blockchain technology. Essentially, this system serves as a decentralized platform that enables both individuals and organizations to initiate and participate in fundraising campaigns in a secure and transparent manner.

Within this system, users have the ability to create crowdfunding campaigns by providing essential information such as the campaign title, description, funding goal, and duration. Campaign creators also have the flexibility to customize various campaign settings, including the target funding amounts, fundraising deadlines, and campaign categories. Moreover, the platform supports the integration of multimedia content, allowing creators to enhance the visibility of their campaigns through the use of images, videos, and other media.

Contributors to active campaigns can effortlessly contribute funds using supported cryptocurrencies, facilitated by the implementation of blockchain technology. These transactions are characterized by their transparency, immutability, and security, ensuring the integrity of the crowdfunding process. To ensure smooth transactions, the system seamlessly integrates with popular cryptocurrency wallets, enabling users to securely connect their wallets. This integration is supported by robust authentication and authorization mechanisms, which safeguard user funds and private keys, establishing a secure and reliable crowdfunding environment.

1. Architecture

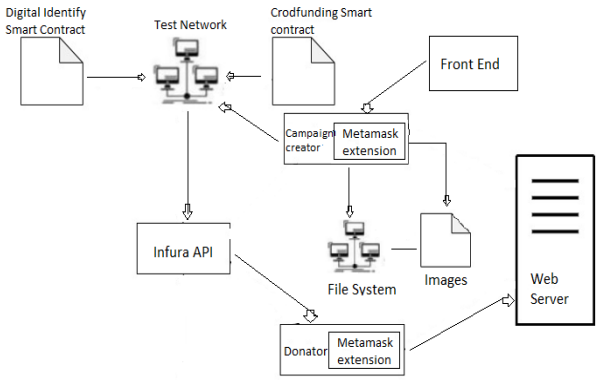

Figure 1 - Architecture diagram of crowdfunding system

The project's architecture Figure 1 adheres to a client-server model, where a web-based frontend interacts with a backend server. The frontend is responsible for presenting the user interface, which includes features like campaign creation, fund contribution, and platform engagement. It is built using web development technologies such as HTML, CSS, and JavaScript, and may incorporate frameworks like React.js or Next.js to enhance its dynamic capabilities.

On the other hand, the backend server acts as a mediator between the frontend and the underlying blockchain network. It handles tasks like user authentication, campaign administration, transaction processing, and integration with blockchain protocols. To implement the backend, server-side languages like Node.js are commonly used, along with frameworks like Express.js or Flask to facilitate server-side logic and API development.

The core component of this architecture is the blockchain network, which serves as a decentralized ledger for recording crowdfunding transactions. Ethereum is often chosen as the blockchain platform for implementing crowdfunding platforms due to its support for smart contracts. Smart contracts define the

rules and conditions for crowdfunding campaigns, including aspects like campaign creation, fund distribution, and transaction verification. To interact with the blockchain network, libraries like web3.js are utilized, enabling seamless communication between the frontend, backend, and the blockchain network. This ensures that data is securely and accurately recorded on the blockchain, providing transparency and trust in the crowdfunding process.

V. REQUIREMENT ANALYSIS

A) Functional Requirement

i) Campaign Creation: To initiate a campaign, users are required to provide essential details such as titles, descriptions, funding goals, and durations. Additionally, they are offered customization options to specify target amounts and campaign categories. Furthermore, the platform supports the uploading of multimedia content to enhance the campaign's appeal and engagement.

ii) Contribution: Users can securely contribute funds using supported cryptocurrencies, ensuring the safety of their transactions. The platform integrates with blockchain technology, guaranteeing transparency and immutability of all transactions. Moreover, users have the flexibility to choose between anonymous or public contributions, accompanied by messaging capabilities to communicate their support or queries.

iii) Real-Time Analytics: The platform provides real-time insights into the performance of campaigns, offering valuable information on funds raised and contribution trends. Visual representations, such as charts, are available to facilitate easy tracking of fundraising progress. Additionally, users receive notifications for significant campaign events, ensuring they stay informed and engaged throughout the campaign duration.

iv) Wallet Integration: Seamless integration with popular cryptocurrency wallets, such as MetaMask, is offered to users. This integration ensures a smooth and convenient experience for users, allowing them to connect their wallets securely. The platform prioritizes the protection of user funds and private keys, implementing robust authentication and authorization measures.

v) Security and Audits: The platform prioritizes the security of user data by implementing robust measures for data encryption and secure transmission. Regular security audits are conducted to ensure the integrity of smart contracts and blockchain transactions. Furthermore, the platform incorporates multi-factor authentication to enhance security and compliance with regulatory standards.

B) Non-functional Requirements:

i) User Experience: Develop an interface that is easy to navigate and understand for both individuals creating campaigns and those supporting them.

ii) Efficiency: Streamline the execution of smart contracts to reduce gas fees and improve the overall user experience.

iii) Safety: Perform thorough security assessments on smart contracts to detect and address any potential vulnerabilities.

iv)Expandability: Construct the website in a manner that can accommodate a significant volume of campaigns and contributors without compromising performance.

v) Compatibility: Guarantee seamless integration with different blockchain networks and wallets to promote interoperability.

VI. METHODOLOGY

Campaign Creation: To create a campaign, users need to connect their Metamask wallet to the web application. Once their wallet is connected, they can proceed to create a unique campaign by providing the

necessary campaign details such as the Campaign Title, Campaign Photo, Campaign Details, and Fund-Raising Amount. The contract code responsible for this process which is written in Solidity, which is utilized to deploy the contract on the blockchain platform. Each new campaign is generated by instantiating the Campaign factory. It is important to note that every transaction requires a specific amount of gas fee to be processed. This gas fee is a small amount of money that ensures the validity of the transaction. Therefore, when the user clicks on the "Create Campaign" button, a new campaign will be created along with the associated gas fees. After a short period of time, the transaction will be finalized, and a new block containing the contract address will be added to the blockchain.

Once the campaign is created, it will be prominently displayed on the homepage of the website, allowing other users to engage with it. However, in order to manage the associated transactions, an E-Wallet such as Metamask is required after the campaign has been created and added to the blockchain.

Contributors and Approvers play important roles in the crowdfunding process. Contributors are users who contribute and fund the campaigns. By connecting their Metamask wallet to the application, they can easily search for the campaigns they wish to support. It's worth noting that the funds go directly to the campaign's address, rather than the creator's, ensuring a more efficient and secure process that minimizes the risk of fraud.

Approvers, on the other hand, are contributors who have contributed more than the Minimum Contribution. They have the authority to approve or deny withdrawal requests. This mechanism ensures that the funds are being utilized in accordance with the community's agreement. To withdraw the funds, the approval of at least 50% of the approvers is required. Once approved, the funds will be transferred to the predetermined address decided upon by the group.

All transactions and decisions made during this process are securely stored in the blockchain, guaranteeing transparency and preventing any alterations or manipulations. This level of transparency and community decision-making adds an extra layer of security to the crowdfunding process, making it a trustworthy and reliable method for startups to raise funds.

2. Result/Analysis

The integration of blockchain technology into crowdfunding platforms enhances the confidentiality of contributors when making contributions to campaigns. This is primarily because blockchain transactions are transparent, allowing all users to access the records of each transaction through the utilization of the Etherscan API. Additionally, the implementation of smart contracts eliminates the necessity for stakeholders to place trust in one another, as the contract is automatically executed once the predetermined conditions are fulfilled.

Thank you for providing more information about the project. Based on the technologies you've mentioned (HTML, CSS, JavaScript, React.js, and Web3 framework), here's a general outline of how a crowdfunding project using blockchain might be implemented:

i) Project Setup:

- The project would typically start with creating to folder, one for client and second one for Web3 and setting up the basic structure using HTML for markup, CSS for styling, and JavaScript for interactivity.
- React.js might be used as the frontend library to create reusable components and manage the state of the application efficiently.

ii) Integration with Web3.js:

- Web3.js is a JavaScript library that allows interaction with the Ethereum blockchain.
- Integration with Web3.js enables communication between the frontend of the crowdfunding platform and the Ethereum blockchain.
- This includes functionalities like connecting to a blockchain node (such as MetaMask or a custom node), querying data from the blockchain, and sending transactions.

iii) Smart Contract Development:

- Smart contracts are self-executing contracts with the terms of the agreement directly written into code. In the case of a crowdfunding project, a smart contract would manage the funds raised and the distribution of those funds.
- Smart contracts would be developed using Solidity, the programming language for Ethereum smart contracts.
- The smart contract would include functions for contributing funds, withdrawing funds, checking the current balance, and potentially other features specific to the crowdfunding project's requirements.

iv) Deployment of Smart Contract:

- Once the smart contract is developed, it needs to be deployed to the Ethereum blockchain.
- This can be done using tools like Hardhat, which facilitate the compilation and deployment of smart contracts.

v) Interacting with the Smart Contract:

- In the frontend of the crowdfunding platform, users would interact with the deployed smart contract through Web3.js.
- Users can contribute funds to the crowdfunding campaign by sending transactions to the smart contract.
- The frontend would display relevant information such as the current funding progress, the target amount, contributors' list, etc., by fetching data from the smart contract.

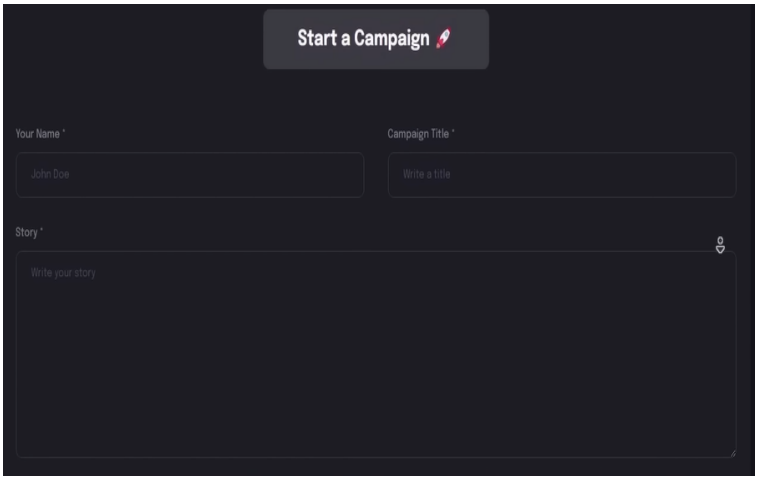

Figure 2 - To create a campaign

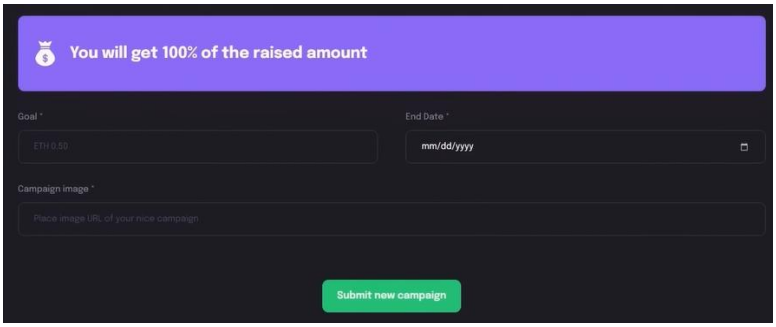

Figure 3 To submit the campaign

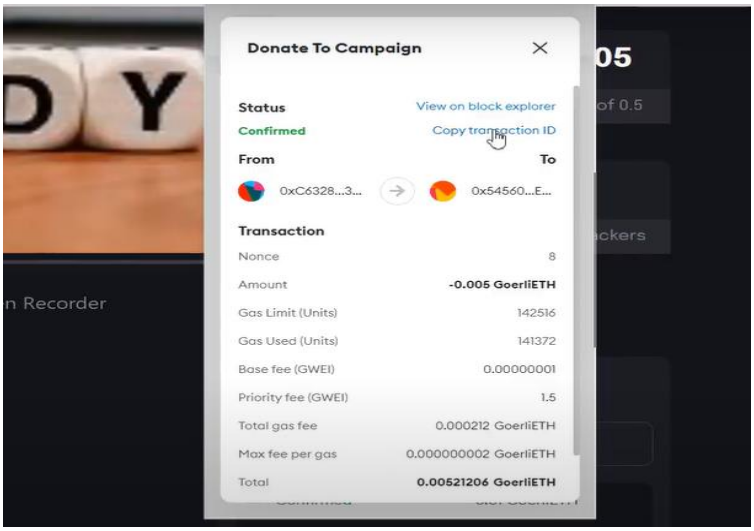

Figure 4 - To donate to the campaign

vi) Security Considerations:

- Security is paramount in blockchain applications. Measures such as input validation, access control, and secure handling of private keys.

- Smart contracts should be thoroughly tested to ensure they behave as intended and are resistant to attacks.

vii) Testing and Deployment :

- The crowdfunding platform would be thoroughly tested to ensure that it functions correctly and securely.
- Once testing is complete, the application can be deployed to a web server

VII. CONCLUSION

In this paper, we present our findings that the proposed web-based crowdfunding system, which utilizes blockchain technology, effectively addresses the critical challenges encountered by conventional crowdfunding platforms. By harnessing Ethereum smart contracts and the solidity programming language, this system provides improved trust, transparency, and control over funds, as well as secure storage of transactions. The integration of Infura ensures a dependable connection between the web system and the Ethereum network, guaranteeing that all transactions are securely and reliably recorded. This innovative approach to crowdfunding eliminates the necessity for imposing fees and offers a more secure and reliable means for startups to acquire funds. Overall, this system presents a promising solution to the obstacles faced by traditional crowdfunding platforms and possesses the potential to revolutionize the funding process for startups.

VIII. FUTURE SCOPE

Crowdfunding using blockchain technology has the potential to revolutionize decentralized finance (DeFi). DeFi involves leveraging blockchain and cryptocurrencies to recreate conventional financial systems, including banking, lending, and investing, in a decentralized manner. By utilizing blockchain-based crowdfunding platforms, individuals or projects can engage in peer-to-peer lending and borrowing without relying on traditional financial intermediaries. Through smart contracts on the blockchain, funds can be borrowed directly from lenders in the form of cryptocurrencies.

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