



Decentralized Crowdfunding Platform Using Blockchain

Arohi Rathore¹, Syed Wajahat Abbas Rizvi²

^{1,2}Department of Computer Science and Engineering, Amity School of Engineering and Technology Lucknow, Amity University Uttar Pradesh, India

¹arohi.rathore@s.amity.edu, ²swarizvi@lko.amity.edu

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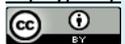
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Abstract

Few years back, blockchain was particularly used to support cryptocurrencies, but after some decades, more and more sectors are adopting this brand-new technology. Blockchain will be used by the majority of technologies in the future as an effective means of conducting online transactions. Crowdfunding platforms are one of the industries to which blockchain technology may be applied. Although crowdfunding is quite common online, there are still some problems with it. Projects that don't finish on schedule, don't finish at all, or don't provide what they promised cause trust concerns. Additionally, crowdfunding sites serve as intermediaries, so you must put your faith in them to transmit your cash properly. This project solves these problems by integrating Ethereum smart contracts with the crowdfunding platform, scams may be avoided, and it is ensured that projects can be fulfilled within the specified time frame. With the use of blockchain technology, decentralized crowdfunding offers more accessibility, transparency, and reduced fees. The ability to immediately create, watch, and donate to crowdfunding campaigns via the blockchain is the most crucial feature. The decentralized crowdfunding platform is linked to the blockchain and features authoring solidity code, pairing metamasks, interacting with smart contracts, and sending Ethereum across the network.

Keywords

Blockchain, Crowd-funding, Decentralized, Ethereum

1. Introduction

One of the most interesting technological phenomena right now is blockchain. It is a distributed, encrypted database design that has a lot of potential for resolving a variety of security and trust-related concerns with the internet. It is well recognized for being the technology that underlies a number of cryptocurrencies, including Bitcoin. Blockchain is defined as a distributed database of transaction records that are shared among involved parties. Decentralization of data, persistence, anonymity, and



auditability are among the traits of blockchain. The transaction and block are the two primary parts of the blockchain technology. While the block is a collection of data that records the transaction and other related information like the correct sequence, timestamp of creation, etc., the transaction is the action that the participant triggers. A blockchain's transaction records, or blocks, are cryptographically linked to one other, making them impenetrable to tampering. As a result, no block that has been added may be changed or removed. Blockchain relies on consensus algorithm to be reliable. By ensuring that every node in the system has an identical copy, trust between nodes in the network is no longer necessary. The blockchain network's consensus-building process is known as mining. Mining is crucial because it makes sure that each piece of data contributed to the ledger is safe and unchangeable.

Ever evolving businesses & start-ups require a huge amount of funds to sustain the competitive market. When anyone decides to launch a business or startup, the need for money emerges to fulfil the cost of new business. Money is the key ingredient that is needed to buy fixed as well as current assets for operations, to buy raw material, to pay staff, etc. In such scenarios Crowdfunding can be extremely helpful as it is a method of raising capital to sponsor businesses and companies. Fundraisers can be often used for internet-based platforms to accumulate money from a certain number of people.

As it has become more and more difficult to fetch loans from banks or other angel investors, many project owners have adopted crowdsourcing to acquire money for their very own start-ups or business. This is considered to be a result of the lengthy processing times for most banks to get loans. There are non-financial benefits to crowdsourcing, according to certain research. According to Schlueter, there are two key benefits of crowdsourcing. The first advantage is that crowdfunding helps match global funders and innovators more effectively. The second benefit is that during the project's early stages, investors may access more data. Investors would benefit greatly from knowing this information, which may increase their desire to finance such crowdsourcing ventures.

The fact that the campaigns are not regulated and some of the crowd-funding efforts have proven to be fraudulent is the most prevalent issue with the present crowdfunding industry globally. Additionally, several projects' completion times were also severely pushed back. Through the use of Ethereum smart contracts on the crowdfunding platform, this project seeks to address these issues by assuring that the projects can be completed within the specified time frames and preventing fraud. In this study, we propose an extended version of Crowdfunding model using blockchain, where a verified user may start a campaign and solicit donations from other app users. A user who needs to raise money for a cause must submit a campaign on the website using a wallet. The campaign itself has a name, a short description, a deadline, and a target, which is how much money the campaign hopes to generate. The programme includes areas where users may give eth, or the blockchain currency ethereum, using a blockchain wallet. Metamask is the chosen blockchain wallet in this case. The creator of the campaign is able to withdraw funds contributed by users only if the goal of the campaign is reached after the deadline.

This project is a perfect illustration of how web3, blockchain, Solidity, and smart contracts actually function behind the scenes. It features a stunning design, connectivity to the blockchain, metamask pairing, interaction with smart contracts, sending Ethereum via the blockchain network, writing solidity code, and, perhaps most significantly, the ability to create, view, and donate to crowdfunding campaigns instantly through the blockchain. The fundamental building blocks of the decentralized crowdfunding platform consist of coupling a react application with the blockchain and an ethereum wallet through metamask. The Chrome Metamask plugin will be used as a wallet to communicate with our decentralized application. Through a suitable web browser or the mobile app's built-in browser, MetaMask enables users to securely connect to decentralized applications, store and manage account keys, broadcast transactions, transfer and receive tokens and cryptocurrencies based on Ethereum, and broadcast transactions.

The main contributions of this study are summarized as follows:

- The proposed method of crowdfunding platform does not have any intermediate fee unlike existing method, which means companies do not have to pay the additional charges for hosting their projects. Also, they don't have the need to pay an



extra amount of management money.

- We improved the transparency of the existing crowdfunding model as the proposed decentralized crowdfunding platform relies on smart contract technology which guarantees that the funds generated will be used for the company's growth only.
- We extended the features of the existing crowdfunding model by making it globally accessible and available which enables individuals or businesses to run their campaigns and collect donations from peers around the world and gives them quick solutions for their requirements.

1.1. Issues with existing crowdfunding platform

Crowdfunding on the internet is quite popular, however there are several problems with the present platform. Projects that don't finish on schedule, don't finish at all, or don't provide what they promised cause trust concerns. You must have faith in the crowdfunding services to transmit your cash properly as they also serve as intermediaries. Most, if not all, of these platforms also take a cut of the money generated (often between 3% and 5%) in order to act as a middleman in these financial transactions. The fact that the campaigns are not regulated and some of the crowd-funding efforts have proven to be fraudulent is the most prevalent issue with the present crowdfunding industry globally. Additionally, several projects' completion times were also severely pushed back.

1.2. Benefits of Decentralized crowdfunding platform

The Blockchain technology offers effective remedies for these problems. All financial transfers are completely open and traceable, which promotes confidence. Without an intermediary or the fees they demand, smart contracts with set rules may control the flow of cash. When handling people's money, it's especially crucial that the blockchain is completely safe and decentralized to guard against bad actors and single points of failure. With the use of blockchain technology, decentralized crowdfunding offers more accessibility, transparency, and reduced fees. The ability to immediately create, watch, and contribute to crowdfunding campaigns via the blockchain is the most crucial feature.

The rest of the paper is organized as follows; Section 2 describes the methodology of the already existing Crowdfunding method as well as the proposed system i.e. Decentralized Crowdfunding Platform, section 3 presents the overview of the technologies used in decentralized crowdfunding platform, the section 4 is comprised of working of the platform illustrated with the help of diagram, section 5 is mainly focused on result of the entire research on decentralized crowdfunding platform, section 7 is based on the future work regarding the platform, and finally the paper concludes with conclusion section in section 8.

2. Methodology

2.1. Existing system

Both the fundraiser and the funder must log into the fundraising site in the current crowdfunding system. Additionally, if they have never used the fundraising platform before, they must register. Here, a fundraising agency (third party) is in charge of keeping an eye on the fundraising platform. The fund-raiser issues a request for donations on the fundraising website. On this platform, funders who want to donate can do so. The fundraising organization will take down the post after the fundraiser has collected the whole sum that he requested. The money, however, will not be within the funders' control. The donor will be unable to tell if his donation actually made it to the fundraiser or not. Since the fundraising organization, a third party, will have full authority over the funds, they may engage in criminal activity.

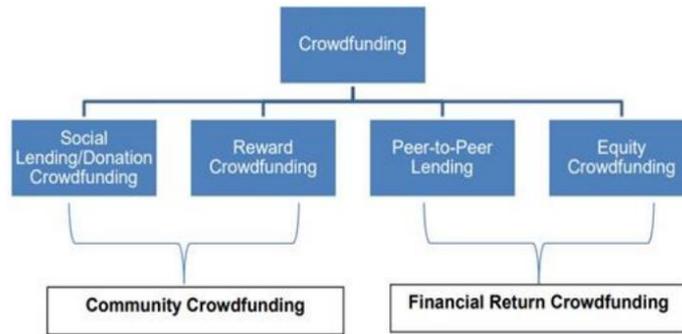


Figure 1. Illustration of Existing crowdfunding model

The engagement of a third party might result in increased costs. Due to the fact that this platform is controlled by a single party, there is a potential that the donors' funds may be used for unlawful purposes. Crowdfunding is a method of gathering money online that has been developed to support the creative ideas of individuals by providing the necessary financial support. People can invest money in starting businesses through a platform by using crowdfunding. The problem with the current crowdfunding approach is that the intermediary doesn't provide the investor who contributed money with any assurances, and the investor also has no control over the money they invested. A blockchain-based method is employed to establish a private, secure, and decentralized crowdfunding platform in order to solve this significant issue. The main goal is to develop a smart contract that will enable investors to participate in any innovative ideas where the safety of the money is assured.

2.2. Proposed system

We must manage several transactions in crowdfunding and properly record them. In this instance, the blockchain idea is employed to record these transactions. The fundraising platform, the funder, the service provider platform, and the blockchain idea for transaction monitoring are the primary players in this initiative. The service provider platform requires both the funder and the fundraiser to log in. They register on this service provider platform if they are a new user. In the digital era, blockchain is upending how conventional businesses are conducted.

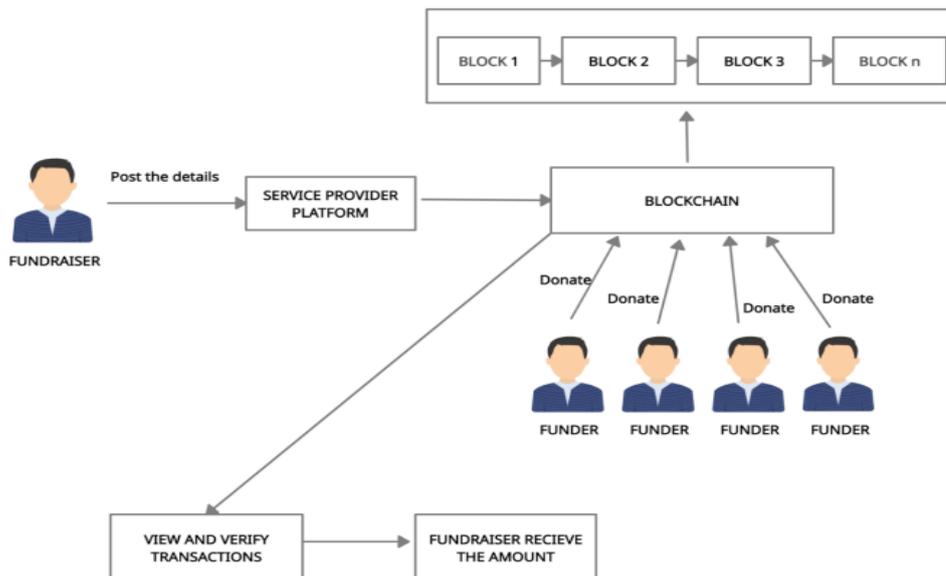


Figure 2. Illustration of proposed decentralized crowdfunding model

The potential of Blockchain technology and the strength of Smart Contracts in creating Decentralized Applications (DApps), Decentralized Autonomous Organization (DAO), and the development of Currency (Cryptocurrency) that allow the exchange of Assets and Wealth are explored in this thesis. Building a decentralized social crowdfunding application on the Ethereum blockchain technology will be the main goal. By developing Smart Contracts that manage the transaction and administration of the application on the Blockchain network, the Blockchain technology would be leveraged to create the application's decentralized design. This project is a perfect illustration of how web3, blockchain, Solidity, and smart contracts actually function behind the scenes. It features a stunning de-sign, connectivity to the blockchain, metamask pairing, interaction with smart contracts, sending Ethereum via the blockchain network, writing solidity code, and, perhaps most significantly, the ability to create, view, and donate to crowdfunding campaigns instantly through the blockchain. The fundamental building blocks of the decentralized crowdfunding platform consist of coupling a react application with the blockchain and an ethereum wallet through metamask. The Chrome Metamask plugin will be used as a wallet to communicate with our decentralized application. Through a suitable web browser or the mobile app's built-in browser, MetaMask enables users to securely connect to decentralized applications, store and manage account keys, broadcast transactions, transfer and receive tokens and cryptocurrencies based on Ethereum, and broadcast transactions.

Solidity programming language was used to create the smart contract on the Ethereum network, and it was then deployed on the blockchain with just one command utilizing thirdweb. The developer may examine all the read and write command code samples and even copy the deployed smart contract address right from the thirdweb's user-friendly dashboard, where the smart contract is deployed. This Web 3.0 application is a fully fledged decentralized crowdfunding platform that enables users to send transactions through the blockchain. Each transaction will be associated with a particular crowdfunding campaign and will be permanently stored on the blockchain. Thirdweb is a web3 development framework that enables us to create, release, or deploy our smart contract with a single command. It is free and open source, and its main advantage is its simplicity because web3 is still a relatively new technology, and thirdweb solves that problem for developers all over the world.

3. Technologies Used

3.1. Thirdweb Framework

The Thirdweb provides a platform for programmers to create, maintain, and assess web3.0 applications. To enable more intelligent SDKs, unique admin dashboards, and customized data feeds, the Thirdweb framework analyses your contracts to find standards and recurring trends. Thirdweb is a platform that offers a set of tools for businesses, artists, and creators to quickly develop, publish, and oversee Web3 projects. It enables users to enhance their Web3 applications without writing a single line of code with features like NFTs, markets, and social tokens. Building Web3 apps requires a lot of effort and money without thirdweb's services. Thirdweb considers itself to be a platform that lowers entry barriers and shortens the build-to-launch cycle by several months.

3.2. React JS

The JavaScript community's preferred framework for contemporary web development is React.js, a front-end library. Facebook created the open-source React.js framework and library for JavaScript. It is used to quickly and efficiently construct user interfaces that are interactive and internet applications as compared to utilizing plain JavaScript. React's primary job in an app is to handle the view layer, much similar to Model V in a model-view-controller (MVC) architecture, by providing the best and most efficient rendering execution. To make larger programmes easier to comprehend and manage, it uses component and data patterns. Using React Native, React can power native apps, and Node can be used for server-side rendering. React enables a single-dire reactive flow of information, which has fewer boilerplate and easier to comprehend than traditional data

binding.

3.3. Vite

A frontend tool called Vite is used to create web apps that are quick and efficient. It offers a simplified and effective development experience by utilizing a contemporary build system and a quick development server. The Vue project templates utilize Vite by default, a local development server created by Evan You. It supports JSX and TypeScript. Vite is a fantastic build tool that is only recently available on the market. It has already gained a lot of traction among developers thanks to its distinctive features, faster developer experience, and support for several languages. It's fantastic when we need reduced scripts and styles but don't want to use a framework. Vite runs the server right away after pre-bundling the dependencies using es-build. The code is then examined, and processing is done using route-based code splitting. Modern online applications are developed with the help of the Vite.js programming tool, which includes a dev server. In terms of development, it offers a quicker and more streamlined approach.

3.4. Metamask

Using the cryptocurrency wallet MetaMask, users may save their Ether. The wallet also enables communication with decentralized applications, or dapps. As a key entry point into the world of Web3, decentralized financial technology (DeFi), and NFTs, one of the most well-known cryptocurrency wallets, MetaMask, emphasizes browser integration and appealing design. MetaMask has to be downloaded prior to it is able to be utilized for an Ethereum wallet, much like other browser plugins. Once loaded, users are able to save Ethereum and carry out transactions using any Ethereum address. By connecting Meta-Mask to Ethereum-based dapps, users may use their currency in games, stake tokens in gambling apps, and sell them on decentralized exchanges (DEXs).

3.5. Goerli Testnet Faucet

On the Ethereum testnet, there is an untrusted faucet called the Goerli Faucet that gives away free test ETH. Programmers can make a 24-hour request for up to 0.05 test ETH via the Goerli Faucet. Developers deploy test transactions and smart contracts using these tokens to test their DApps. Developers can benefit greatly from a Goerli tap when working on a project. We are explicitly referring to a faucet on the Goerli testnet, one of the two public Ethereum testnets that the ETH community maintains, when we use the term "Goerli faucet." You may input your Ethereum wallet address in the Goerli testnet faucet, a type of Web3 application, and get a specific amount of Goerli ETH in return.

3.6. Solidity

Smart contracts are created using the object-oriented, high-level programming language Solidity and automate blockchain transactions. The language was created by Ethereum project participants after being proposed in 2014. The Ethereum blockchain and other blockchains both support the creation of smart contracts using this language. With Solidity, there is no need to type code in ones and zeros because it is a high-level language. Humans can create programmes far more easily by combining letters and numbers in a way that makes sense to them. In 2015, Ethereum, the second-largest cryptocurrency market by valuation, introduced Solidity, a brand-new programming language.

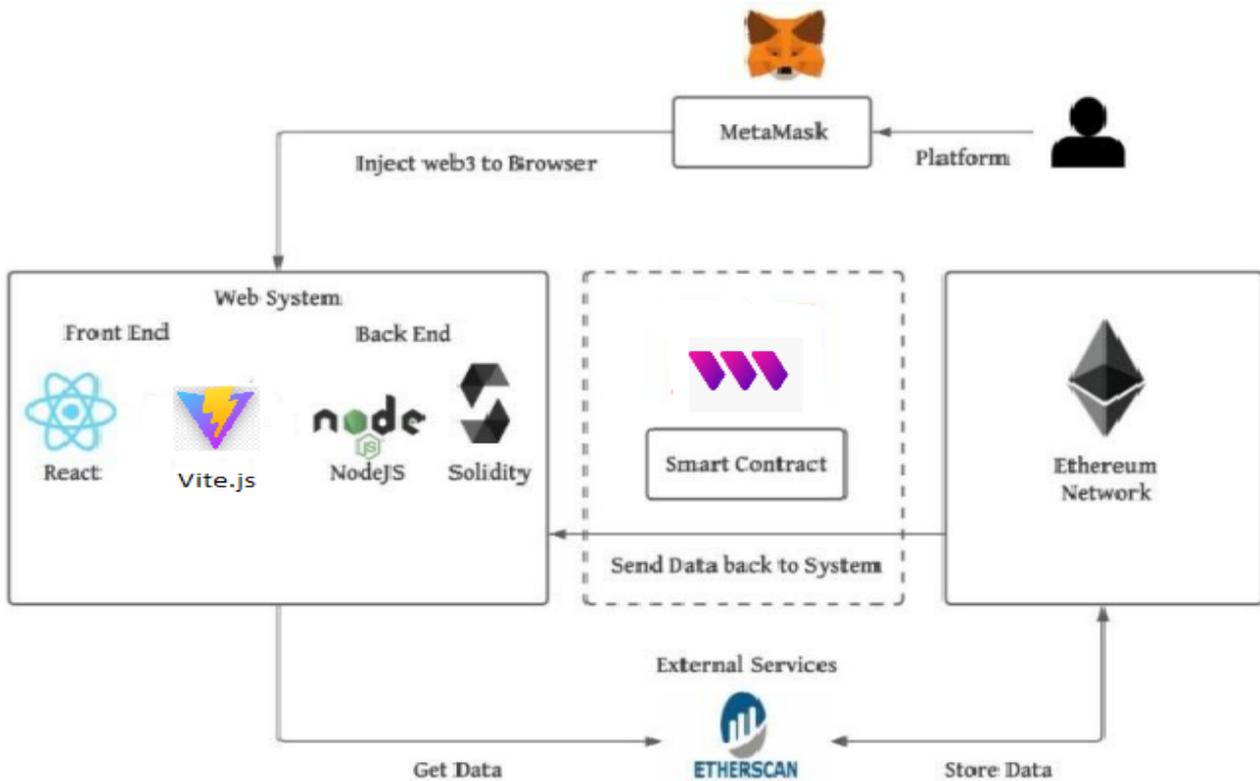
4. Working

The objective of the decentralized crowdfunding platform is to offer a decentralized platform for crowdfunding where a verified user may start a campaign and solicit donations from other app users. A user who needs to raise money for a cause must



submit a campaign on the website using a wallet. The campaign itself has a name, a short description, a deadline, and a target, which is how much money the campaign hopes to generate. The program includes areas where users may give eth, or the blockchain currency ethereum, using a blockchain wallet. Metamask is the chosen blockchain wallet in this case. The creator of the campaign is able to withdraw funds contributed by users only if the goal of the campaign is reached after the deadline.

Figure 3. System Architecture



4.1. Smart Contract

Define An agreement between parties that is kept on a platform that uses blockchain technology and has a unique identification number known an address may be validated and enforced using a smart contract, which is a set of instructions and digital protocol built using computer language. To facilitate the creation of a smart contract, several tools are being developed, which will promote the usage of blockchain technology. Smart contracts may be written in a number of high-level programming languages. The most popular programming language used specifically for building smart contracts is called Solidity. The Smart contract contains a struct 'campaign' that has properties such as:

- Owner: It specifies the wallet address of the owner of the campaign.
- Title: It is the title of the campaign, the name by which we can specify the campaign.
- Description: It is the detailed explanation of the campaign and its cause.
- Target: It specifies the Amount of Eth required for the campaign to be successful.
- Deadline: It denotes the last date, after which the campaign will expire and will not accept any donation.
- AmountCollected: It represents the amount of donations in eth collected till now for the campaign.
- Image: It is a visual display in the form of picture of the campaign.

- Donaters: It specifies the list of the donates who have donated in the campaign.
- Donations: It denotes the amount of donations received by the campaign.

Smart contracts are one of the main features that blockchain technology used for crowdfunding offers. These are electronic programmes that run on their own when specific circumstances are fulfilled. This essential component enables the creation of platforms that function without the intervention of humans, ensuring the speed and security of every transaction. This also removes the majority of expenses, which might be significant if you have several backers, in addition to middlemen.

In this project of decentralized crowdfunding platform, Smart contract functions are comprised of 4 functions namely:

- createCampaign: This function enables the user to create a campaign for the crowdfunding platform. This function creates various properties of the campaign such as, owner, title, description, target, description, target, deadline, amountCollected, image, donaters, donations.
- donateToCampaign: This function allows user to donate to a specific campaign This function of smart contract is used to collect eth from contributors as a donation.
- getCampaigns: It gives the list of all the campaigns mentioned on the application so far. This smart contract function returns the list of all the campaigns created over the decentralized platform.
- getdonaters: This function gives the list of donators who have donated a certain amount of eth to a specific campaign, along with that this smart contract function returns the amount of donations beside the id donator.

4.2. Code Description

The two main components that make up the decentralized crowdfunding platform system are called "Creating a Campaign" and "Contributing a Campaign".

4.2.1. Creating a Campaign

The In the real world as well as other crowdfunding sites, anybody can launch a campaign in a few minutes. The campaign data will be tracked by an Ethereum-based smart contract, assuring its integrity. A campaign may only be created when a few simple fields have been completed. The name of the campaign and a few phrases explaining it must be provided by the campaign's author. The minimal contribution amount and the campaign's target amount must be chosen by the campaign's author. The picture URL must be provided by the campaign's author. Making a campaign-related graphic is ideal. Once the minimum contribution amount has been established, the contributor cannot make a contribution below it. The creator of the campaign must first link their Ethereum wallet, which is the most important need. They won't be able to create a campaign if they don't have an Ethereum wallet or if they haven't connected their Ethereum wallet with MetaMask.

4.2.2. Contributing to a Campaign

Once a campaign has been built, it may be contributed to by anybody. Users are able to share campaigns they have produced. Contributor is sent to the campaign donation page once they clicked on a campaign from the main page. On that page, you can see the campaign's name and description, the minimum contribution amount set by the campaign creator, the wallet address of the campaign creator, the number of requests that have been made so far, the number of approvers or contributors that have made contributions so far to the campaign, as well as the status of the funds raised. The donor will not be allowed to contribute to the campaign if he does not use a meta mask to connect his Ethereum wallet. The contributor can examine the campaign withdrawal requests before to making a contribution. The process will be more effective and anti-fraudulent since the monies would be paid to the campaign address instead of the campaign creator.

5. Result

As a result of this decentralized crowdfunding platform, users may easily begin new projects by entering information such as the title of the project, description of and minimal donation with only one click. The purpose of this thesis was to investigate the properties of blockchain technology and how they affect the way apps are being created utilizing this new distributed architecture. I also examined how inefficient it is to use traditional crowdfunding platforms and campaigns to raise money. I looked into a solution that would not only use blockchain technology to reduce the fees that those conventional platforms charge, but also make it much simpler for users to communicate with those platforms and make a much lower-cost contribution to any crowdfunding campaign they choose.

Figure 4. Illustration to Create a Campaign on the platform

6. Future Work

The future work of decentralized crowdfunding platform of creating features where Investments may be made completely anonymously and without freezing, ensuring that the designated charity receives the whole amount. All contributions are made directly to a user-controlled cryptocurrency wallet. We can also add a feature where membership is necessary to invest, and it enables charities to create their own subscription-based business models. This implies that a monthly cost is required in order to access the platform's large community, and that transaction fees apply to donations as well, by using feature donors can easily feel more organically linked to the initiatives they support because to its community-driven framework. We can also add a feature of the decentralized environment permits the listing, tokenization, and breakdown of several projects derived from patents, digital assets, and other intellectual property rights.

7. Conclusion

The Our economy, society, and community can all profit from the development of a decentralized community crowdfunding application on the blockchain. The advantage of using this new approach to application development over the conventional method is that it lowers the cost of running and maintaining the application, which in turn stimulates the development of the local economy and distributes wealth and value evenly among the population. An example of such an application is the community crowdfunding application. A distributed application operating on the blockchain network doesn't need an intermediary to conduct transactions, which is the foundation of its cost effectiveness. The danger of vulnerable information being exposed to a prospective attack is extremely minimal because the application operates on a trustless environment. A decentralized application has barely anything in terms of transaction costs. This study introduces a blockchain-based crowd-funding system that, by utilizing Ethereum smart contracts, may offer a private, secure, and decentralized crowdfunding path. By using Ethereum and developing smart contracts that give contributors control over their Ethereum spending, the main objective of is to enable contributors to effectively contribute to any campaign anywhere in the world. This will also enable campaign creators and contributors to efficiently raise and reserve financing for the project or campaign. The goal of decentralized crowdfunding platform is to apply Ethereum smart contracts to the crowdfunding platform in order to fully automate the execution of the contracts, therefore resolving these issues and fostering positive relationships between the platform, the fundraisers, and the contributors.

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