Distributed Crowd Funding System

Submitted in partial fulfillment of the

requirements for the award of

Bachelor of Engineering degree in Computer Science and Engineering
By

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
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<u>BONAFIDE CERTIFICATE</u>

This is to certify that this Project Report is the Bonafide work of Siva Sal Kakumani(39110014) who carried out the Project Phase-2 entitled **"Distributed crowdfunding system"** under my supervision from October 2023 to June 2023

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DECLARATION

I, **Siva Sai Kakumani(39110014)**, hereby declare that the Project Phase-2
Report entitled **"Distributed crowdfunding system"** done by me under the
guidanceof **Dr. J. Albert Mayan, M.E.,Ph.D** is submitted in partial fulfillment of the
requirements for the award of Bachelor of Engineering degree in **Computer Science
and Engineering**.

DATE: 20.4.2023

PLACE: Chennai   **SIGNATURE OF THECANDIDATE**

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ABSTRACT

Crowdfunding is a decentralized application based on the Ethereum blockchain platform that allows users to invest money in the campaigns that interest them. By using blockchain, we can make sure that the investors engage in low-risk support of new ventures and venture creators can gain more supporters globally making it easy for them to raise large amounts of funds in minimal time. Especially in the blockchain world at present, there are a lot of projects created by individuals or small-distributed teams that want to raise funds by issuing tokens to the investors. A crowdfunding platform simplifies the whole idea of raising capital with help of the global public that might be interested in the campaign for an incentive that is profitable to the investor. Ethereum was the perfect choice for this project "Crowdfunding app" which creates an environment for people to raise money for their dream project. With the smart contracts present, the application can store and manage user account data, and store metadata and users can interact with the smart contracts using transactions created by the project's client application. Ethereum makes smart contracts always available, accessible anywhere, and restricts control to people who are only authorized to use them. It can achieve this because of the underlying technology "blockchain" first used in Bitcoin.

CHAPTER 1

INTRODUCTION

Blockchain and smart contracts open up new possibilities in philanthropy, reworking resource into virtual property and constructing accept as true with in charitable businesses. The givers can now tune the effect in their contributions whilst charities can use crypto tokens to incentivize making donations.

When identifying approximately donating budget to charitable causes, many will marvel whether or not or now no longer their contribution could have an effect. Quite a number of nonprofit businesses have shaken people`s accept as true with in philanthropy and made them query the credibility of charity tasks through undertaking shady schemes to extract extra revenue. Transparency is one of the key problems in today`s philanthropic world. Enter blockchain generation, an immutable ledger in which each report may be traced to its creation.

Decentralized and allotted amongst its users, blockchain permits them to tune transactions and make sure of the absence of fraudulent activities. Read directly to discover extra approximately the upward thrust of blockchain charity tasks and what advantages the generation brings for philanthropic businesses, donors, and beneficiaries.

Working Of Blockchain

A blockchain is a data structure that stores data in a growing chain of blocks linked by cryptography. Each block in the blockchain consists of her three core components: data, the hash of the previous block, and the hash of the subsequent block. A hash of a block is a function that takes data as input and transforms that input into an untraceable, immutable hash output.

Blockchain design is perfect for storing sensitive information. In today's technology-dependent world, all transactions must pass through a central server, exposing identities and assets to a multitude of intermediaries on the Internet. If this central server is hacked, all information can be accessed. However, blockchain eliminates the need for intermediaries. Records transactions across a user's computer and allows users to authenticate transactions.

Thus, because of blockchain`s decentralization, there's no significant factor of danger that hackers can target. In addition, the information inside a block cannot be changed; seeing that every block at the blockchain is connected to its adjoining blocks, with the aid of using changing the information inside one block, its hash will now no longer in shape that of the following block, main the chain to interrupt after the altered block. Blockchain generation permits information to be saved stable and eliminates the risk of tampering.

As a decentralized, stable information shape, blockchain opens the door to a global of evolving generation. Countless industries may want to use blockchain to streamline and reinforce their systems. In particular, blockchain can revolutionize the shape of nonprofit organizations, simplifying their tactics and giving donors transparency.

By incorporating blockchain into recording charitable donations, donors might be capable of song precisely in which their donations pass and whilst they're placed into use. Blockchain will offer extra transparency at the back of nonprofit companies and supply each donor and operators' extra responsibility in terms of how donations are spent.

With blockchain`s immutable structure, donations can't be falsified and are completely recorded for donors to see. In addition, blockchain can song how an awful lot of each donation is funneled towards certainly supporting the reason this is marketed, which in flip prevents companies from diverting finances towards lining their very own management`s pockets.

In a large, centralized charity, there is always the potential for too many levels of administrators to eat up the funds. Blockchain-based charities minimize the number of intermediaries between donors and the people they want to help, allowing the majority of donations to go to those in need.

 By using blockchain technology to track, store and authenticate donations, donors can self-verify their donations and track exactly how their money is spent. Blockchain fosters donor trust in charities by increasing the visibility of philanthropic transactions and paving the way for a more philanthropic future.

Another challenge that charities face is translucency. When people contribute to charities, they generally trust that the association will insure that their plutocrat is

spent well. still, numerous nonprofits aren't as over- frontal about their spending as benefactors would hope, telling their fund distribution only in broad terms and neglecting to reveal specifics, or indeed falsifying their records.

Therefore, benefactors are left in the dark as to how important of their plutocrat actually went toward helping those in need and how important was diverted toward other associations, budgeting issues, and other overhead costs.

With the addition of blockchain into charities, benefactors would no longer be ignorant of what's being done with their plutocrat. Donation information would be stored in blocks along with patron information, but benefactors would be suitable to save their sequestration with a kind of digital hand that doesn't reveal their identity.

Since blockchain is a public tally that's viewable by anyone, charity fraud would be veritably delicate to commit; benefactors are suitable to precisely cover their finances and insure that no data is tampered with.

Blocks are stored permanently and in chronological order, so benefactors can check to see how their donations are spent, who's in possession of their finances at any given time, and where their plutocrat has been transferred to.

Likewise, if enough benefactors connect their computers to the blockchain (which would also serve as bumps), they would support the security of the blockchain, their donation information would be more delicate to manipulate, and they would have further confidence in the safety of their deals.

Although utmost charities and fundraisers are licit and seek to help the less fortunate, there are still some false drivers that are only trying to fiddle people out of their plutocrat. Being offered on a blockchain ecosystem, benefactors can use confirmation mechanisms to identify authentic nonprofit associations.

Advantages Of Blockchain-Based Charities

Blockchain both as a technology and the operations that are erected on top of it, similar as digital hold all trading exchanges, and advancing results could introduce a whole array of new and innovative tools for humanitarian associations. Some of these innovative generalities and the benefits for charities are described below.

Digital Smart Contracts

Smart contracts are operations that run on blockchain technology that have rules and conditions programmed into them and initiate certain events when these conditions are met. In the case of philanthropy, these contracts can represent agreements between the giver and the charitable association.

This brings a lot of openings for all the parties involved in the donation process and can make it completely automated and exacting. Clauses and vittles could be erected right into the smart contracts and stipulate when and where finances, goods, or inventories should be transferred.

These agreements could regulate the chance of payments that go to support the charitable cause. The whole process of dispersing donations could be streamlined, from entering the payment to choosing the donors to finishing deals to heirs.

This builds a lot further trust between the charity associations and the givers, allowing them to see how the money or donation or charity is spent and get a refund if the impact of the donation wasn't vindicated by the smart contract.

Blockchain-Based Payments Bring Tax Benefits

Cryptocurrency payments like Bitcoin are not subject to capital gains tax. Since charities are often global organizations, the associated international payment fees are also not an issue as cryptocurrency transfer fees are much lower. receive. At the same time, donors can also benefit from higher government tax deductions.

Engagement Of Philanthropic Assets

Tokenization is a method of creating digital assets that represent something of value, such as: B. Charitable Contributions That Can Be Purchased and Shared Between Stakeholders.

Such digital assets can be used to maintain a fundraising system where donors are rewarded with tokens for participating in charitable events. More donations from

other supporters will increase the token's value, creating an effective engagement model.

Tokens can be allocated for specific purposes, such as assisting with daily living in nursing homes or providing medical care. In this way, donors can not only help the organization financially, but also choose the projects they want to get involved in and send the funds directly to the people they want to help.

A Profitable Combination With The Growing Sharing Economy

Sharing economy platforms help people in more ways than a simple donation. Placing resources in a distributed system like blockchain makes them accessible from anywhere. Housing rentals, ride-sharing, knowledge and staffing services can be used by charities to provide affordable housing, commuting and education to those in need.

These platforms also provide a more efficient way for charities to find and access resources to operate and grow their ecosystem. Ultimately, the blockchain shared economy system will open up new channels for philanthropy and offer greater reach to non-profit organizations.

Drawbacks Of Blockchain-based Charity and Fundraising

Despite its significant positive impact on philanthropy, blockchain technology has certain limitations that may slow its adoption worldwide. Let's see what is holding it back.

Concerns About Security

Blockchains are inherently very secure, protected by strong cryptographic mechanisms and their decentralized and decentralized nature, but they are not completely impenetrable. Smart contracts are essentially software prone to bugs and vulnerabilities that can provide a backdoor for hackers looking to steal your funds.

Holding donations in cryptocurrency also carries the risk of losing the private key to the wallet, thus allowing access to the funds without any chance of recovery. Donations can also be stolen by malicious individuals if keys are not stored properly and securely and common precautions are taken to limit online access.

Learning Curve Of The Blockchain

Someone new to cryptocurrencies and blockchains may find these concepts very confusing. Blockchains and smart contracts, if he doesn't understand the basics of contracts, it can alienate potential donors. Some charities may be hesitant to adopt a completely unreliable new technology without fully understanding blockchain's benefits for charities.

No Established Regulatory Base

Most policymakers around the world are just beginning to introduce legislation mandating the use of blockchain and cryptocurrencies. The long-term impact and full potential of this technology are not yet clear, so regulations are subject to change and amendment. In some jurisdictions, beneficiaries who accept cryptocurrency donations may be subject to additional taxes imposed on their use of digital assets.

CHAPTER 2

LITERATURE SURVEY

[1] Mirko Zichichi, Michele Contu, Stefano Ferretti, Gabriele D'Angelo, "LikeStarter: a Smart-contract based Social DAO for Crowdfunding", IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), 2019
In this paper, Mirko Zichichi presents LikeStarter, a blockchain-based decentralized platform that incorporates social interactions with crowdfunding mechanisms, allowing any user to raise funds while increasing their social network popularity. LikeStarter is built on the Ethereum blockchain and is structured as a Decentralized Autonomous Organization (DAO), which fosters crowdfunding without the intervention of any central authority and recognizes donors' active role, allowing them to support artists or projects while profiting.

[2] Umit Cali, Ugur Halden, Marthe Fogstad Dynge, Aleksandra-Sasa Bukvic-Schaefer, "Blockchain-Enabled Equity Crowdfunding for Energy Storage Investments", International Conference on Smart Energy Systems and Technologies (SEST), 2021
The Levelized Cost of Storage for a residential scale Lithium-Ion battery is assessed in this study by contrasting traditional and new financing options such as blockchain-enabled crowdfunding. The proposed Financial Technology tool will enable numerous small stakeholders to offer loans with longer debt tenors and lower interest rates, allowing for digital partial ownership of such investments and providing additional incentives for the rapid deployment of energy storage solutions. The findings demonstrate the economic viability of energy storage systems entering the European energy sector and highlight how blockchain-based FinTech tools could accelerate energy storage system deployment through energy financing.

[3] Nikhil Yadav, Sarasvathi V., "Venturing Crowdfunding using Smart Contracts in Blockchain", Third International Conference on Smart Systems and Inventive Technology (ICSSIT), 2020
This paper proposes a blockchain-based crowdfunding platform that can provide a private, secure, and decentralized path for crowdfunding. The main goal of this paper is to allow investors to effectively contribute to any project by creating smart

contracts through which contributors can have control over the invested money and project creators and investors can effectively make and reserve funding for the project.

[4] Iman Vakilinia, Shahriar Badsha, Shamik Sengupta, "Crowdfunding the Insurance of a Cyber-Product Using Blockchain", 9th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON), 2019

To improve the application of cyber insurance, Iman Vakilinia proposes a new framework for insuring a cyber-product using blockchain technology in this study. After a vendor initiates a request for insurance on a cyber product, interested insurers compete in a sealed-bid auction by bidding their preferred premium for the insurance service. The auction winners will be chosen as insurers, and they will receive tokens in exchange for their obligations. In the case of an indemnity request, the auditor verifies the request's validity before calling the claim function to retrieve the corresponding amount from funds collected from insurers. Furthermore, a new method was proposed for implementing a sealed-bid auction in smart contracts for insurance crowdfunding.

[5] Claire Ingram Bogusz, Christofer Laurell, Christian Sandström, "Tracking the Digital Evolution of Entrepreneurial Finance: The Interplay Between Crowdfunding, Blockchain Technologies, Cryptocurrencies, and Initial Coin Offerings", IEEE Transactions on Engineering Management (Volume: 67, Issue: 4), 2020

The findings show that discussions about blockchain technologies dominated the interplay in the first analyzed time period, cryptocurrencies and ICOs dominated the interplay in the second analyzed time period, and discussions about blockchain technologies, cryptocurrencies, and ICOs converged heavily in the third time period. This article contributes to previous literature on entrepreneurial finance by providing an empirical contribution that details the coevolution of these phenomena in recent years by illustrating this shift over the analyzed time periods and by offering a systematic exploration of key characteristics of the interplay at hand.

[6] S Rashmitha, H A Sanjay, K Aditya Shastry, K Jayaa Shree Laxmi, "FarmFund - A Blockchain based Crowdfunding App for Farmers", 7th International Conference on Communication and Electronics Systems (ICCES), 2022

This paper proposes a blockchain-based system that allows investors to receive a portion of their investment based on the farmer's returns. The proposed system will ensure that farmers can easily obtain capital when they are in need. To increase trust in the system, the Credit Score system has been integrated. The plasma-based distributed Ledger framework will enable gasless transactions, resulting in a cost-effective system, as shown in the results section.

[7] Harsh Khatter, Hritik Chauhan, Ishan Trivedi, Jatin Agarwal, "Secure And Transparent Crowdfunding Using Blockchain", International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), 2021
Nowadays, there are several crowdfunding platforms, such as Kickstarter, that allow entrepreneurs to post their ideas on the platform, where backers can see the project and contribute money to it. These crowdfunding platforms made it easier for entrepreneurs to reach out to a large crowd of people all over the world who could support their projects. Despite having many advantages, the existing crowdfunding system has some issues, such as charging a large amount of money for maintenance, transparency in the system, and trust. By providing a more transparent system in which every transaction can be stored on the blockchain using Smart Contracts, this application can eliminate the problems associated with the existing crowdfunding system.

[8] Viren Patil, Vasvi Gupta, Rohini Sarode, "Blockchain-Based Crowdfunding Application", Fifth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC), 2021
This crowdfunding application is not like any other application that simply allows people to invest their money; instead, this platform guarantees returns to backers. The application will also provide transparency between backers and start-ups, allowing backers to stay up to date on the progress of the project work of the start-ups in which they have invested their money. If the project is canceled in the middle, the money will be returned to the backers. This will be a multi-user application with three distinct user types: Admin, Backers, and Start-up. Start-ups can be approved for listing by the administrator. Startups can track the status of their project's approval and funds raised in real-time. Backers can track the progress of the projects they support, as well as general information about other projects listed

on the application.

[9] Ye Fan, Chen Ao, Liang Jingren, "Research on the Application Model of Public Welfare Crowdfunding Based on Blockchain Technology", 2nd International Conference on E-Commerce and Internet Technology (ECIT), 2021

Aiming at the current pain points in the field of public welfare crowdfunding, this article introduces the concept of "public welfare points," which is innovatively based on the open consensus, decentralization, and non-tamper able technical characteristics of the blockchain and its available points in the field of public welfare crowdfunding. A new public welfare crowdfunding application mode with a reasonable incentive operation mechanism is proposed.

[10] Shubhangi Priya, Garima Srivastava, Sachin Kumar, "Blockchain Integrated Crowdfunding Platform for Enhanced Secure Transactions", 4th International Conference on Recent Developments in Control, Automation & Power Engineering (RDCAPE), 2021

Blockchain has been integrated into the proposed solution to build trust among funders and those raising these funds, with its characteristics of decentralized, irrefutable, distributed ledgers, consensus, and faster settlement. Campaigns for the proposed model were implemented on remix ide, which will create a campaign for those in need of funds and donors to donate funds to these campaigns. The campaign master has the authority to refuse or accept requests, thereby preventing fraud and ensuring a tamper-proof environment. The model has been subjected to the positive and negative unit and integration tests on Mocha; the model's efficiency is comparable to existing solutions, with the added benefit of security via smart contract protocols.

2.1 INFERENCES FROM LITREATURE SURVEY

The findings show that discussions about blockchain technologies dominated the interplay in the first analyzed time period, and cryptocurrencies and ICOs dominated the interplay in the second analyzed time period.

It also includes discussions about blockchain technologies, cryptocurrencies, and ICOs converging heavily in the third time period.

This project contributes to previous literature on entrepreneurial finance

By providing an empirical contribution that details the coevolution of these phenomena in recent years by illustrating this shift over the analyzed time periods and by offering a systematic exploration of key characteristics of the interplay at hand.

2.2 OPEN PROBLEMS IN EXISTING SYSTEM

Despite the existing crowdfunding system, having many advantages there are some problems related to these systems such as charging a huge amount of money for maintenance, transparency in the system, and trust. Our application can remove these problems related to the existing crowdfunding system by providing a more transparent system where every transaction can be stored on the blockchain using Smart Contracts. Traditionally, banks and venture capital funds are the main way to fill the gap in the funding chain. A startup founder would approach a bank or a venture capitalist with his project pitch for funding and if they are interested in the project then the bank or venture capitalist will fund it for some returns, such as equity in case of a venture capitalist or loan interest amount in case of banks. However, this way of raising funds has limitations associated with it. This process of fundraising requires a huge amount of time, money, and valuable resources that project creators from developing countries or remote places do not have access to. If we consider a bank loan as the solution for funding a project then the bank might become a bottleneck in the project as a bank needs concrete proof of how the project generates revenue and also it requires the founder to provide collateral for the amount loaned. Online crowdfunding enables people to raise funds for their projects. People who are interested in a project can donate by making an online transaction. The donated money goes to the project manager, which he uses to complete the project or to make a product. This existing method of online crowdfunding has a major drawback. It does not allow contributors to have control over the money they have contributed. Since in the existing method the project manager has all the control over the money contributed he can very easily perform malicious activities. Here we address this problem faced by the existing online crowdfunding platforms by using Ethereum network and smart contract. The development of Blockchain technology has allowed businesses to build decentralized models. Current

crowdfunding companies need to establish a cost-efficient and credible voting system for investors to vote on critical business decisions. Such a system will ensure that shareholders have a say in important decisions, small investors can participate in corporate governance, large shareholders do not infringe upon the interests of small investors, and the interests of all investors are protected.

CHAPTER 3
REQUIREMENT ANALYSIS

3.1 FEASIBILITY STUDIES/RISK ANALYSIS OF THE PROJECT

FEASIBILITY STUDY

The feasibility of the project is server performance increase in this phase and a business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis, the feasibility study of the proposed system is to be carried out. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

● Economical feasibility

● Technical feasibility

● Operational feasibility

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of funds that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands being placed on the client. The developed system must have modest requirements, as only minimal or null changes are required for implementing this system.

OPERATIONAL FEASIBILITY

The aspect of the study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user

must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system

3.2 SOFTWARE REQUIREMENTS SPECIFICATION DOCUMENT

Hardware specifications:

- Microsoft Server enabled computers preferably workstations.
- Higher RAM, of about 4GB or above
- Processor of frequency 1.5GHz or above

Software specifications:

- Python 3.6 and higher
- Anaconda software

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEM

4.1 SELECTED METHODOLOGY OR PROCESS MODEL

Algorithms

Overview:

The project is a web application which is basically an enhancement of the existing crowd funding systems. In normal Crowdfunding's there is no security ensured for contribution amount. So, smart contract of Ethereum platform which is an application of blockchain can be used in order to solve this issue. Blockchain is a decentralized distributed ledger system that accesses, verifies, and transmits network data through distributed nodes. An Ethereum based smart contract is a cryptographic box which stores information, processes inputs, writes outputs and is only accessible to the outside if certain predefined conditions are met and the contracts in Ethereum are written in special language called solidity. In practice, Ethereum allows for an easy implementation of such smart contracts and in addition Ethereum offers developers online compilers of solidity code. Smart contract is written in such a way that the entire amount funded by the contributors will safely be kept in smart contracts so that no one can modify it or steal it. The amount will not be directly given to campaign creator rather it will be held in smart contract itself. If the campaign creator wants to use this amount, he/she has to create a spending request. Then the approvers (people who have contributed to the campaign) should approve the request created by the campaign creator. If the request gets majority no of approvals/votes as shown in then the amount can be sent to the vendor specified by the campaign creator. The voting system used is decentralized as blockchain technology is used in implementing it. This makes the voting system more secure and also cost efficient while guaranteeing the voters privacy. Campaign creator will be able to finalize the payment once the required votes are obtained.

Existing System

In the existing framework, the issue is that the organizations charge intensely to both the benefactor and the client. There is no track of the records of the cash, straightforwardness, communication between the investor and the client in building up the project. The trust is the fundamental issue with regards to the crowdfunding with the current organizations. None of these organizations give the benefactor guarantee policy.

– Not Transparent

– High Charges

– Donor guarantee policy not available

– No track of Records

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Proposed System

In the proposed framework, the mission makers will post their task thoughts in the mission and the intrigued individuals will donate the fund to the undertaking thought. Where it concedes from the old crowdfunding is that all the cash is currently digital currencies like ether. All ether coin will be recorded and keep tracks in the blockchain, where the blockchain is an immutable ledger. The Donor has power over the subsidized cash. With the Request endorsement module, the donor has full command over the cash they invested. Just in the event that one by two of the investors need to approve the solicitation made by the creators. By giving control on invested money the Trust is gained.

– Trust

– Control over money

– No charges

– Donor Guarantee Policy

– All transactions are recorded

– Money is Stored Securely

4.2 Architecture / Overall Design of Proposed System.

Module 1

Function List

Start Project

We should be able to start a new crowdfunding project, along with setting its details like goal amount, etc. Before submitting a proposal to a fundraising platform, of course fundraisers must register to a fundraising platform service providers. of course, each service provider has its own rules who can submit proposals to find funds in their organizations. In general, the fundraiser registration process only involves two entities, the fundraiser and the service provider of fundraising platform itself. The fundraiser will register to service provider of fundraising platform. In this case, the data from the fundraiser is stored in the service provider database and can be accessed by certain parties in accordance with the rules that apply to the service provider of fundraising platform. All transaction or historical data of fundraiser only can be consumed by service provider.

View Projects

We should be able to retrieve our existing projects' details and display it. User create project by lying all the required details. The inputs for the campaign creations include

project name, project target, project category and project image. Once the campaign creator confirms the inputs and click create campaign, the information will be stored in the blockchain network.

Fund Project

We should be able to fund an existing project with Ether. Each withdrawal made is recorded in the blockchain network and the contributors will receive notification about transactions made. Each transaction is logged in blockchain and is available to all Ethereum can users.

Retrieve Funds

In the case where a project does not meet its goal amount, and is past its deadline, funders should be able to retrieve their contributed funds (All-or-Nothing setup). There is a process whereby the fundraising does not reach the target with a certain amount and time then the funds collected will be returned to the fundraiser either directly or indirectly and there is also the possibility to develop the fundraising with certain term and conditions. This AoN scheme is a crowdfunding process scheme that implements if fundraising does not reach the target, then the funds will be returned to the funders.
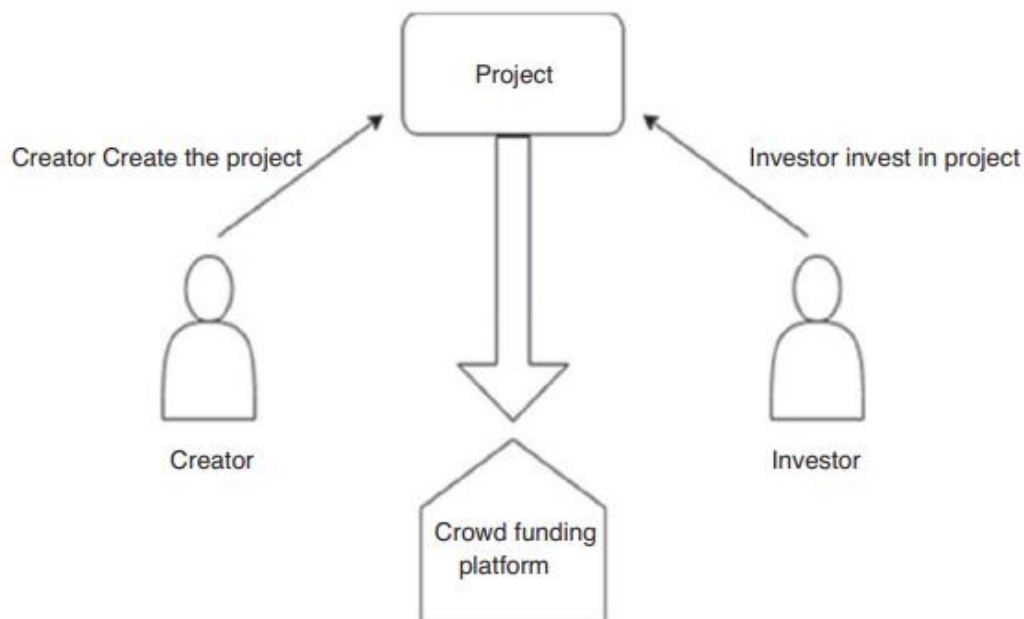
Fig 4.1 Retrieve funds.

Metamask

Metamask allows to run Ethereum decentralized applications in the browser itself without running a full Ethereum node and it is a self-hosted wallet to store, send, and receive Ethereum or ERC20 tokens. It allows to create n number of accounts which are just like bank accounts. Metamask wallet has to be installed from the chrome browser and network has to be set to Rinkeby test network which is available in

options at top of the wallet. Then in order to test and run the project some fake Ethereum(currency) is transferred from Rinkeby faucet to the account being used in the project by giving its address.

Git

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency. Git is a fast, scalable, distributed revision control system with an unusually rich command set that provides both high-level operations and full access to internals.

The Git feature that really makes it stand apart from nearly every other SCM out there is its branching model. Git allows and encourages you to have multiple local branches that can be entirely independent of each other. The creation, merging, and deletion of those lines of development takes seconds.

With Git, nearly all operations are performed locally, giving it a huge speed advantage on centralized systems that constantly have to communicate with a server somewhere.

React.js

React (also known as React.js or ReactJS) is a free and open-source front-end JavaScript library for building user interfaces based on UI components. React can be used as a base in the development of single-page, mobile, or server-rendered applications with frameworks like Next.js.

Module 2

In this module, we will work on building the smart contract and creating the web app.

Ethereum has its own very high-level and object-oriented language, that is, Solidity; it provides a human-readable format which can also be understood by machines, and it is also a combination of JavaScript, Python, and C++.Solidity, one of the programming languages used for creating smart contracts, specifically for Ethereum-based ones, is used as primary programming language here. All the contract code is written in solidity which is used to deploy contract in blockchain platform.

Solidity is an object-oriented, high-level language for implementing smart contracts. Smart contracts are programs which govern the behaviour of accounts within the Ethereum state. Solidity was influenced by C++, Python and JavaScript and is designed to target the Ethereum Virtual Machine (EVM). Solidity is statically typed, supports inheritance, libraries and complex user-defined types among other features. With Solidity you can create contracts for uses such as voting, crowdfunding, blind auctions, and multi-signature wallets.

We're creating 2 contracts in one .sol file: Crowdfunding and Project.

The Crowdfunding contract acts as a container for all Project contracts that will be initialized. Each crowdfunding project will have a contract of its own.

As for the Project contract, it is instantiated through the Crowdfunding contract, and handles all the methods that can be performed in every crowdfunding project, such as contribute(), getRefund(), etc.

Basically, each project will initially be in the Fundraising state, and will change states through the checkIfFundingCompleteOrExpired() function from there.

Every time someone contributes funds towards the project, the state will change depending on certain conditions such has "has the project goal amount been met" or "has the project exceeded set deadline".

Also, notice how we send funds from our contract in both the payOut() and getRefund() functions. We did not just directly send it, but had some security considerations because this is an area prone to a reentrancy attack.

Module 3

Ethereum tokens were used to build this decentralized platform. When tokens are transferred from the Meta mask account to the project initiator account, a project is funded by the investor. All the transactions are thus stored on a block of a blockchain. The campaign or a project is said to be successful if it receives all targeted amount within the specified time. Else, the money is sent back to the investors through the backtracking method. The investors can see the target amount and they will be aware of the backtracking option available where the money invested by them will be sent back if the target is not met. The campaign creators need to be highly innovative and Decentralized application for crowdfunding using blockchain technology visionary. This helps them to display their projects uniquely thus making the project look more unfeigned.
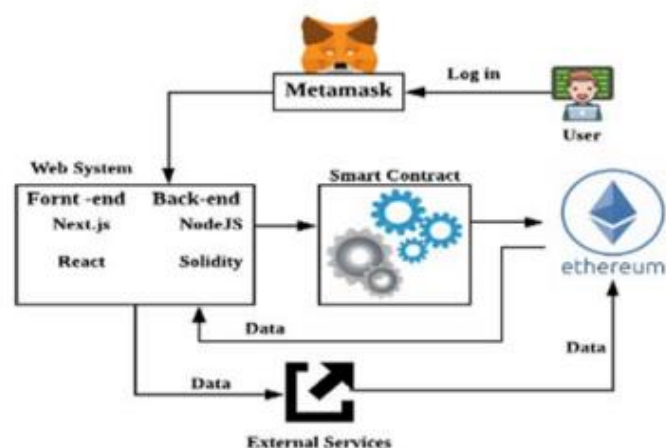
Fig 4.2 Outline of module 3.

The system is constructed by web3.js as front-end and NodeJS is working as backend. Solidity is an object-oriented programming language, which has been used in terms of the smart contracts. By using Metamask, a user will be able to access the system. The Web3.js works to connect in between the users and smart contracts. When the new project is created by the administrator, the smart contracts is automatically generated as well in Ethereum. The combination of these components establishes the basic building block of crowdfunding system. The smart contract offers transparency to encourage the entrepreneurs to deposit their resource on the project. Figure above shows the smart contract based secured system

Frontend

To enable our web app to interact with our smart contract, web3.js is used. web3.js is a collection of libraries that allow you to interact with a local or remote Ethereum node using HTTP, IPC or WebSocket.

Both Injected Web3 and Web3 Provider require the use of an external tool. An external tool for Injected provider is Metamask. Some external tools used with Web3 provider are a Truffle Ganache-CLI, Hardhat node, or an Ethereum node itself. The JavaScript VM is convenient because it is a blockchain that runs in your browser and you don't need any other software or Ethereum node to run it.

The web3.js library is a collection of modules that contain functionality for the Ethereum ecosystem.

- web3-eth is for the Ethereum blockchain and smart contracts.
- web3-shh is for the whisper protocol, to communicate p2p and broadcast.
- web3-bzz is for the swarm protocol, the decentralized file storage.
- web3-utils contains useful helper functions for Dapp developers.

In this project, we added Web3.js using the following methods-
- npm: npm install web3
- yarn: yarn add web3
- pure js: link the dist/web3.min.js

After that, we created a web3 instance and set a provider.

Application Binary Interface (ABI)

The Contract Application Binary Interface (ABI) is the standard way to interact with contracts in the Ethereum ecosystem, both from outside the blockchain and for contract-to-contract interaction. Data is encoded according to its type, as described in this specification. The encoding is not self-describing and thus requires a schema in order to decode.

We assume that the interface functions of a contract are strongly typed, known at compilation time and static. We assume that all contracts will have the interface

definitions of any contracts they call available at compile-time.

- We have 2 contracts, so we need to get both their ABIs.

- To get it, go back to Remix, go to the Compile tab, and click ABI beside the Details button as shown in the picture (make sure Crowdfunding is selected).

- After getting it, open the file named crowdfundInstance.js in the contracts folder, then paste it as the variable ABI's value.

- There should be an example in the file, which you can always refer to.
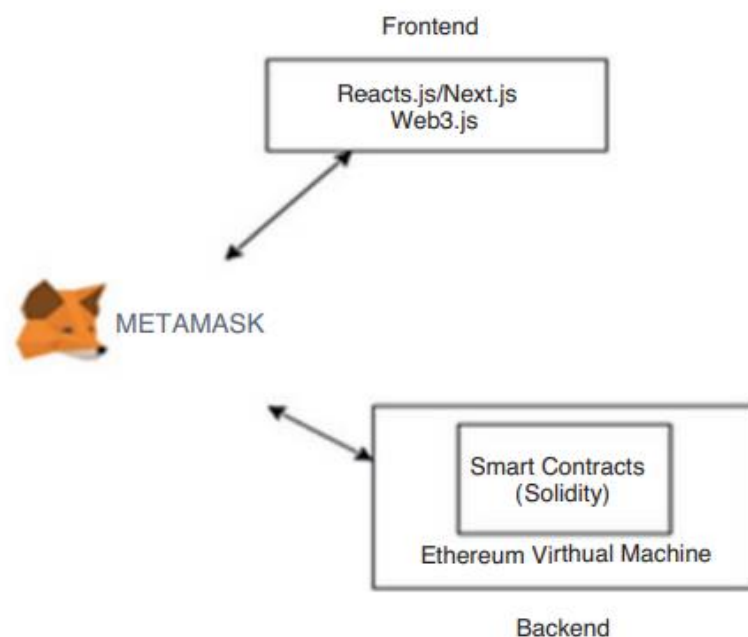
Fig 4.3 Metamask.

Remix

Remix IDE is used for the entire journey of smart contract development by users at every knowledge level. It requires no setup, fosters a fast development cycle and has a rich set of plugins with intuitive GUIs. The IDE comes in 2 flavors (web app or desktop app) and as a VSCode extension. Remix is an integrated development environment (IDE) used for developing smart contracts in solidity. Developing in remix assists developers to find bugs and debug code
with ease. Remix supports three different kinds of environments to deploy and run the smart contract:

• Javascript VM: It creates a mock of blockchain environment so you can test your smart contract functionality.

• Injected Web3: This environment uses a browser plugin or a blockchain based browser such as Mist to connect to any Ethereum network (test or main).

• Web3 Provider: This environment connects to Ethereum node running at localhost and send the transactions to any network (test or main) as specified by the user.

Metamask

Metamask works like a connection between the webpages and the Ethereum blockchain. The smart contracts in the blockchain check whether the node in the network can access that data or not. The nodes can be managed by Metamask wallet when a local blockchain network is built. Metamask is a cryptocurrency wallet and is used as a chrome extension. It is used as an interface for interacting with Ethereum blockchain. Metamask is used for storing Ethereum accounts; it is secure and effcient to use and we can also deploy to main Ethereum networks using Metamask. Our project is deployed to Rinkeby test network.

Ethereum

Ethereum is best known for cryptocurrency but it can also be used for business logic means we can use Ethereum for building smart contracts. Smart contracts are the layer on the blockchain which are used for building business logic on the blockchain; they are programs that govern the behaviour of accounts with Ethereum state. We use Solidity language for building smart contracts; it is a high-level objectoriented language which is infuenced by C++, Python, and JavaScript to target Ethereum virtual machines (EVMs).

Although Ethereum blockchain is much more advanced and intricate, it is still based on the same principles as Bitcoin's. Ethereum similar to Bitcoin also uses a proof-of-work algorithm run by a peer to peer distributed network to find consensus on the current state of the system, with the miners being rewarded in Ether(crypto currency used by Ethereum network). Network gets transactions from users distributed across the globe and the proof of work algorithm at regular intervals determines a sequence of those transactions to be included in the next block in the blockchain. Every new block added to the chain determines the state of the system. The block creation time in case of Ethereum averages around 14 seconds while that of Bitcoin averages around 10 minutes, both operate on the same set of core principles of blockchain.
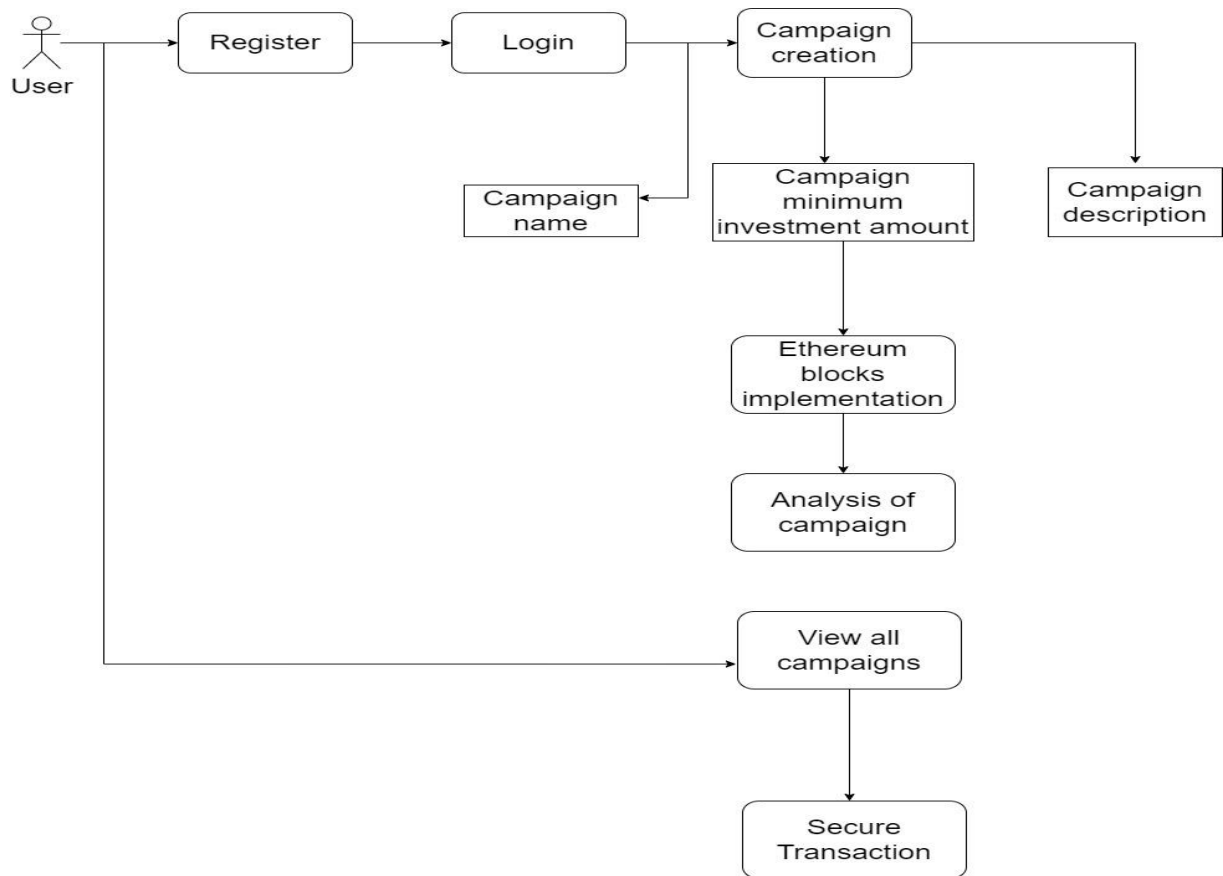
Fig 4.4 System Architecture of Crowd Funding Platform.

4.3 DESCRIPTION OF SOFTWARE FOR IMPLEMENTATION AND TESTING PLAN OF THE PROPOSED MODEL/SYSTEM

Anaconda is an open-source package manager for Python and R. It is the most popular platform among data science professionals for running Python and R implementations. There are over 300 libraries in data science, so having a robust distribution system for them is a must for any professional in this field. Anaconda simplifies package deployment and management. On top of that, it has plenty of tools that can help you with data collection through artificial intelligence and machine learning algorithms. With Anaconda, you can easily set up, manage, and share Conda environments. Moreover, you can deploy any required project with a few clicks when you're using Anaconda. There are many advantages to using Anaconda and the following are the most prominent ones among them: Anaconda is free and open-source. This means you can use it without spending any money. In the data science

sector, Anaconda is an industry staple. It is open-source too, which has made it widely popular. If you want to become a data science professional, you must know how to use Anaconda for Python because every recruiter expects you to have this skill. It is a must-have for data science.

It has more than 1500 Python and R data science packages, so you don't face any compatibility issues while collaborating with others. For example, suppose your colleague sends you a project which requires packages called A and B but you only have package A. Without having package B, you wouldn't be able to run the project. Anaconda mitigates the chances of such errors. You can easily collaborate on projects without worrying about any compatibility issues. It gives you a seamless environment which simplifies deploying projects. You can deploy any project with just a few clicks and commands while managing the rest. Anaconda has a thriving community of data scientists and machine learning professionals who use it regularly. If you encounter an issue, chances are, the community has already answered the same. On the other hand, you can also ask people in the community about the issues you face there, it's a very helpful community ready to help new learners. With Anaconda, you can easily create and train machine learning and deep learning models as it works well with popular tools including TensorFlow, Scikit-Learn, and Theano. You can create visualizations by using Bokeh, Holoviews, Matplotlib, and Datashader while using Anaconda.

How to Use Anaconda for Python

Now that we have discussed all the basics in our Python Anaconda tutorial, let's discuss some fundamental commands you can use to start using this package manager.

Listing All Environments

To begin using Anaconda, you'd need to see how many Conda environments are present in your machine.

conda env list

It will list all the available Conda environments in your machine.

Creating a New Environment

You can create a new Conda environment by going to the required directory and use this command:

conda create -n <your_environment_name>

You can replace <your_environment_name> with the name of your environment. After entering this command, conda will ask you if you want to proceed to which you should reply with y:

proceed ([y])/n)?

On the other hand, if you want to create an environment with a particular version of Python, you should use the following command:

conda create -n <your_environment_name> python=3.6

Similarly, if you want to create an environment with a particular package, you can use the following command:

conda create -n <your_environment_name>pack_name

Here, you can replace pack_name with the name of the package you want to use.

If you have a .yml file, you can use the following command to create a new Conda environment based on that file:

conda env create -n <your_environment_name> -f <file_name>.yml

We have also discussed how you can export an existing Conda environment to a .yml file later in this article.

Activating an Environment:

You can activate a Conda environment by using the following command:

conda activate <environment_name>

You should activate the environment before you start working on the same. Also, replace the term <environment_name> with the environment name you want to activate. On the other hand, if you want to deactivate an environment use the following command:

conda deactivate

Installing Packages in an Environment

Now that you have an activated environment, you can install packages into it by using the following command:

conda install <pack_name>

Replace the term <pack_name> with the name of the package you want to install in your Conda environment while using this command.

Updating Packages in an Environment

If you want to update the packages present in a particular Conda environment, you should use the following command:

conda update

The above command will update all the packages present in the environment. However, if you want to update a package to a certain version, you will need to use the following command:

conda install <package_name>=<version>

Exporting an Environment Configuration

Suppose you want to share your project with someone else (colleague, friend, etc.). While you can share the directory on GitHub, it would have many Python packages, making the transfer process very challenging. Instead of that, you can create an environment configuration .yml file and share it with that person. Now, they can create an environment like your one by using the .yml file.

For exporting the environment to the .yml file, you'll first have to activate the same and run the following command:

conda env export ><file_name>.yml

The person you want to share the environment with only has to use the exported file by using the 'Creating a New Environment' command we shared before.

Removing a Package from an Environment

If you want to uninstall a package from a specific Conda environment, use the following command:

conda remove -n <env_name><package_name>

On the other hand, if you want to uninstall a package from an activated environment, you'd have to use the following command:

conda remove <package_name>

Deleting an Environment

Sometimes, you don't need to add a new environment but remove one. In such cases, you must know how to delete a Conda environment, which you can do so by using the following command:

conda env remove –name <env_name>

The above command would delete the Conda environment right away.

4.4 PROJECT MANAGEMENT PLAN

Introduction:	**September 1-30**
Literature Survey:	**October 1-31**
System Design:	**November 1-30**
System Implementation:	**December 1-31**
Testing:	**January 1-30**

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