PROJECT REPORT

on

"Development of CrowdFunding System Based on BlockChain"

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Submitted in fulfillment of the requirements for
Degree of Bachelor of Engineering

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

S.B. JAIN INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NAGPUR.

2022-2024

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SESSION 2022-2023

CERTIFICATE

This is to certify that the Project Report titled **"Development of CrowdFunding System Based on BlockChain"** submitted by **Mr. Amaan Ranapurwala, Mr. Aniruddha Kate , Mr. Atharva Gaikwad , Mr. Harsh Maroo, Mr. Yash Mishra,** has been accepted under the guidance of **Dr. Rashmi Jain** and **Mr. Hrushikesh Panchabuddhe.** This Project work is Carried out for the partial fulfilment of the requirement for award of Degree Bachelor of Engineering in **Computer Science & Engineering, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.**

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Designation: _____

Institution: _____

Date: _____

DECLARATION

We hereby declare that the Project Progress Report titled **"Development of CrowdFunding System Based on BlockChain"** submitted herein has been carried out by us in the Department of Computer Science & Engineering of S. B. Jain Institute of Technology Management and Research, Nagpur under the guidance of **Dr. Rashmi Jain** and **Mr. Hrushikesh Panchabuddhe**. The work is original and has not been submitted earlier as a whole or in part for the award of any degree / diploma at this or any other Institution / University.

Mr. Amaan Ranapurwala _____

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ABSTRACT

At first, blockchain was solely used to support cryptocurrencies, but as time goes on, further and further sectors are espousing this new technology. piecemeal from bitcoin numerous other crypto currencies began to crop. Defy systems helps to boost the power of websites with smart contracts and blockchain network. Blockchain is anticipated to be used by the maturity of technologies in the future as an effective means of conducting online deals. Crowdfunding platforms are one of the diligences to which blockchain technology may be applied. Crowdfunding is a new and innovative system for funding colorful kinds of gambles, wherein individual authors of the gambles can request for finances. The gambles may be working for profit motive, artistic or social. The finances are generally given to help people. It includes the use of internet social media platforms to connect investors with entrepreneurs in order to raise capital for colorful kinds of gambles in return for compensation. Internet and social media came new platforms that surfaced. The internet and social media are essential for nonprofit businesses and entrepreneurs to raise plutocrat. To further work the superiority of combining blockchain and crowdsourcing, in this paper, we propose an innovative mongrel blockchain crowdsourcing platform, named CrypFunds. Whether it be donations to a political cause or to an association, crypto is generally treated as property in the United States, and therefore numerous. Donations made in cryptocurrencies can be subtracted by levies as charitable benefactions. Donations in crypto can allow associations to take advantage of a new set of implicit benefactors who would prefer to contribute via blockchain rather than some of the more traditional styles that might bear them to dodge capital earnings levies.

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LIST OF FIGURES

LIST OF PUBLICATION/PARTICIPATIONS/COPYRIGHT

Sr No	Title	Event Name/Journal Name/Conference	Date	Remarks
	Development of CrowdFunding System Based on BlockChain	Hinweis Conference	03/6/23	Paper Publish
1	Development of CrowdFunding System Based on BlockChain.	Technothon 2023 - Raisoni	28/03/23	Project Competition
2	Development of CrowdFunding System Based on BlockChain.	AXIS'23 - VNIT	8/04/23	Project Competition
3	Development of CrowdFunding System Based on BlockChain.	Infotsav 2k23 - Gurunanak	24/04/23	Project Competition
4	Development of CrowdFunding System Based on BlockChain.	Copyright Office, Department of Industrial Policy & Promotion, Ministry of commerce and Industry	18/04/23	Applied to copyright

CHAPTER NO 1

INTRODUCTION

CHAPTER 1
INTRODUCTION

1.1 PROJECT BACKGROUND

Crowdfunding is one of the most popular ways to raise funds for any project, cause or for helping any individual in need. With the onset of Covid we have seen a rise in Crowdfunding activities across the globe which includes small campaigns to help people in need.
The major problems with the Current Crowdfunding Platforms that we wanted to solve were:

- **Security:** As the funds become larger, they need to be heavily secure, although stringent measures such as symmetric encryption are in place to make e-payment safe and secure, it is still vulnerable to hacking. Blockchain which has never been compromised yet can provide that level of security.

- **Transparency and Anti-Fraud:** We have seen and continue to see a lot of crowdfunding scams happening around. There is no way to see where the funds are being used. We wanted to make the entire flow of funds transparent at every stage, so that there is no possibility of the money being misused.

- **Global Contribution:** With some of the platforms being country specific, it becomes hard for people from other countries to contribute to various campaigns. Using blockchain anyone in the world can contribute to the campaign. Transactions are quick and convenient.

1.2 PROBLEM STATEMENT

Crowdfunding systems which utilize the human intelligence to solve complex tasks have gained considerable interest and adoption in recent years. However, the majority of existing crowdfunding systems rely on central servers, which are subject to the weaknesses of traditional trust-based model, such as single point of failure. In this project, we conceptualize a blockchain-based decentralized framework for crowdfunding named CrypFunds

1.3 PURPOSE OF STUDY

Looking back into the history, conventional practices like raising money through small loans to poor families were practiced followed by providing microcredits to small entrepreneurs which were unable to qualify for bank loans.

New technology and innovation always make a huge impact on humans and the society. With the emergence of new technology, it definitely will impact the existing ones. This transformation can definitely be seen with crowdfunding. The number of projects being launched through crowdfunding platforms has increased significantly. Stakeholders would usually like to track the way the organization is working, and be a part of the same, provided financial information is 100% transparent. And therefore, it is important for the entrepreneurs as well as stakeholders to maintain transparency, credibility and also understand the legal and regulatory framework behind the project.

Accepting donations on the blockchain can allow an organization to minimize reliance on intermediaries. Not only can this structure help reduce the costs of sending, receiving, and deploying donated funds, but it can also help reduce dependency on political and/or business entities that might unfairly limit which causes can receive donations and which ones cannot. Decentralization is really the crux of blockchain. The ability to minimize undue influence from third-party systems that impose their own regulations — while encouraging peer-to-peer (P2P) transactions — is one of the defining characteristics that can make blockchain technology so powerful. Crowdfunding blockchain startups are increasingly becoming a key way to give back to the new crop of projects that seek to improve existing blockchain infrastructure.

Objectives

- To combine the advantages of blockchain, we formalize a decentralized funding framework named CrypFunds
- To design a Payment gateway that supports multiple currencies.
- Creating Progress meter to easily track campaign progress.
- Providing Secure mobile options to best reach your audience.

1.4 TECHNOLOGICAL BASE

This Project can be implemented by using various technologies like-

JavaScript

JavaScript, often abbreviated as JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. As of 2022, 98% of websites use JavaScript on the client side for webpage behavior, often incorporating third-party libraries. All major web browsers have a dedicated JavaScript engine to execute the code on users' devices.

JavaScript is a high-level, often just-in-time compiled language that conforms to the ECMAScript standard. It has dynamic typing, prototype-based object-orientation, and first-class functions. It is multi-paradigm, supporting event-driven, functional, and imperative programming styles. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model (DOM).

The ECMAScript standard does not include any input/output (I/O), such as networking, storage, or graphics facilities. In practice, the web browser or other runtime system provides JavaScript APIs for I/O.

JavaScript engines were originally used only in web browsers, but are now core components of some servers and a variety of applications. The most popular runtime system for this usage is Node.js. Although Java and JavaScript are similar in name, syntax, and respective standard libraries, the two languages are distinct in design.

JavaScript is the dominant client-side scripting language of the Web, with 98% of all websites (mid–2022) using it for this purpose. Scripts are embedded in or included from HTML documents and interact with the DOM. All major web browsers have a built-in JavaScript engine that executes the code on the user's device.
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Examples of scripted behavior

- Loading new web page content without reloading the page, via Ajax or a WebSocket. For example, users of social media can send and receive messages without leaving the current page.
- Web page animations, such as fading objects in and out, resizing, and moving them.
- Playing browser games.
- Controlling the playback of streaming media.
- Generating pop-up ads or alert boxes.
- Validating input values of a web form before the data is sent to a web server.
- Logging data about the user's behavior then sending it to a server. The website owner can use this data for analytics, ad tracking, and personalization.
- Redirecting a user to another page.
- Storing and retrieving data on the user's device, via the storage or IndexedDB standards.

Libraries and frameworks

Over 80% of websites use a third-party JavaScript library or web framework for their client-side scripting.

jQuery is by far the most popular library, used by over 75% of websites. Facebook created the React library for its website and later released it as open source; other sites, including Twitter, now use it. Likewise, the Angular framework created by Google for its websites, including YouTube and Gmail, is now an open-source project used by others.

In contrast, the term "Vanilla JS" has been coined for websites not using any libraries or frameworks, instead relying entirely on standard JavaScript functionality.

Solidity

Solidity is an object-oriented programming language for implementing smart contracts on various blockchain platforms, most notably, Ethereum. It was developed by Christian Reitwiessner, Alex Beregszaszi, and several former Ethereum core contributors. Programs in Solidity run on Ethereum Virtual Machine.

Solidity was proposed in August 2014 by Gavin Wood; the language was later developed by the Ethereum project's Solidity team, led by Christian Reitwiessner.

Solidity is the primary language on Ethereum as well as on other private blockchains, such as the enterprise-oriented Hyperledger Fabric blockchain. SWIFT deployed a proof of concept using Solidity running on Hyperledger Fabric.

Solidity is a statically typed programming language designed for developing smart contracts that run on the Ethereum Virtual Machine (EVM).

Solidity uses ECMAScript-like syntax which makes it familiar for existing web developers however unlike ECMAScript it has static typing and variadic return types. Solidity is different from other EVM-targeting languages such as Serpent and Mutan in some important ways. It supports complex member variables for contracts, including arbitrarily hierarchical mappings and structs. Solidity contracts support inheritance, including multiple inheritance with C3 linearization. Solidity introduces an application binary interface (ABI) that facilitates multiple type-safe functions within a single contract (this was also later supported by Serpent). The Solidity proposal also includes "Natural Language Specification", a documentation system for specifying user-centric descriptions of the ramifications of method-calls.

CHAPTER NO 2

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

2.1 HISTORICAL STUDY

2.1.1 BlockChain

A blockchain is a type of distributed ledger technology (DLT) that consists of growing list of records, called blocks, that are securely linked together using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree, where data nodes are represented by leaves). The timestamp proves that the transaction data existed when the block was created. Since each block contains information about the previous block, they effectively form a chain (compare linked list data structure), with each additional block linking to the ones before it. Consequently, blockchain transactions are irreversible in that, once they are recorded, the data in any given block cannot be altered retroactively without altering all subsequent blocks.

Blockchains are typically managed by a peer-to-peer (P2P) computer network for use as a public distributed ledger, where nodes collectively adhere to a consensus algorithm protocol to add and validate new transaction blocks. Although blockchain records are not unalterable, since blockchain forks are possible, blockchains may be considered secure by design and exemplify a distributed computing system with high Byzantine fault tolerance.

A blockchain was created by a person (or group of people) using the name (or pseudonym) Satoshi Nakamoto in 2008[6] to serve as the public distributed ledger for bitcoin cryptocurrency transactions, based on previous work by Stuart Haber, W. Scott Stornetta, and Dave Bayer. The implementation of the blockchain within bitcoin made it the first digital currency to solve the double-spending problem without the need of a trusted authority or server.

2.1.2 Smart Contract

A Smart Contract (or crypto contract) is a computer program that directly and automatically controls the transfer of digital assets between the parties under certain conditions. A smart contract works in the same way as a traditional contract while also automatically enforcing the contract. Smart contracts are programs that execute exactly as they are set up(coded, programmed) by their creators. Just like a traditional contract is enforceable by law, smart contracts are enforceable by code.

- The bitcoin network was the first to use some sort of smart contract by using them to transfer value from one person to another.
- The smart contract involved employs basic conditions like checking if the amount of value to transfer is actually available in the sender account.
- Later, the Ethereum platform emerged which was considered more powerful, precisely because the developers/programmers could make custom contracts in a Turing-complete language.

2.2 Related Work

2.2.1 CrowdBC

A Blockchain-Based Decentralized Framework for Crowdsourcing," in IEEE Transactions on Parallel and Distributed Systems. crowdsourcing systems which utilize the human intelligence to solve complex tasks have gained considerable interest and adoption in recent years. However, the majority of existing crowdsourcing systems rely on central servers, which are subject to the weaknesses of traditional trust-based model, such as single point of failure. They are also vulnerable to distributed denial of service (DDoS) and Sybil attacks due to malicious users' involvement. In addition, high service fees from the crowdsourcing platform may hinder the development of crowdsourcing. How to address these potential issues has both research and substantial value. In this paper, we conceptualize a blockchain-based decentralized framework for crowdsourcing named CrowdBC, in which a requester's task can be solved by a crowd of workers without relying on any third trusted institution, users' privacy can be guaranteed and only low transaction fees are required. In particular, we introduce the architecture of our proposed framework, based on which we give a concrete scheme.

2.2.2 zkCrowd

A Hybrid Blockchain-Based Crowdsourcing Platform," in IEEE Transactions on Industrial Informatics Blockchain, a promising decentralized paradigm, can be exploited not only to overcome the shortcomings of the traditional crowdsourcing systems, but also to bring technical innovations, such as decentralization and accountability. Nevertheless, some critical inherent limitations of blockchain have been rarely addressed in the literature when it is incorporated into crowdsourcing, which may yield the performance bottleneck in the crowdsourcing systems. To further leverage the superiority of combining blockchain and crowdsourcing, in this article, we propose an innovative hybrid blockchain crowdsourcing platform, named zkCrowd. Our zkCrowd integrates with a hybrid blockchain structure, smart contract, dual ledgers, and dual consensus protocol to secure communications, verify transactions, and preserve privacy. Both the theoretical analysis and experiments are performed to evaluate the advantages of zkCrowd over the state of the art

2.2 REAL-TIME SURVEY

We conducted survey of people who recently donated in a centralized crowdfunding project. From there experiences it was clear that the common crowdfunding website has some issues like lack of transparency, centralized control and no feature for voting the cause.

So, we came up with the idea of creating a decentralized crowdsourcing website called **CrypFunds** to help people donate to a better cause and maintain transparent traditions over the blockchain.

CHAPTER NO 3

METHODOLOGY &

PROPOSED SOLUTION

CHAPTER 3

METHODOLOGY & PROPOSED SOLUTION

3.1 PROPOSED SOLUTION

Our proposed system will be consisting of two modules:

1. Model Designing:

Identifying stakeholders

The stakeholders can be divided into two parts:

- **Campaign Creators:** These are the users who have created a Campaign.
- **Contributors & Approvers:** *Contributors* are the users who contribute and fund the campaigns. Approvers are Contributors who have contributed more than the Minimum Contribution, and they can approve the withdrawal requests.

Detailed Solution

Any web-based application is a centralized application which means that anything we do on the platform is managed by a server which is owned by a single company. We propose a Decentralized Application powered by Ethereum Blockchain, where all the information about campaigns, contributions, withdrawal requests and funds are kept on a Blockchain Network, visible to all and decentralized. This means the funds and transactions are visible to and stored at every node on the blockchain, and prevents the data from being stored in a centralized server, single location.

Hence not letting the money get into the hands of anyone and eliminating every possibility of it getting misused — an elegant and logical solution to the problem in hand.

The features are explained below:

Creating a Campaign: Just like Crowdfunding in the real world as well as on other crowdfunding platforms, anyone can create a campaign in a few minutes. The campaign information will be managed by the Ethereum-based smart contract and thus cannot be tampered with.

Contributing to a Campaign: Once a campaign has been created, users can share the campaign and anybody can contribute to the campaign. **The funds will go to the address of the campaign and not to the creator of the campaign**, thus making the process more efficient and anti-fraudulent.

Withdrawal of Funds: The Creator of a Campaign can propose how to use the funds in the form of a Withdrawal Request. Anybody who contributes more than a particular amount is called an approver, and will be able to approve or deny the request. **Funds can't be withdrawn without the approval of 50% approvers.**

2. Application:

Proposing the idea of combining Blockchain technology with Crowdfunding which can provide efficiency and ensure security by eliminating other intermediary Crowdfunding platforms. The usage of blockchain technology in crowdfunding might be the foundational technology to address the majority of the apparent difficulties of current crowdfunding contracts over the other technologies. Crowdfunding contracts are conducted online using a variety of technologies. The use of blockchain technology in crowdfunding contracts might offer the much-needed remedy to the problems associated with abuse, trust, and secrecy

Apart from crowdfunding following are applications of blockchain

1 Asset Management : Asset management of the funds generated in a donation is done properly and transparently with the help of blockchain.

2 Cross Border Payments : With the help of third-party wallets and Crypto Currency Exchanges Cross Border Payments are enabled.

3 Online Identity Verification : Etherscan enables us to trace the persons wallet address.

1. Asset Management

Blockchain plays a big part in the financial world and it is no different in asset management. In general terms, asset management involves the handling and exchange of different assets that an individual may own such as fixed income, real estate, equity, mutual funds, commodities, and other alternative investments.

2. Cross-Border Payments

Have you ever tried to make cross-border payments in different currencies from one country to another? This can be a long-complicated process and it can take many days for the money to arrive at its destination. Blockchain has helped in simplifying these cross-border payments by providing end-to-end remittance services without any intermediaries.

3. Online Identity Verification

It is not possible to complete any financial transactions online without online verification and identification. And this is true for all the possible service providers any user might have in the financial and banking industry. However, blockchain can centralize the online identity verification process so that users only need to verify their identity once using blockchain and then they can share this identity with whichever service provider they want.

Blockchain is a relatively new technology that is still not widespread in all industries, but it is slowly gaining more momentum. Once Blockchain becomes more widespread, it could become a powerful tool for the democratization of data that will encourage transparency and ethical business tactics. And the applications of Blockchain in the world are only increasing with the result of faster transactions.

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3.2 SYSTEM ARCHITECTURE

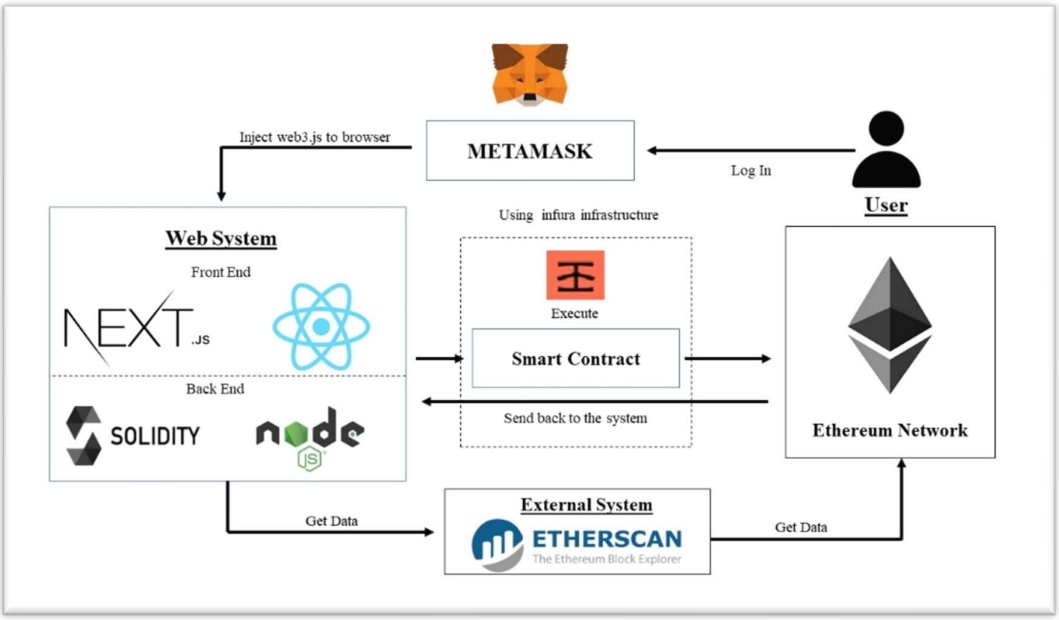

Fig 3.2.1 System Architecture

The above diagram depicts the entire flow of operations, along with the tech stacks used.

- A user (campaign creator/donor) logs into the website by connecting their MetaMask wallet.

- The Metamask wallet connects to our website that contains ChakraUI for the frontend, and a Node.js based server for the backend. The user interacts with the UI, and the UI uses the Node.js server to interact with the blockchain and the smart contracts on it, that have been writted and compiled using Solidity.

- Once connected, the user can either:

i. **Create a campaign:** This involves the user creating a contract from the UI, while in the backend, the details received from the front-end will be converted into a smart contract and deployed on the blockchain for interactibility and immutability.

ii. **Donate funds:** The user can also donate to existing campaigns on the blockchain (shown in the UI) via their MetaMask wallets in the blockchain's native currency, i.e., eth. This donation record will be permanently stored on the blockchain.

iii. **Withdraw Funds**: This step can only be performed by the campaign creator, and requires the campaign manager's approval, as well as that of the majority contributors of a campaign.

- The record of all these transactions is stored on the blockchain forever, and can be viewed by anyone, at any time, freely via the website Etherscan.io .

3.3 FLOW CHART

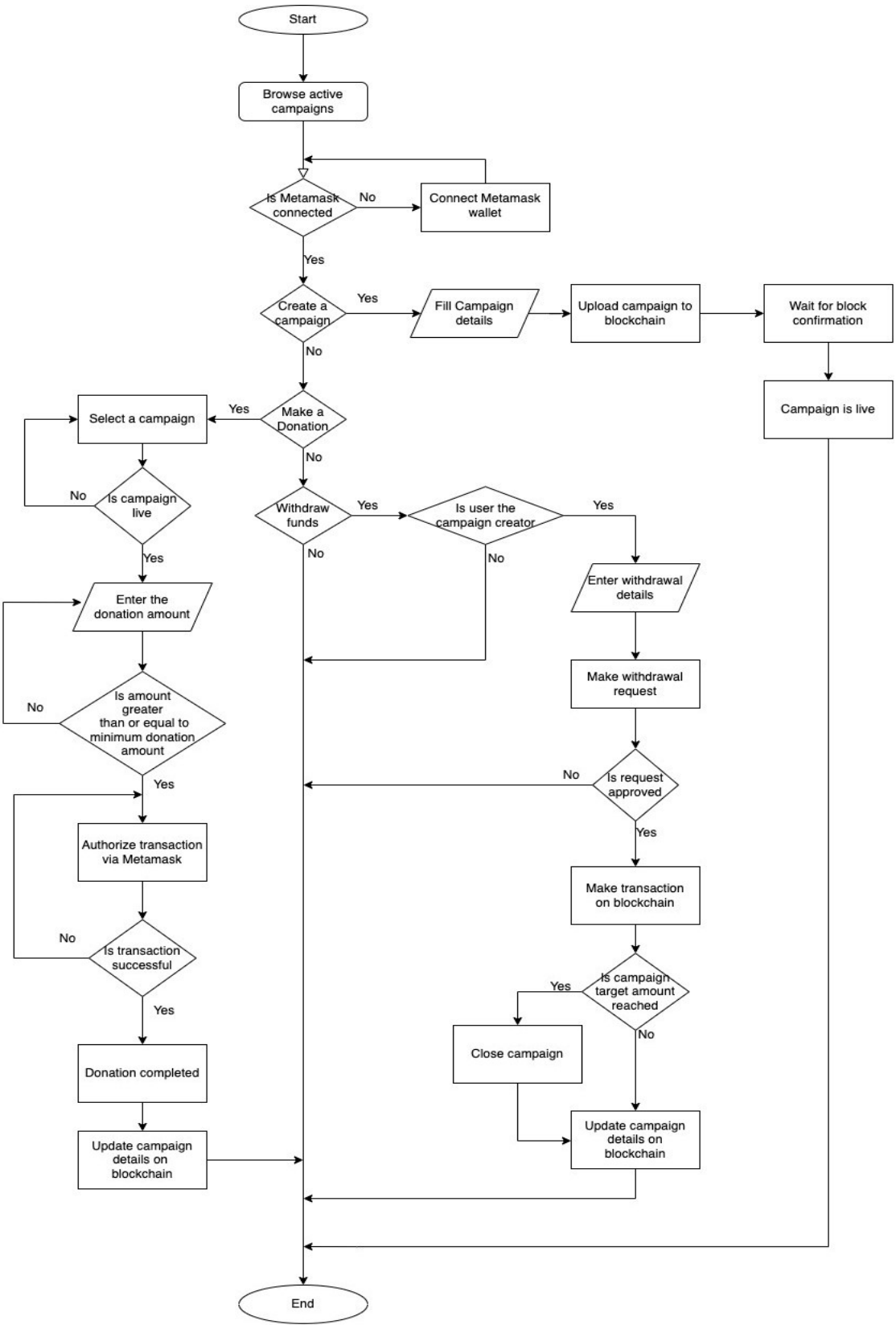

Fig 3.3.1 Flow Chart

There are two modules - Admin and Donators/Fundraisers.

- Investors needs to fill in details like description of campaign, target amount and minimum contribution.
- These details are registered on the network along with the campaign. Only Admin can withdraw funds to the desired wallet when the finds requirements are met and consensus is passed.

CHAPTER NO 4

TOOLS & PLATFORM

CHAPTER 4

Tools & Platform

4.1 SOFTWARE REQUIREMENT

The software used to create this system include:

- **OS** – Any Operating System
- **Language** – JavaScript, Solidity
- **Framework** – React.js, Web3.js, Next.js, Chakra UI
- **Extension** – MetaMask
- **Infrastructure** – Goerli.Infura Infrastructure
- **IDE** – Visual Studio Code

1. Operating System –

Any Operating System which has a Web Browser and an IDE**.**

2. JavaScript

JavaScript, often abbreviated as JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS.

3. 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.

4. Next.js

Next.js is an open-source web development framework created by Vercel enabling React-based web applications with server-side rendering and generating static websites.

5. Web3.js

Web3 (also known as Web 3.0) is an idea for a new iteration of the World Wide Web which incorporates concepts such as decentralization, blockchain technologies, and token-based economics. Some technologists and journalists have contrasted it with Web 2.0, wherein they say data and content are centralized in a small group of companies sometimes referred to as "Big Tech".

6. Solidity

Solidity is an object-oriented programming language for implementing smart contracts on various blockchain platforms, most notably, Ethereum. It was developed by Christian Reitwiessner, Alex Beregszaszi, and several former Ethereum core contributors. Programs in Solidity run on Ethereum Virtual Machine.

7. Chakra UI

Chakra UI is a simple, modular and accessible component library that gives you the building blocks you need to build your React applications

8. MetaMask

MetaMask is a software cryptocurrency wallet used to interact with the Ethereum blockchain. It allows users to access their Ethereum wallet through a browser extension or mobile app, which can then be used to interact with decentralized applications. As of November 2021, MetaMask's browser extension had over 21 million monthly active users, according to Bloomberg

9. Goerli Infura

Infura provides the tools and infrastructure that allow developers to easily take their blockchain application from testing to scaled deployment - with simple, reliable access to Ethereum and IPFS.

10. Visual Studio Code

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting,

4.2 HARDWARE REQUIREMENT

There are several software and hardware requirements to run any software project, and the minimum requirements for running CrypFunds are as follows.

- **PROCESSOR:** Intel Core 2 Duo and above (2.5+ GHz processor)
- **HARD DISK:** Minimum 128GB
- **RAM:** Minimum 4GB
- **OTHERS:** A modern day browser with the latest updates and a stable internet connection.

CHAPTER NO 5

DESIGN & IMPLEMENTATION

CHAPTER 5

DESIGN & IMPLEMENTATION

The following section contains the system design and implementation of the system. The system design is depicted by use case, class and sequence diagrams, and the implementation is explained by breaking down the project in various modules and explaining them.

5.1 SYSTEM DESIGN

5.1.1 USE-CASE DIAGRAM

Actors –

1. Admin
2. Fundraiser
3. Investor or Sponsor

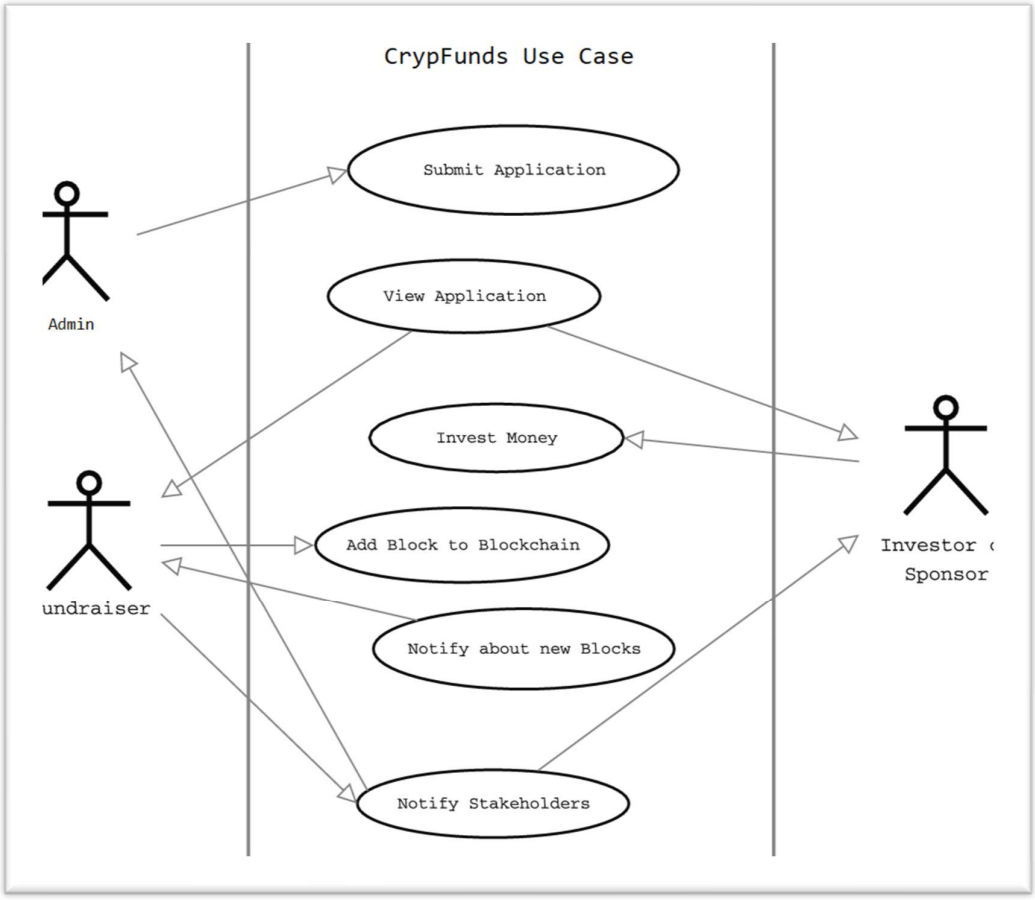

Fig. - 5.1.1: Use-Case Diagram

In Use-Case diagram, the tasks performed by the users are listed below,

1. Admin- Maintaining the campaign and transferring funds to the fundraiser
2. Fundraiser – User who creates a campaign
3. Investor – User who invests\donates in the campaign

5.1.2. CLASS DIAGRAM

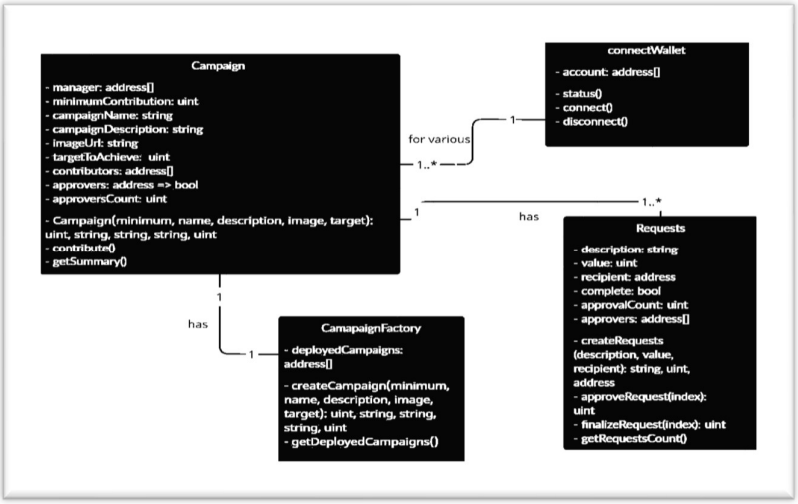

Fig. - 5.1.2: Class Diagram

In the above diagram, one can see the flow of the entire operation of the project, from creating a campaign, to donating, and finally, withdrawal. The flow is explained w.r.t the indicators in the diagram below:

1. A user in need of money (NGO in this case) creates a campaign for fundraising for a cause, with details such as the name of the organization, required amount of funds, a description of the cause, the minimum amount of funds that can be contributed etc. This campaign is stored on the blockchain, and once it is live, it cannot be modified or removed.
2. Donors can contribute to a campaign of their liking by connecting their MetaMask wallet, and donating their desired amount of contribution in the native blockchain currency (eth).
3. Once the required amount is met, or the campaign manager wants to withdraw a portion of/whole amount of funds from the campaign contract, the manager raises a request for withdrawal.
4. This request for withdrawal must be approved by at least half the contributors, so as to ensure the transparency of the operation.
5. Once the request is approved, the funds can be withdrawn.

Hence, this process can then be repeated with a new campaign.

5.1.3 SEQUENCE DIAGRAM

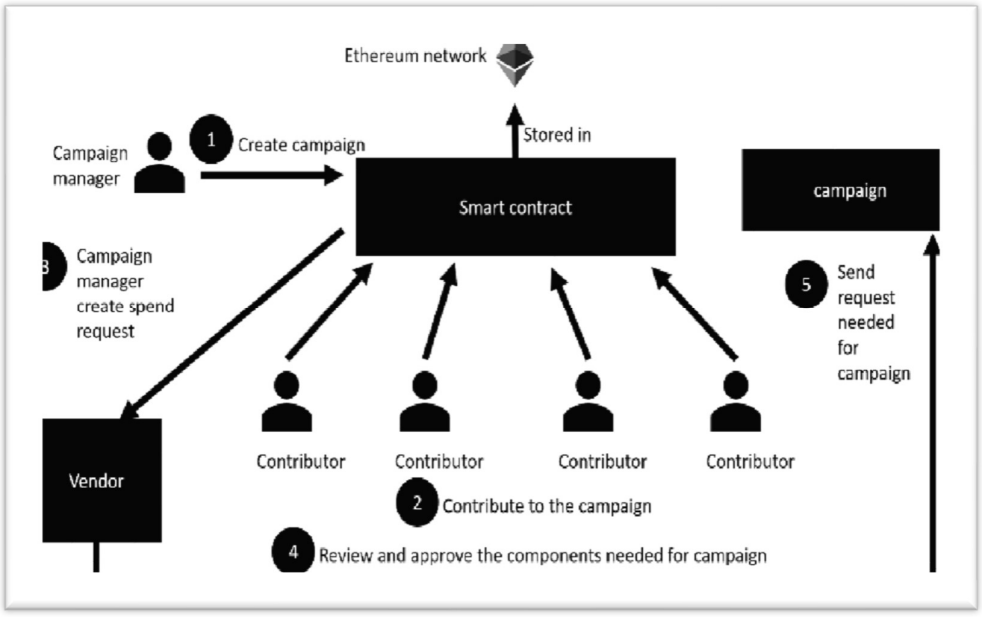

Fig. - 5.1.3. Sequence Diagram

In the above class diagram, one can see the various entities involved - Campaign, CampaignFactory, Requests, connectWallet.

- Campaign: This is the main campaign class that defines the structure of a campaign. It acts as a blueprint for all the values that the user enters regarding the campaign, as well as specifics related to that campaign such as the record of donations and withdrawals made.

- CampaignFactory: This is the parent contract, that creates all the subsequent campaign contracts, and stores a record of their addresses to fetch them when needed.

- Requests: This entity keeps track of all the withdrawal requests made to a contract. Any withdrawal request made to a contract must be approved by atleast half the contributors (including the manager of the contract). Once the desired approval count is reached, the request is finalized, and the withDrawal is made.

- connectWallet: connectWallet is a helper function that helps the user to connect/disconnect their Metamask wallet, which is then used to make the various tracnsactions offered by the website.

5.2 Implementation of System

5.2.1 Completed Modules

- **Module 1 – Creating Smart Contract:**
  - Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met.
  - The contract for Crypfunds has functions for creating a campaign, donating to it, and withdrawing funds from the campaign. The smart contract also uses a consensus algorithm for withdrawing the funds collected via the campaign, to ensure fair use of the funds.
  - The image 5.2.1 shows the creation and deployment of the smart contract on Goerli Testnet (a test network based on the Ethereum blockchain), using Remix, a web based IDE used for smart contract development.
  - The creation process is instant, but the deployment takes some time, as it needs to wait for block confirmations before adding the block to the blockchain.

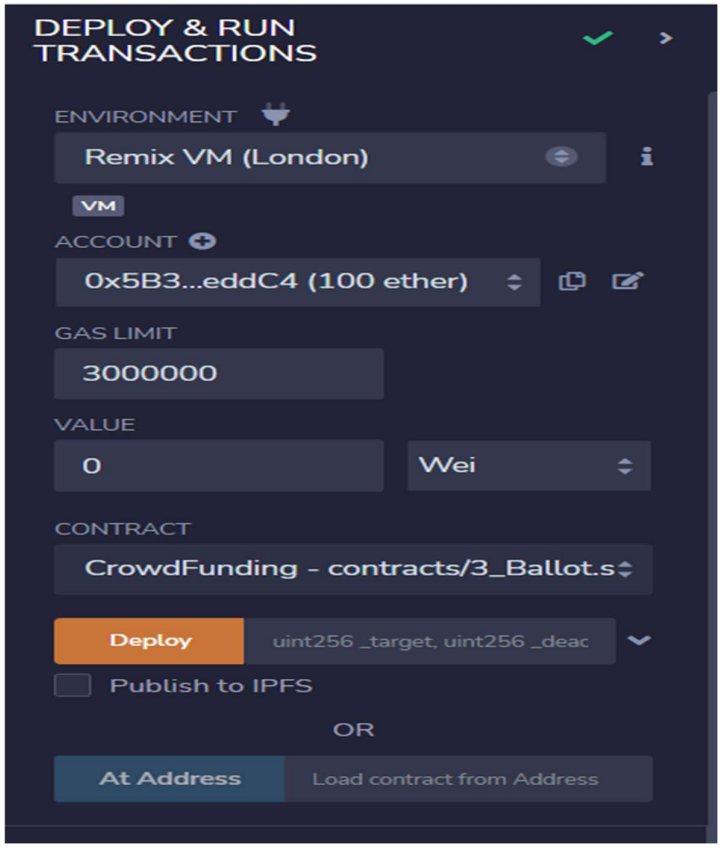

Fig. - 5.2.1: Contract deployment specifications

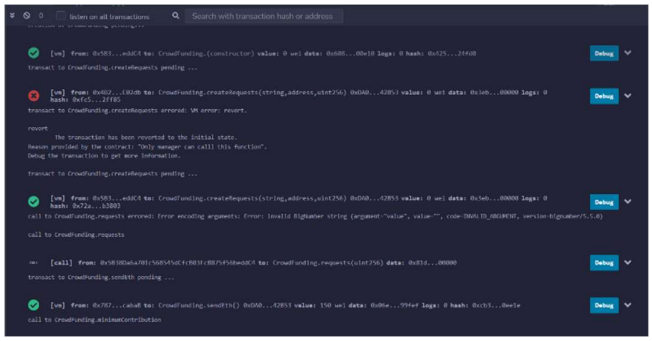

Fig. - 5.2.2: Contract deployment details

- **Module 2 – Website:**
  - The website provides an easy-to-use interface to interact along with a layer of abstraction to interact with the smart contracts and blockchain.
  - To create a campaign, withdraw funds, or donate to an active campaign, a user needs to connect their Metamask wallet to the website. This can be done by clicking on the Connect wallet button in the top-right corner of the homepage.
  - The homepage primarily displays the active campaigns, along with a basic working, and other options mentioned below. Any user who wishes to donate can do so by clicking on an active campaign, entering the donation amount, and donating.
  - There's also a section for creating a campaign, that asks the user to fill a form, which contains the information to be displayed in the campaign details. Once the form is filled, the user can submit the form, and a smart contract specific to that campaign is added to the blockchain, post which the campaign is live.
  - To withdraw funds from the campaign, the campaign creator must create a withdrawal request, that is approved by the donors via a consensus mechanism. Thus, the funds can only be withdrawn upon a successful approval from the donors.

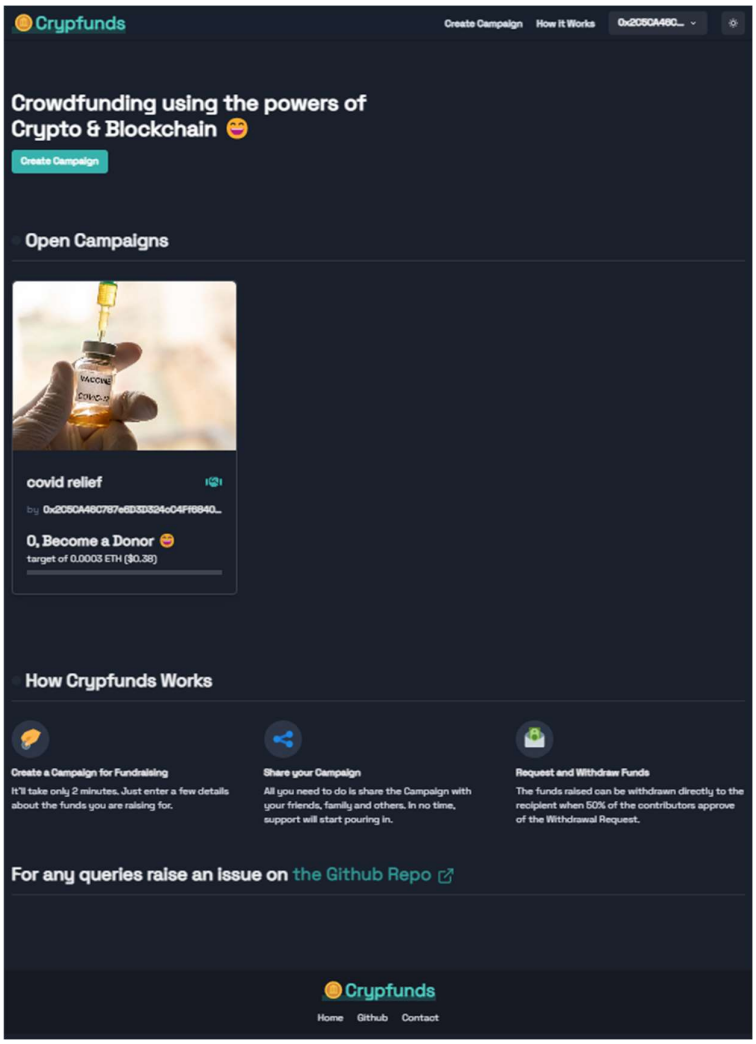

Fig - 5.2.3 Crypfunds website homepage

This is the home page of our website. It contains hyperlinks to various sections of the website such as Active Campaign, How it works and Create Campaign. User can continue as a guest if they don't want to connect wallet and authorize to the app.

5.3 Sample Code

Campaign.sol (Smart Contract) code -

```
//SPDX-License-Identifier: UNLICENSED
// pragma solidity >=0.4.17 <0.9.0;


pragma solidity 0.4.17;



contract CampaignFactory {
    address[] public deployedCampaigns;

    function createCampaign(uint minimum,string name,string description,string
image,uint target) public {
        address newCampaign = new Campaign(minimum,
msg.sender,name,description,image,target);
        deployedCampaigns.push(newCampaign);
    }

    function getDeployedCampaigns() public view returns (address[]) {
        return deployedCampaigns;
    }
}


contract Campaign {
  struct Request {
      string description;
      uint value;
      address recipient;
      bool complete;

uint approvalCount;
      mapping(address => bool) approvals;
  }

  Request[] public requests;
  address public manager;
  uint public minimunContribution;

string public CampaignName;
  string public CampaignDescription;

string public imageUrl;

uint public targetToAchieve;
address[] public contributers;
```

```
  mapping(address => bool) public approvers;
  uint public approversCount;


  modifier restricted() {
      require(msg.sender == manager);
      _;
  }

    function Campaign(uint minimun, address creator,string name,string
description,string image,uint target) public {
      manager = creator;




       minimunContribution = minimun;

       CampaignName=name;
       CampaignDescription=description;

       imageUrl=image;
      targetToAchieve=target;
  }

  function contibute() public payable {
      require(msg.value > minimunContribution );

      contributers.push(msg.sender);
      approvers[msg.sender] = true;
      approversCount++;
  }

  function createRequest(string description, uint value, address recipient)
public restricted {
      Request memory newRequest = Request({
         description: description,
         value: value,
         recipient: recipient,
         complete: false,
         approvalCount: 0
      });

      requests.push(newRequest);
  }

  function approveRequest(uint index) public {
      require(approvers[msg.sender]);
      require(!requests[index].approvals[msg.sender]);

      requests[index].approvals[msg.sender] = true;
```

```
    requests[index].approvalCount++;


    function finalizeRequest(uint index) public restricted{
    require(requests[index].approvalCount > (approversCount / 2));

    require(!requests[index].complete);

    requests[index].recipient.transfer(requests[index].value);
    requests[index].complete = true;

}




    function getSummary() public view returns
    (uint,uint,uint,uint,address,string,string,string,uint) {
      return(

            minimunContribution,
          this.balance,
          requests.length,
          approversCount,
          manager,
          CampaignName,
          CampaignDescription,
          imageUrl,
          targetToAchieve
        );
```

CHAPTER NO 6

TESTING,
RESULTS & DISCUSSION

CHAPTER 6

TESTING, RESULTS & DISCUSSION

6.1 TESTING

6.1.1 TYPES OF TESTING

- **Manual Testing**

  Manual testing includes testing a software manually, i.e., without using any automated tool or any script. In this type, the tester takes over the role of an end-user and tests the software to identify any unexpected behavior or bug. There are different stages for manualtesting such as unit testing, integration testing, system testing, and user acceptance testing

  .

  Testers use test plans, test cases, or test scenarios to test a software to ensure the completeness of testing. Manual testing also includes exploratory testing, as testers explore the software to identify errors in it.

  Following are the testing techniques that are performed manually during the test life cycle:

  - Acceptance Testing
  - White Box Testing
  - Black Box Testing
  - Unit Testing
  - System Testing
  - Integration Testing

- **Automation Testing**

Automation testing, which is also known as Test Automation, is when the tester writes scripts and uses another software to test the product. This process involves automation ofa manual process. Automation Testing is used to re-run the test scenarios that were performed manually, quickly, and repeatedly.

Apart from regression testing, automation testing is also used to test the application fromload, performance, and stress point of view. It increases the test coverage, improves accuracy, and saves time and money in comparison to manual testing

Test Automation should be used by considering the following aspects of a software:

- Large and critical projects
- Projects that require testing the same areas frequently
- Requirements not changing frequently
- Accessing the application for load and performance with many virtual users
- Stable software with respect to manual testing
- Availability of time

6.1.2 LEVELS OF TESTING

There are four levels of testing: Unit, Integration, System and Acceptance.

1. **Unit Testing:** A level of the software testing process where individual units/components of a software/system are tested. The purpose is to validate that each unit of the software performs as designed.

2. **Integration Testing:** A level of the software testing process where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units.

3. **System Testing:** A level of the software testing process where a complete, integrated system/software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements.

4. **Acceptance Testing:** A level of the software testing process where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery.

6.1.3 TESTING REPORT

Following are the test reports indicating the various tests that were performed on the project.

PROJECT:	Crypfunds
MODULE:	Campaign Creator
PREPARED BY:	Amaan Ranapurwala Aniruddha Kate Atharva Gaikwad Harsh Maroo Yash Mishra

SR.NO.	TEST CASE ID	TEST OBJECTIVE	STEPS	DATA	PREREQUISITE	EXPECTED RESULT	ACTUAL RESULT	STATUS
1	TC_WALLET_CONNECT	To check whether the host is able to connect the wallet with the portal	1. click on Connect wallet Button 2. Select your particular Wallet Account 3. Click on Connect Button	Wallet Address		After successful login, the Connect Wallet Button should be replaced with the Wallet Address	It is working properly	Pass
2	TC_CAMPAIGN_VISIBILTY	To check whether all the campaign thatare hosted on the smart contract are visible or not				All the hosted Campaign must be visible on the homepage.	All the campaigns are visible on the Homepage	Pass
3	TC_CAMPAIGN_PROGRESS_INDICATOR	To check whether the progress bar of the campaign is getting updated in real time	1. Click on the Campign 2. Enter the Amount you want to contribute 3. After successful transaction check if the progress is filling up	Amount of Eth to be Contirubuted	Min Contibution amount	Progress bar should be filled depending upon the amount is contributed	Progress bar is filled	Pass
4	TC_CAMPAIGN_CREATION	To check whether we are able to create a campaign	1. click on create campaign buton	All the necessary details relatd to the campign		A Campign should be created and be seen on the Homepage	Campaign is created	Pass
5	TC_CAMPAIGN_DETAILS_VALIDY	To check whether the detials entered during its creation are visible or not	1. click on the recent created campaign			All the details about the campaign must be visible	All the details about the campaign is visible	Pass
6	TC_WITHDRAWL_REQUEST	To check whether we are able to push a Withdrawl request	1. click on the recent created campaign 2. click on View Withdrawl Request 3. Click on Add Withdrawl Request	Amount needed to be Withdrawn		A withdrawl request should be created	A withdrawl request is created	Pass
7	TC_WITHDRAWL_REQUEST_CONSENSUS_ALGORITHM	To check whether we are able to withdrawl money	1. click on the recent created campaign 2. click on View Withdrawl Request 3. Click on Add Withdrawl Request			Money should only be able to Withdrawn if more than 50% voters have clicked on Approve Button	More than 50% voters approved the request, so the withdrawl request is accepted	Pass
8	TC_ TRANSACTIONS	To check whether transaction is successfully completed	1. Copy the transaction Id that we recived after the executing the transaction 2. Go to Etherscan Website 3. Enter the Transaction ID		Transaction ID	If transaction was Succeessfull, On etherscan we can see the status of the Transaction	Transaction status can be seen on the Etherscan website	Pass

PROJECT:	Crypfunds
MODULE:	Campaign Contributor
PREPARED BY:	Amaan Ranapurwala
	Aniruddha Kate
	Atharva Gaikwad
	Harsh Maroo
	Yash Mishra

SR.NO.	TEST CASE ID	TEST OBJECTIVE	STEPS	DATA	PREREQUISITE	EXPECTED RESULT	ACTUAL RESULT	STATUS
1	TC_WALLET_CONNECT	To check whether the host is able to connect the wallet with the portal	1. click on Connect wallet Button 2. Select your particular Wallet Account 3. Click on Connect Button	Wallet Address		After successful login, the Connect Wallet Button should be replaced with the Wallet Address	It is working properly	Pass
2	TC_CAMPAIGN_VISIBILTY	To check whether all the campaign thatare hosted on the smart contract are visible or not				All the hosted Campaign must be visible on the homepage.	All the campaigns are visible on the Homepage	Pass
3	TC_CAMPAIGN_PROGRESS_INDICATOR	To check whether the progress bar of the campaign is getting updated in real time	1. Click on the Campign 2. Enter the Amount you want to contribute 3. After successful transaction check if the progress is filling up	Amount of Eth to be Contirubuted	Min Contibution amount	Progress bar should be filled depending upon the amount is contributed	Progress bar is filled	Pass
4	TC_CAMPAIGN_DETAILS_VALIDY	To check whether the detials entered during its creation are visible or not	1. click on the recent created campaign			All the details about the campaign must be visible	All the details about the campaign is visible	Pass
5	TC_ TRANSACTIONS	To check whether transaction is succeessfully completed	1. Copy the transaction Id that we recived after the executing the transaction 2. Go to Etherscan Website 3. Enter the Transaction ID		Transaction ID	If transaction was Succeessfull, On etherscan we can see the status of the Transaction	Transaction status can be seen on the Etherscan website	Pass
6	TC_ MINIMUM_CONTRIBUTION	To check whether we are able to enter amount less than the Minimum amount set for a particular transaction	1. Click on the Campaign 2. Click on Contibute Now 3. Enter amount less than the minimum amount	Eth Coins	Minimum Amount	Transaction Should not be Successful	Transaction was not successful as the amount entered was less than the minimum amount	Pass
7	TC_VIEW_WITHDRAWL_REQUEST	To check whether we are able to see the Withdrawl requests initiated by the Admin	1. click on the recent created campaign 2. click on View Withdrawl Request			A recent withdrawl request should be available	A recent withdrawl request is avaialbe	Pass
8	TC_WITHDRAWL_REQUEST_APPROVAL	To check whether we are able to approve or Deny a Withrawl request	1. click on the recent created campaign 2. click on View Withdrawl Request			A recent withdrawl request should be available with clickable buttons of Approve or Deny	A recent withdrawl request is avaialbe with Approve and Deny buttons	Pass

PROJECT:	Crypfunds
MODULE:	Smart Contract
PREPARED BY:	Amaan Ranapurwala
	Aniruddha Kate
	Atharva Gaikwad
	Harsh Maroo
	Yash Mishra

SR.NO.	TEST CASE ID	TEST OBJECTIVE	STEPS	DATA	PREREQUISITE	EXPECTED RESULT	ACTUAL RESULT	STATUS
1	TC_SMARTCONTRACT_CREATION	To check whether the smart contract is successfully created	1. Compile the smart Contract code 2. Copy the Contract ID 3. go to Ehterscan Website 4. Enter the Id			If the details are to be seen then it means the Smart Contract is successfully created	We can see the details of the Smart Contract	Pass
2	TC_WRITE_TRANSACTION	To check whether data can be written on the smart contract	1. click on create campaign buton	Details about the Campaign		Smart Contract should be modified having all the details of the campaign	campaign is created and is visible on the Homepage	Pass
3	TC_READ_TRANSACTION	To check whether data on the smart contract is readable or not				All the campaign created should be displayed on the Webpage	All the campaign created are visible on the Webpage	Pass
5	TC_CAMPAIGN_WALLET	To check whether wallet is accessible with the smart contract	1. Click on the Campign 2. Enter the Amount you want to contribute		Eth Coins	If the transaction gets successful, it means wallet is conneted with the smart contract	Transaction is successful	Pass
8	TC_ TRANSACTIONS	To check whether transaction is succeessfully completed	1. Copy the transaction Id that we recived after the executing the transaction 2. Go to Etherscan Website 3. Enter the Transaction ID		Transaction ID	If transaction was Succeessfull, On etherscan we can see the status of the Transaction	Transaction status can be seen on the Etherscan website	Pass
6	TC_DATA_ALTERATION	To check whether we can modify the smart contract by changes its				Smart Contract should be modified under the same Id	No changes were executed	Pass

6.2 RESULTS AND DISCUSSION

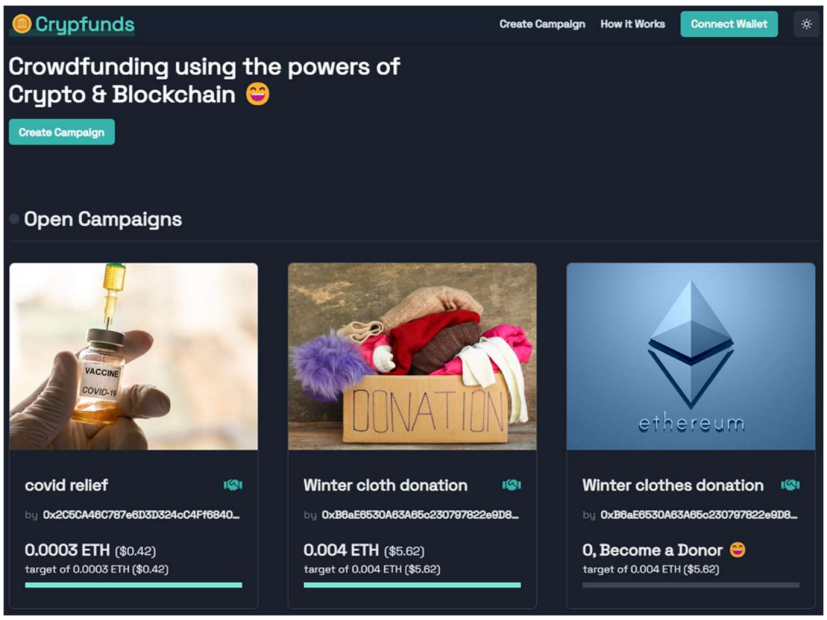

Fig 6.2.1 – Homepage of the website

This is the home page of our website. It contains hyperlinks to various sections of the website such as Active Campaign, How it works and Create Campaign. User can continue as a guest if they don't want to connect wallet and authorize to the app.

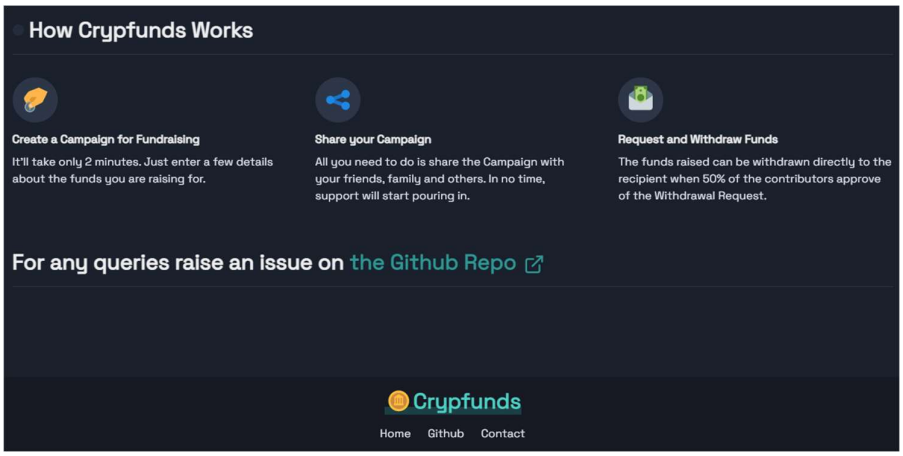

Fig 6.2.2 – How it works (on the homepage)

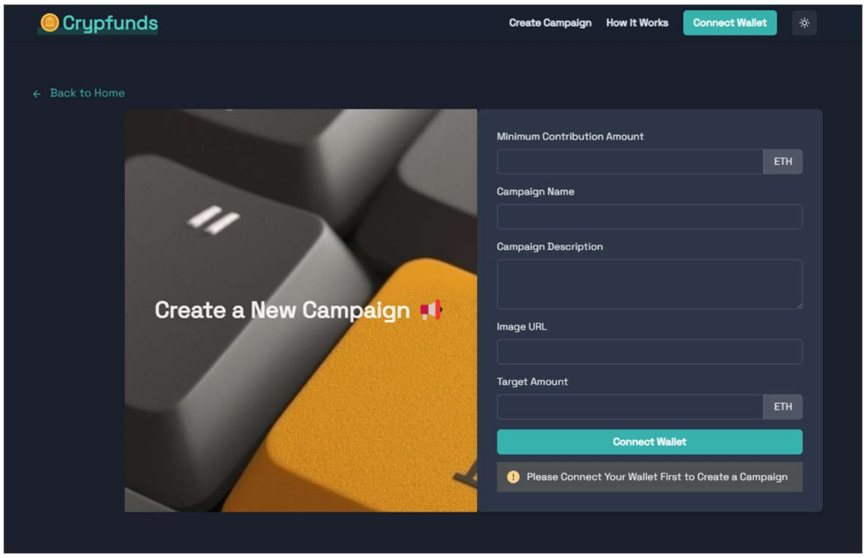

Fig 6.2.3 – Creating a new Campaign

Any user can create a campaign by entering all the mandatory details in the form which are further stored in the blockchain when the campaign is create. Target deadline and minimum contribution are important constraints in the project.

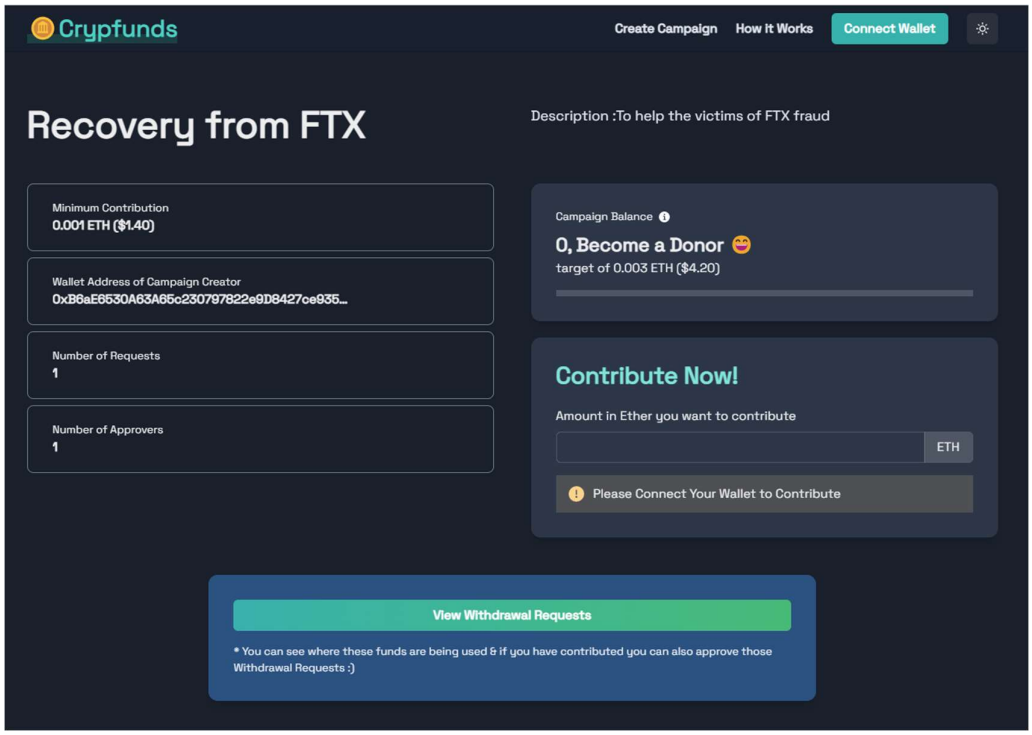

Fig 6.2.4 – All the information related to a particular campaign

This page describes information about the campaign such as number of contributors, recipient's wallet address, fund raised till now, number of approvers, number of requests and campaign balance. We can also create a withdrawal request through this page.

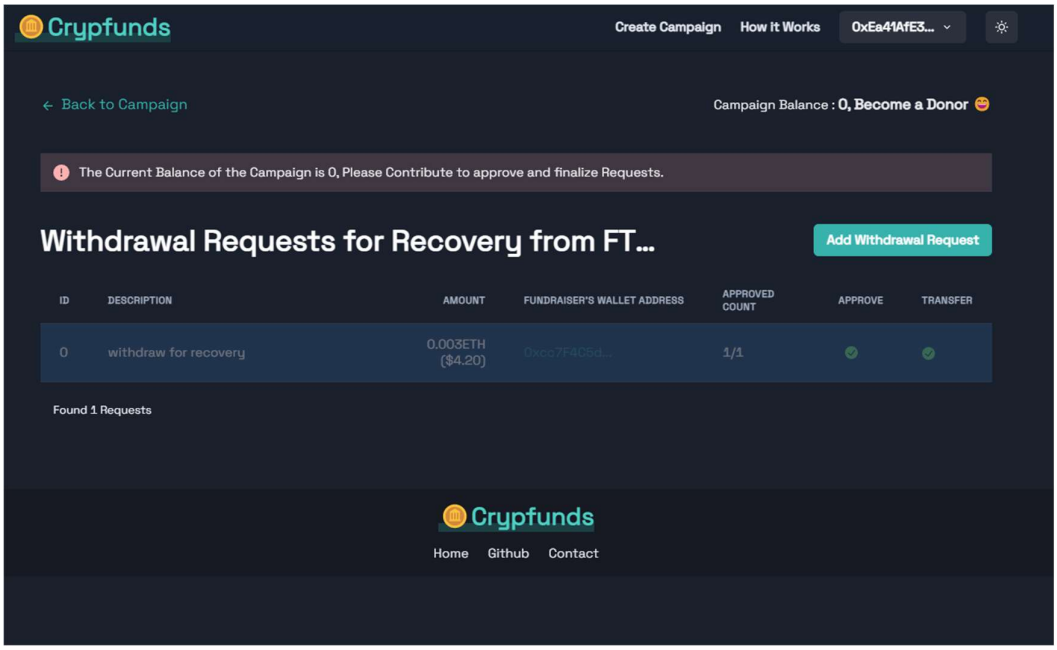

Fig 6.2.5 – Withdrawal Request

User can create a withdrawal request on this page if it is not already created. User can also be reverted back to the campaign details page, if required

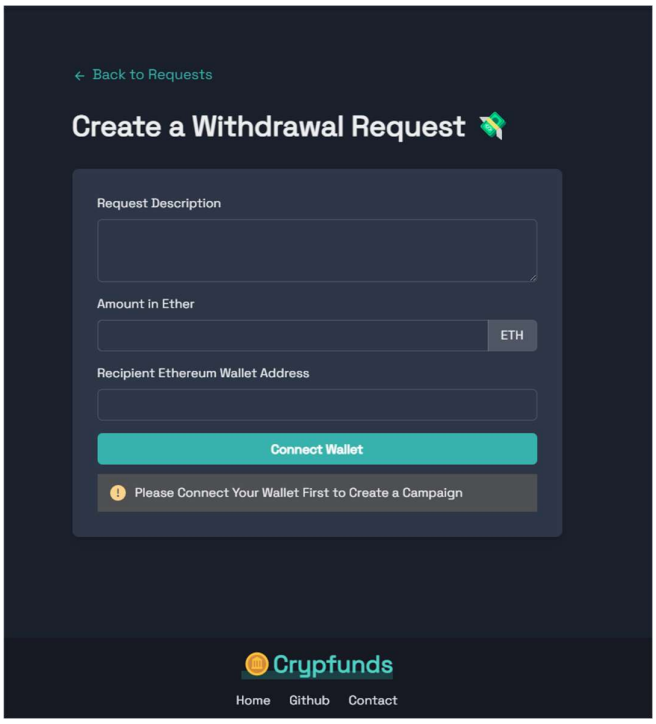

Fig 6.2.6 – Creating a Withdrawal request

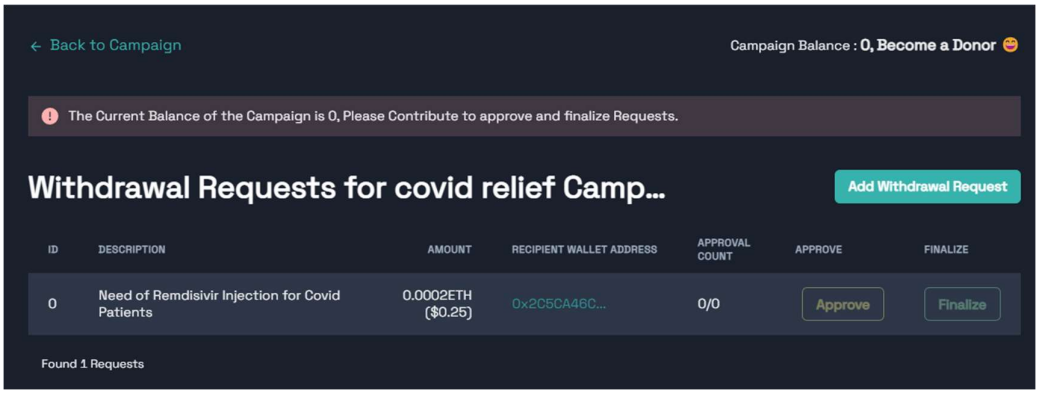

Fig 6.2.7 - List of Withdrawal Request with the option to approve and finalize the request

Here all the requests generated by the users are shown and can be approved and finalized (finalization or transfer of funds can be done only by manager/admin). Details are shown properly in tabular form. Once the funds are transferred to the fundraiser, the campaign is marked as done or completed

CHAPTER NO 7

ADVANTAGES AND APPLICATIONS

CHAPTER 7

ADVANTAGES AND APPLICATIONS

7.1 ADVANTAGES

- Decentralized application powered by Ethereum Blockchain
- All information about the campaign, contributions, withdrawal request and funds are visible to all.
- All of this information will be stored on a Blockchain

7.2 APPLICATIONS

- Currency Transfers & E-payments
- Smart Contracts in Financial Markets
- Voting, healthcare, notary

CHAPTER NO 8

CONCLUSION & FURTHER SCOPE

CHAPTER 8

CONCLUSION

8.1 CONCLUSION

We have designed a platform in which proper **engineering knowledge** has been applied. Conventional crowdfunding methods have long suffered from lack of transparency and fraud; with help of **problem analysis,** it was seen that it is an avoidable problem, and we have implemented a solution that can do away with these long-standing problems with help of **modern tools** usage such as solidity and web3. We have applied algorithms and knowledge to analyze the social problems in crowdfunding and provide a modern engineering solution. Then we have designed the application in two modules. We have investigated the available application to find out the new solutions and updates. The aim to have a transparent, anti-fraudulent, decentralized platform and environment has been achieved to a great extent. We implemented this project with **proper team work** and industry level standards have been maintained. This project has covered the weak points of general crowdfunding platforms to provide transparency to the process of crowdfunding and build trust among **society** by **ethical** practices and transparency, so that they may contribute their wealth to **good ethical** causes without fear of fraud.

8.2 FURTHER SCOPE

1. Migration to Ethereum mainnet .

The project can be migrated to Ethereum mainnet and can be deployed on a website so that anyone can access it and use it for their own purpose**.**

2. Supporting other Crypto Currencies

Support to other crypto Currencies can be added in future to increase the accessibility of the user. Other crypto currencies which can be included in future modules can be Solana using rust environment.

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8. Rinkeby Ethereum Test Network : https://www.rinkeby.io/#stats

APPENDIX I

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This certificate is awarded to Mr./Ms. AMAAN RANAPURWALA

of 4TH CSE Year/Sem for participation & securing _____ position in _____

Project Event/Competition conducted

on dated 28th & 29th March 2023 Organized by Department of Computer Science & Engineering.

We wish for her/his bright & Prosperous future.

Ms. Ranjana Shende	Dr. Sonali Ridhorkar	Dr. Vivek Kapur
Co-ordinator	HOD, CSE	Director, GHRIET

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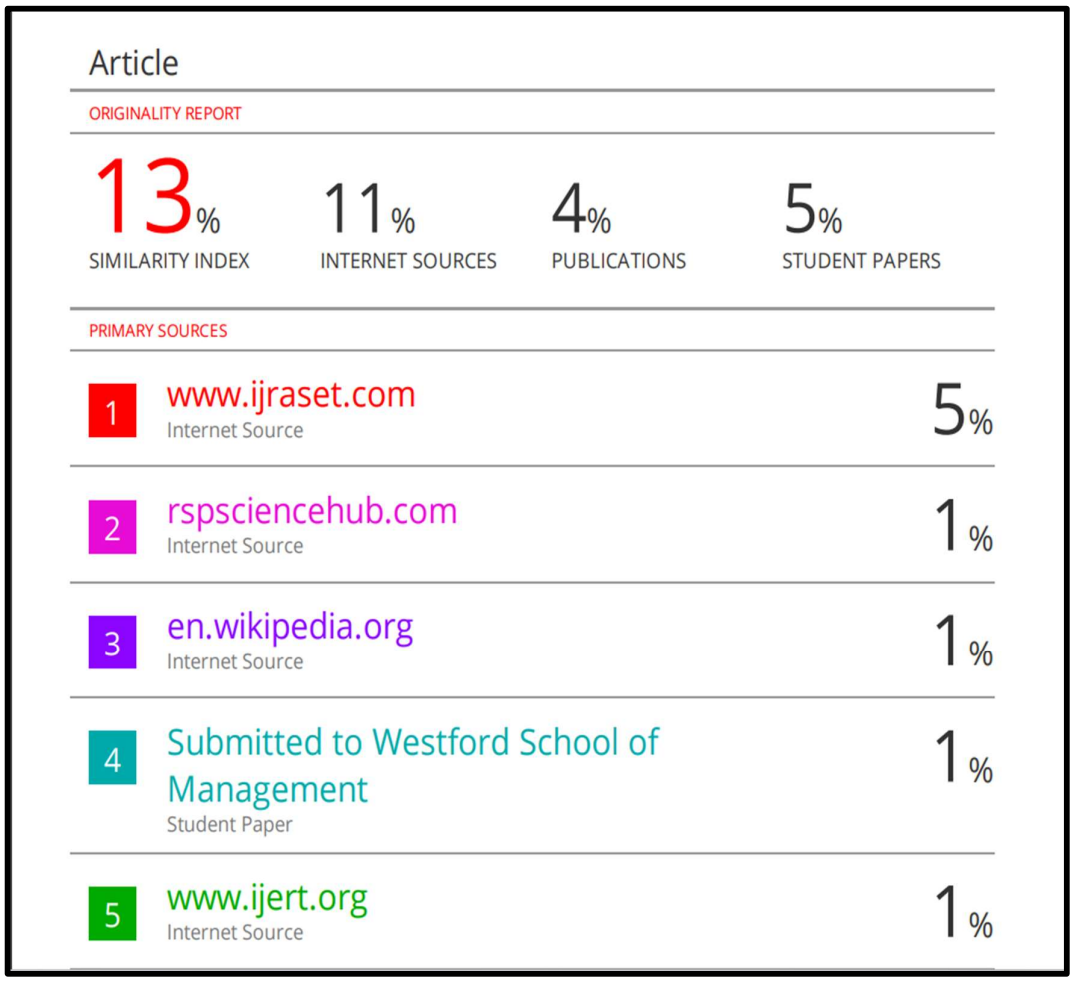
APPENDIX II

APPENDIX III

PLAGIARISM REPORT



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APPENDIX IV

Instruction Manual

On

"Development of Crowdfunding System Based on Blockchain"

Submitted By

Mr. Amaan Ranapurwala

Mr. Aniruddha Kate

Mr. Atharva Gaikwad

Mr. Harsh Maroo

Mr. Yash Mishra

Submitted in fulfillment of the requirementsfor
Degree of Bachelor of Engineering

Guided By: -

Dr. Rashmi Jain

Mr. Hrushikesh Panchabuddhe

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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MANAGEMENT & RESEARCH, NAGPUR.

(An Autonomous Institute, Affiliated to RTMNU, Nagpur)

2022-2023

1. Abstract

At first, blockchain was solely used to support cryptocurrencies, but as time goes on, further and further sectors are espousing this new technology. piecemeal from bitcoin numerous other crypto currencies began to crop. Defy systems helps to boost the power of websites with smart contracts and blockchain network. Blockchain is anticipated to be used by the maturity of technologies in the future as an effective means of conducting online deals. Crowdfunding platforms are one of the diligences to which blockchain technology may be applied. Crowdfunding is a new and innovative system for funding colorful kinds of gambles, wherein individual authors of the gambles can request for finances. The gambles may be working for profit motive, artistic or social. The finances are generally given to help people. It includes the use of internet social media platforms to connect investors with entrepreneurs in order to raise capital for colorful kinds of gambles in return for compensation. Internet and social media came new platforms that surfaced. The internet and social media are essential for nonprofit businesses and entrepreneurs to raise plutocrat. To further work the superiority of combining blockchain and crowdsourcing, in this paper, we propose an innovative mongrel blockchain crowdsourcing platform, named CrypFunds. Whether it be donations to a political cause or to an association, crypto is generally treated as property in the United States, and therefore numerous. Donations made in cryptocurrencies can be subtracted by levies as charitable benefactions. Donations in crypto can allow associations to take advantage of a new set of implicit benefactors who would prefer to contribute via blockchain rather than some of the more traditional styles that might bear them to dodge capital earnings levies

2. Modules Implemented

2.1 Creating Smart Contract :

- A Smart Contract has been created according to the needs of the project and deployed on Ethereum blockchain (test network).
- The contract has functions for creating a campaign, donating to it and withdrawing the funds.

Consensus algorithm has been applied for verification by users order the customer

should be the register member of an application. After that he can make payment and can track the order placed.

2.2 Website :

- The UI is created for user to interact with the smart contract and see the results in real time
- With this website user can interact with the smart contract.
- We have made the UI simple and easy for the user to operate and at the same time UX (animations) are also applied to it.

3.1 SOFTWARE REQUIREMENT

1. **OS** – Any Operating System
2. **Language** – JavaScript, React.js, Web3.js, Next.js, Solidity
3. **Framework** – Chakra UI
4. **Extension** – MetaMask
5. **Infrastructure** – Goerli.Infura Infrastructure
6. **IDE** – Visual Studio Code

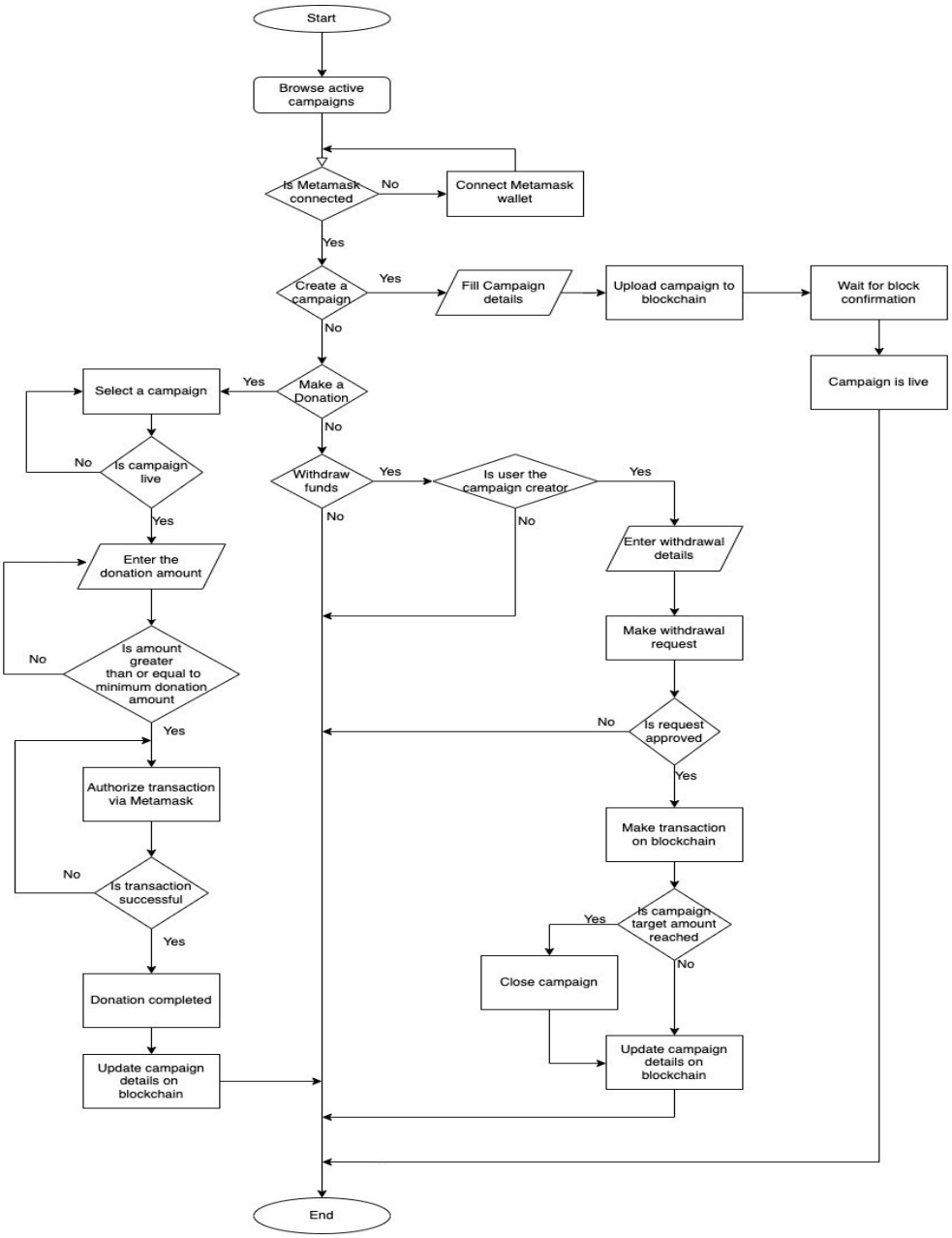
3.2HARDWARE REQUIREMENT

PROCESSOR: Intel Core 2 Duo and above (2.5+ GHz processor)

HARD DISK: Minimum 128GB

RAM: Minimum 4GB

3.3 Flowchart



4. Steps to Run the Project

Run the Website locally as follows:

1. Fork / Clone the Project
2. run yarn install to install all the libraries and packages related to the project
3. run yarn dev to run the application locally and deploy it to the local server.

Following are the steps to setup the project -

A. Pre-requisites

1. Install Metamask as Google Chrome Extension and Create an account.
2. Get 0.01 ether free by giving the ethereum address (https://goerlifaucet.com/)
3. Try other Goerli eth faucets if this one is busy .

B. Deploying your own smart Contract

1. Create an account in https://infura.io
2. Create .env file in Ethereum directory and add these line to it.
   mnemonic = 'Your mnemonic code '
   link = 'Your infura end point link '
3. Do the Changes that you want to do inside the Solidity File
4. Compile the Contract node compile.js
5. Deploy Contract by going into smart-contract Directory and run. node deploy.js
6. Copy the contract deploy address and replace it in factory.js file.
7. Replace your "infura end point link" in web3.js file

Following are the steps to Run the project –

1. After forking the project , run it in vs code or any other IDE ; Alternatively you can cmd into the file .
2. Run Yarn install
3. Upgrade to the latest version of chakra ui and other libraries intalled.
4. Run Yarn dev to run the project on the local host
5. Now the project should be runing on the browser but , you need to connect metamask wallet for futher authentication
6. Install metamask from https://metamask.io/
7. Setup you metamask wallet (Follow the regular signup procedure and setup secure secret key / phrase)
8. Collect Goerli ether from any faucet (https://goerlifaucet.com/)
9. After collecting the Goerli ether , you can connect the wallet and do interactions with the website .

5. Further Scope

In future , this website can be deployed to the ethereum mainnet. We can also enable support for other cryptocurrencies .
By deploying it to mainnet we can reach out to more people and utilize the power of Blockhain and cryptocurrencies.

6. Limitations

1. There are internet dependencies without internet the system won't work.
2. This system is dedicated to Ethereum Cryptocurrency at this time.
3. The system may not work properly if Eth network is in maintenance or any breakout in Goerli eth.
4. User need goerli eth for even demo purposes.
5. Once a campaign is created it cannot be deleted.

7. Achievement Details

APPENDIX V