A Project Report

on

CROWDFUNDING ON THE ETHEREUM BLOCKCHAIN

Submitted in partial fulfillment of the requirement for the award of the degree of

Bachelor of Technology

(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

Under The Supervision of
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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING
GALGOTIAS UNIVERSITY, GREATER NOIDA

CANDIDATE'S DECLARATION

I/We hereby certify that the work which is being presented in the project, entitled **CROWDFUNDING ON THE ETHEREUM BLOCKCHAIN** in partial fulfillment of the requirements for the award of the **Bachelor of Technology** submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of month, July to December 2021, under the supervision of Urvashi Suganth, Asst. Professor, Department of Computer Science and Engineering of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

Suryansh Pratap Singh (19SCSE1180092)
Harsh Vardhan Singh (19SCSE1180096)

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Ravindra Ahuja,

Asst. Professor

CERTIFICATE

The Final Project Viva-Voce examination of Suryansh Pratap Singh (19SCSE1180092), Harsh Vardhan Singh (19SCSE1180096) has been held on ________________ and his/her work is recommended for the award of Bachelor of Technology.

Signature of Examiner(s) **Signature of Supervisor(s)**

Signature of Project Coordinator **Signature of Dean**

Date: December, 2022

Place: Greater Noida

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Abstract

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 get oxygen and medical help to large funds such as PM Cares.

Introduction

Problem Statement and Necessity

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 get oxygen and medical help to large funds such as PM Cares.

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[1] — 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.

We were highly inspired by the CryptoRelief initiative (www.cryptorelief.in)[2] which raised ~1 billion dollars for Covid Relief in India from the entire global community, in a highly transparent manner.

Feasibility: Technical and Non-Technical

- Technical Feasibility
    - It is to be a ReactJS based application, which will be supported by any web browser.
    - Internet connectivity will be required.
    - Users will require ‘Metamask’ browser extension to sign transactions.

- Social Feasibility
    - Crowdfunding over the years has helped people but has also seen heavy frauds in the name of Crowdfunding. With CryptoCrowdFund we want to bring transparency to the process of crowdfunding and build trust among people to contribute to all the causes.

- Economic Feasibility
    - Given the Ethereum Blockchain provides us with most of the security features, the development does not require much cost.
    - The only cost would be the server cost of the deployed application.

- Scope
    - With CryptoCrowdFund we aim to make the crowdfunding process transparent, anti-fraudulent and secure.

Proposed Solution

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 :

1. **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.

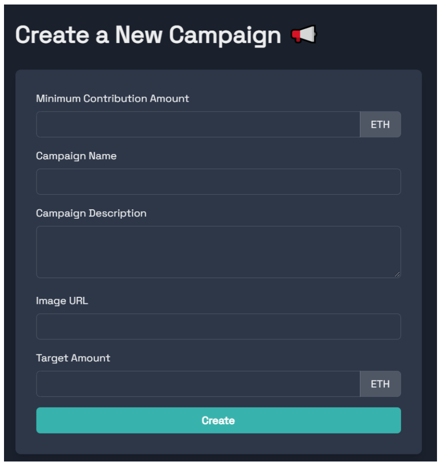
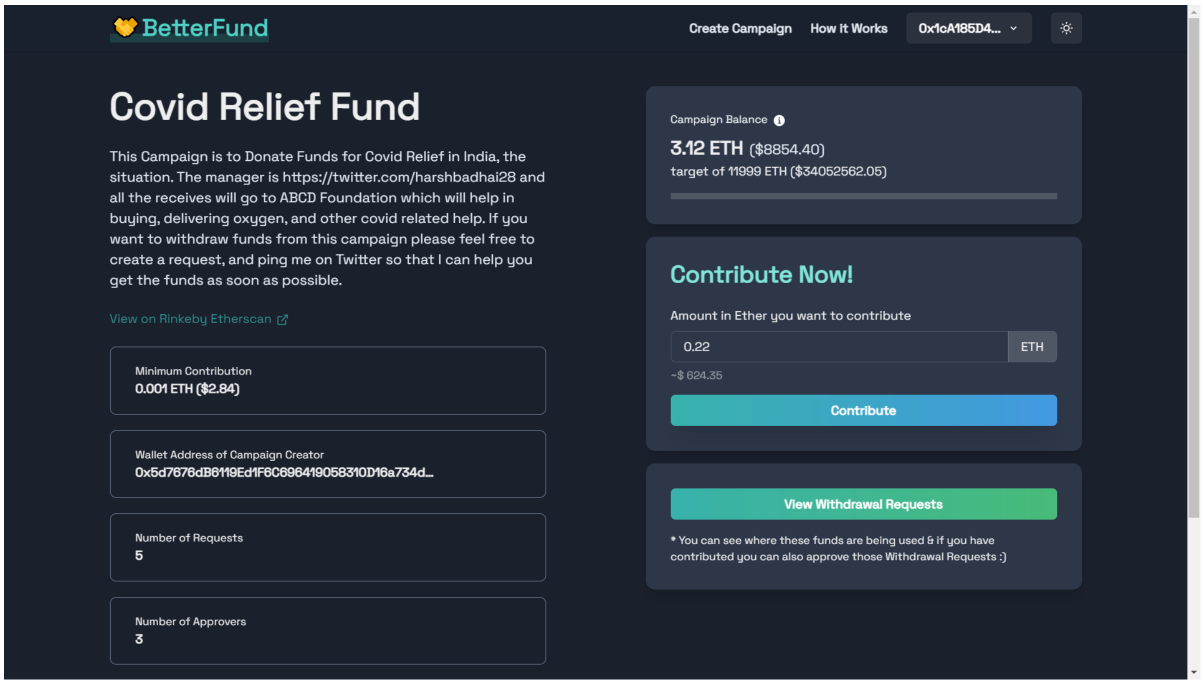


Fig 1: Form to create a campaign

2. **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.



Covid Relief Fund

This Campaign is to Donate Funds for Covid Relief in India, the situation. The manager is https://twitter.com/harshbadhai28 and all the receives will go to ABCD Foundation which will help in buying, delivering oxygen, and other covid related help. If you want to withdraw funds from this campaign please feel free to create a request, and ping me on Twitter so that I can help you get the funds as soon as possible.

View on Rinkeby Etherscan

Minimum Contribution
0.001 ETH ($2.84)

Wallet Address of Campaign Creator
0x5d7676dB6119Ed1F6C696419058310D16a734d...

Number of Requests
5

Number of Approvers
3

Campaign Balance
3.12 ETH ($8854.40)
target of 11999 ETH ($34052562.05)

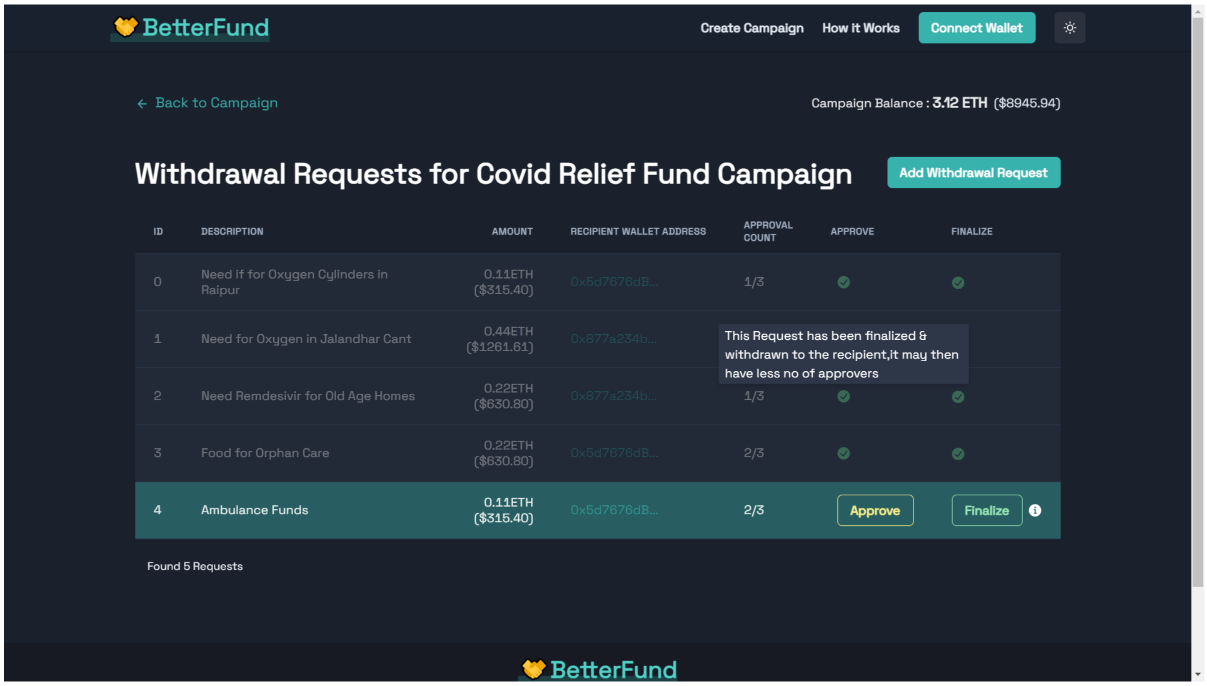
Contribute Now!

Amount in Ether you want to contribute
0.22 ETH
~$ 624.35

* You can see where these funds are being used & if you have contributed you can also approve those Withdrawal Requests :)

Fig 2: The "Contribute to a campaign" screen

3. **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.



Campaign Balance : 3.12 ETH ($8945.94)

Withdrawal Requests for Covid Relief Fund Campaign

ID	DESCRIPTION	AMOUNT	RECIPIENT WALLET ADDRESS	APPROVAL COUNT	APPROVE	FINALIZE
0	Need if for Oxygen Cylinders in Raipur	0.11ETH ($315.40)	0x5d7676dB...	1/3	✓	✓
1	Need for Oxygen in Jalandhar Cant	0.44ETH ($1261.61)	0x877a234b...			
2	Need Remdesivir for Old Age Homes	0.22ETH ($630.80)	0x877a234b...	1/3	✓	✓
3	Food for Orphan Care	0.22ETH ($630.80)	0x5d7676dB...	2/3	✓	✓
4	Ambulance Funds	0.11ETH ($315.40)	0x5d7676dB...	2/3	Approve	Finalize

This Request has been finalized & withdrawn to the recipient,it may then have less no of approvers

Found 5 Requests

Fig 3: The "Withdrawal Requests" screen

Technical Analysis

UML Diagram

Class Diagram

The **Classes** defined are:

- ➔ Campaign
- ➔ CampaignFactory
- ➔ Requests
- ➔ connectWallet

The **Relationships** defined are:

- ➔ A User connects his wallet to support various campaigns; one to many.
- ➔ A campaignFactory has its Campaign; one to one.
- ➔ A Campaign has multiple Requests; one to many.

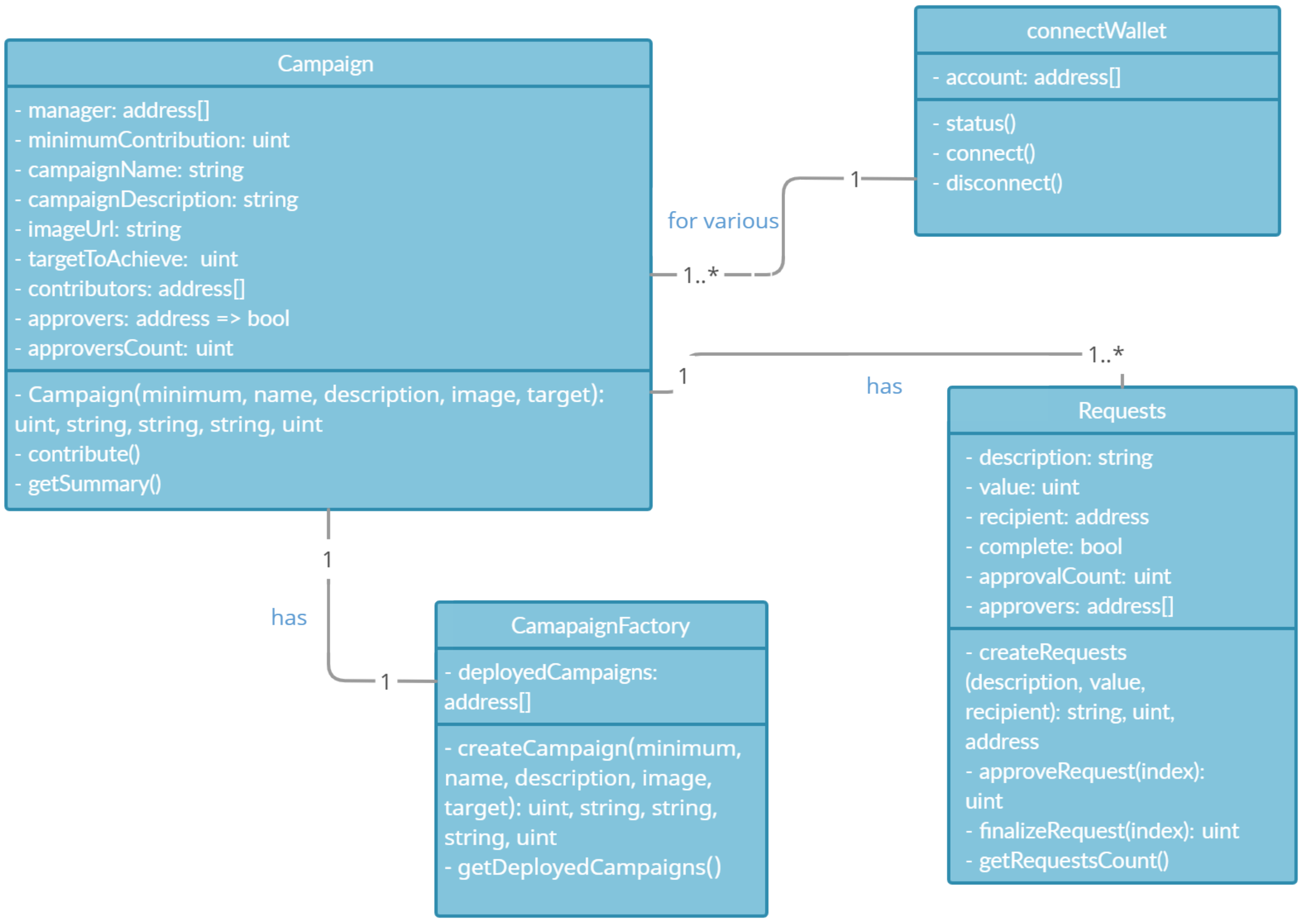

Campaign
- manager: address[]
- minimumContribution: uint
- campaignName: string
- campaignDescription: string
- imageUrl: string
- targetToAchieve: uint
- contributors: address[]
- approvers: address => bool
- approversCount: uint
- Campaign(minimum, name, description, image, target): uint, string, string, string, uint
- contribute()
- getSummary()
connectWallet
- account: address[]
- status()
- connect()
- disconnect()
for various
1
1..*
has
1
1..*
Requests
- description: string
- value: uint
- recipient: address
- complete: bool
- approvalCount: uint
- approvers: address[]
- createRequests (description, value, recipient): string, uint, address
- approveRequest(index): uint
- finalizeRequest(index): uint
- getRequestsCount()
has
1
1
CamapaignFactory
- deployedCampaigns: address[]
- createCampaign(minimum, name, description, image, target): uint, string, string, string, uint
- getDeployedCampaigns()

Fig 4: Class Diagram showing class and object relationships

Tech stack analysis :

In order to achieve the solution we have chosen a tech stack that is

- Optimized for speed
- Efficient
- Secure

The Technologies that have been used are :

1. **NextJS :** Next.js[3] is an open-source React front-end development web framework that enables functionality such as server-side rendering and generating static websites for React based web applications.
2. **Chakra UI :** Chakra UI is a simple, modular and accessible component library that gives the building blocks one needs to build React applications.
3. **Solidity**[4] **:** It is the programming language for implementing Ethereum based Smart Contracts.
4. **Web3** : web3.js[5] is a collection of libraries that allow you to interact with a local or remote ethereum node using HTTP, IPC or WebSocket.
5. **Ethereum Smart Contract** : It is the collection of functions and data that reside at a specific address on the Ethereum Blockchain[6].

Fig 5: Technologies Used

Result and Discussion

App Usage Instructions

1. Connect Wallet :

In order to perform any transactions, be it creation of a campaign or contributing to one, a user first needs to connect an Ethereum wallet to the site. We have made use of a browser extension called Metamask[7] to connect the wallet, which can be used to authorize transactions for cryptocurrency.

The process is as shown in the below flow:

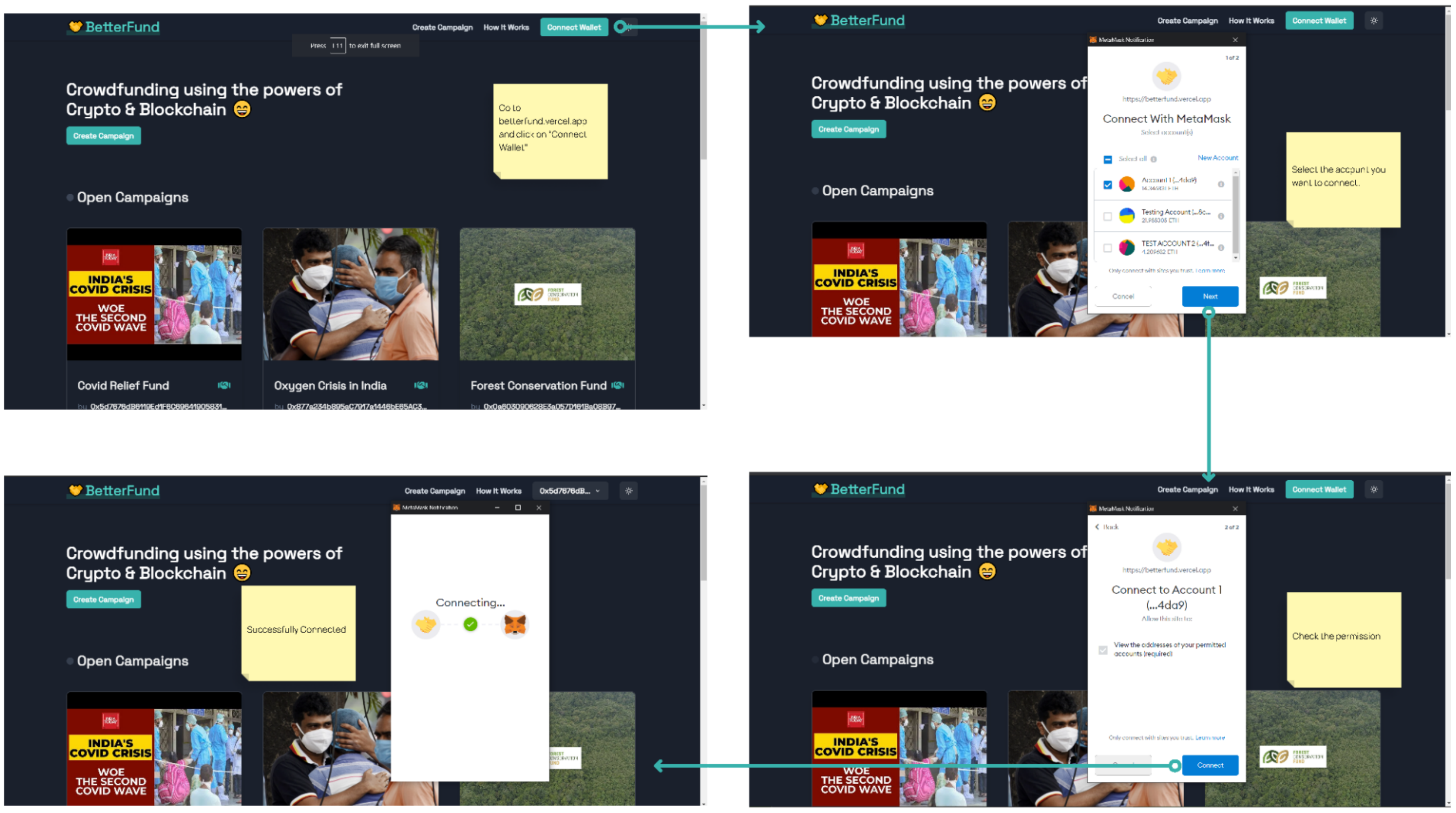

Go to betterfund.vercel.app and click on "Connect Wallet"
Select the account you want to connect.
Check the permission
Successfully Connected
Connect With MetaMask
Connect to Account 1 (...4da9)
Connecting...
Crowdfunding using the powers of Crypto & Blockchain
Open Campaigns
Covid Relief Fund
Oxygen Crisis in India
Forest Conservation Fund

Fig 6: Flow diagram to connect a wallet

2. Creating a Campaign:

Once a wallet has been connected, anyone can create a crowdfunding campaign. The process is highly intuitive and self-explanatory, and the user only has to supply the data as asked in the forms.

The flow of the process is as shown below:

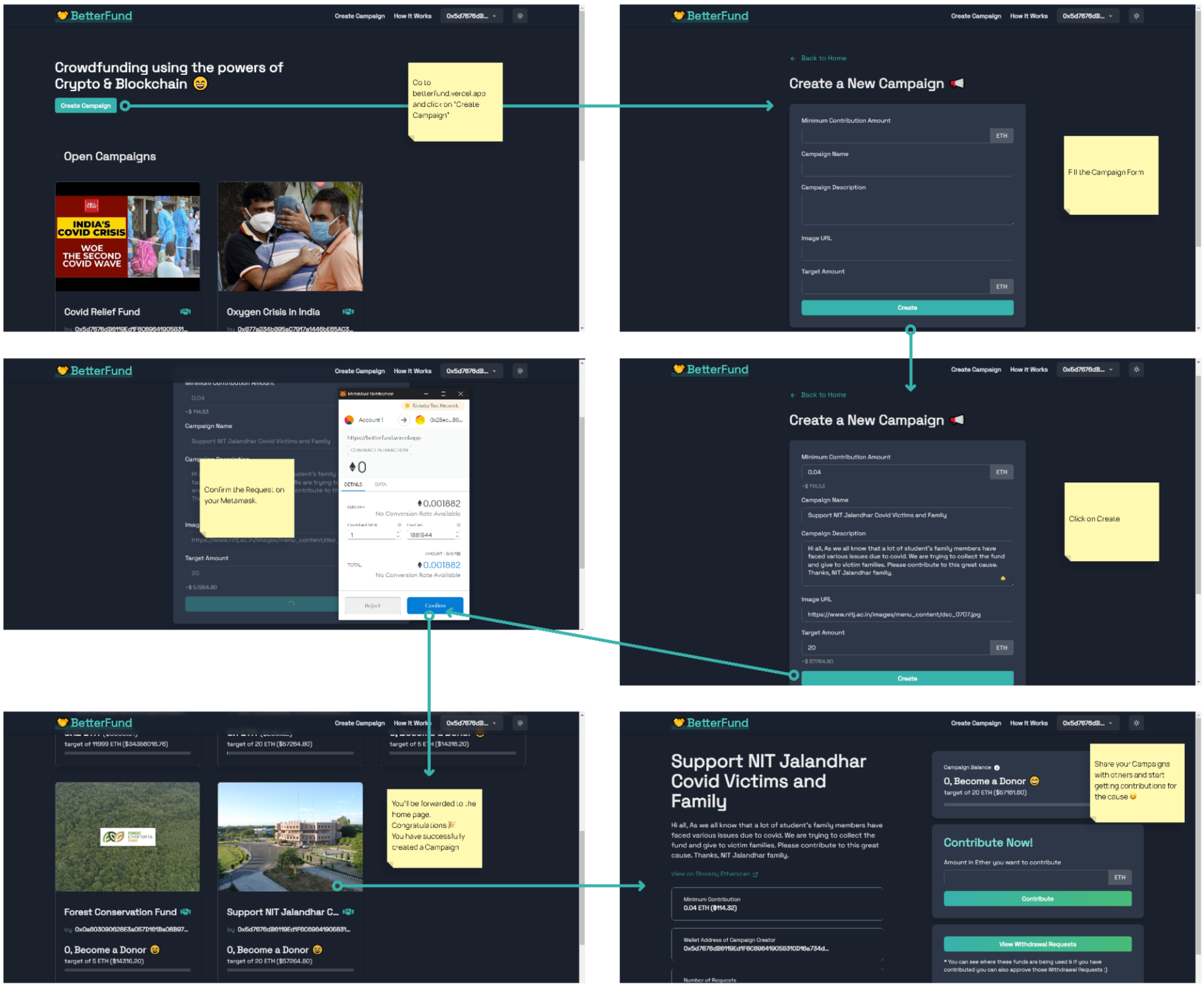
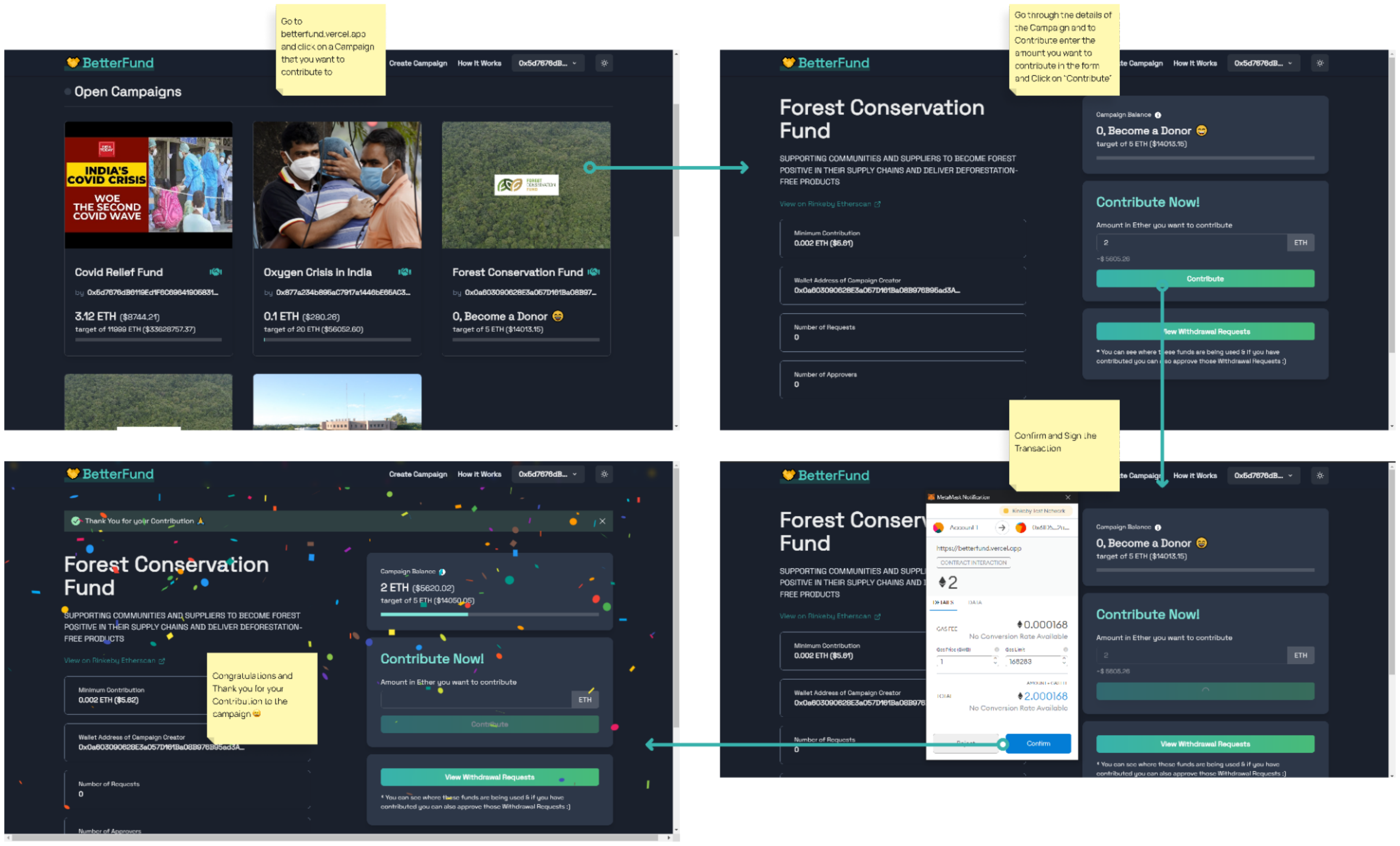

Go to betterfund.vercel.app and click on "Create Campaign"
Fill the Campaign Form
Click on Create
Confirm the Request on your Metamask.
You'll be forwarded to the home page. Congratulations 🎉 You have successfully created a Campaign
Share your Campaigns with others and start getting contributions for the cause 😀
BetterFund
Create a New Campaign
Support NIT Jalandhar Covid Victims and Family
Contribute Now!

Fig 7: User journey to create a campaign

3. Contributing to a Campaign

Any user whose wallet has been connected to the app can contribute to a campaign. The process is simple and detailed in the flow below. The user only needs to select the campaign, enter the amount he wishes to contribute, and then authorize the transaction (in this case, with the Metamask extension).



Go to betterfund.vercel.app and click on a Campaign that you want to contribute to

Go through the details of the Campaign and to Contribute enter the amount you want to contribute in the form and Click on "Contribute"

Confirm and Sign the Transaction

Congratulations and Thank you for your Contribution to the campaign 😀

Fig 8: User journey to contribute to a campaign

4. Making a Withdrawal Request

If you are the creator of a fund, you might need to withdraw from the available funds for various reasons. You can create a Withdrawal Request by the flow given below, which must be approved by the majority of approvers.

If you are a Contributor who has contributed more than the Minimum Contribution (specified in the campaign), then you are an approver. You can vote on the Withdrawal requests made by the creator, and either approve or deny the request.

No funds can be withdrawn without the approval of at least 50% of the approvers.

The process is simple:

1. Click on the 'Create Withdraw Request' button on the campaign management page.
2. Fill out the form which will ask for the **amount** you are requesting, the **reason** for the withdrawal, as well as the **address to which the funds will be transferred**, should the request be approved.
3. Authorize the creation of the request with Metamask.
4. A page will show up which shows all the withdrawal requests for this campaign. This page is also visible to approvers of a campaign and they can approve or deny the request.
5. Once a request has gained a majority approval, the funds can be withdrawn.
6. Withdrawal of funds is performed and the amount is transferred directly to the payee, and not to the creator of the campaign.

This provides complete transparency in the process of withdrawing funds. Approvers can see where their money is going. The creator is not the intermediary of the transfer of funds.

Flow for making a withdrawal request is on the following page:

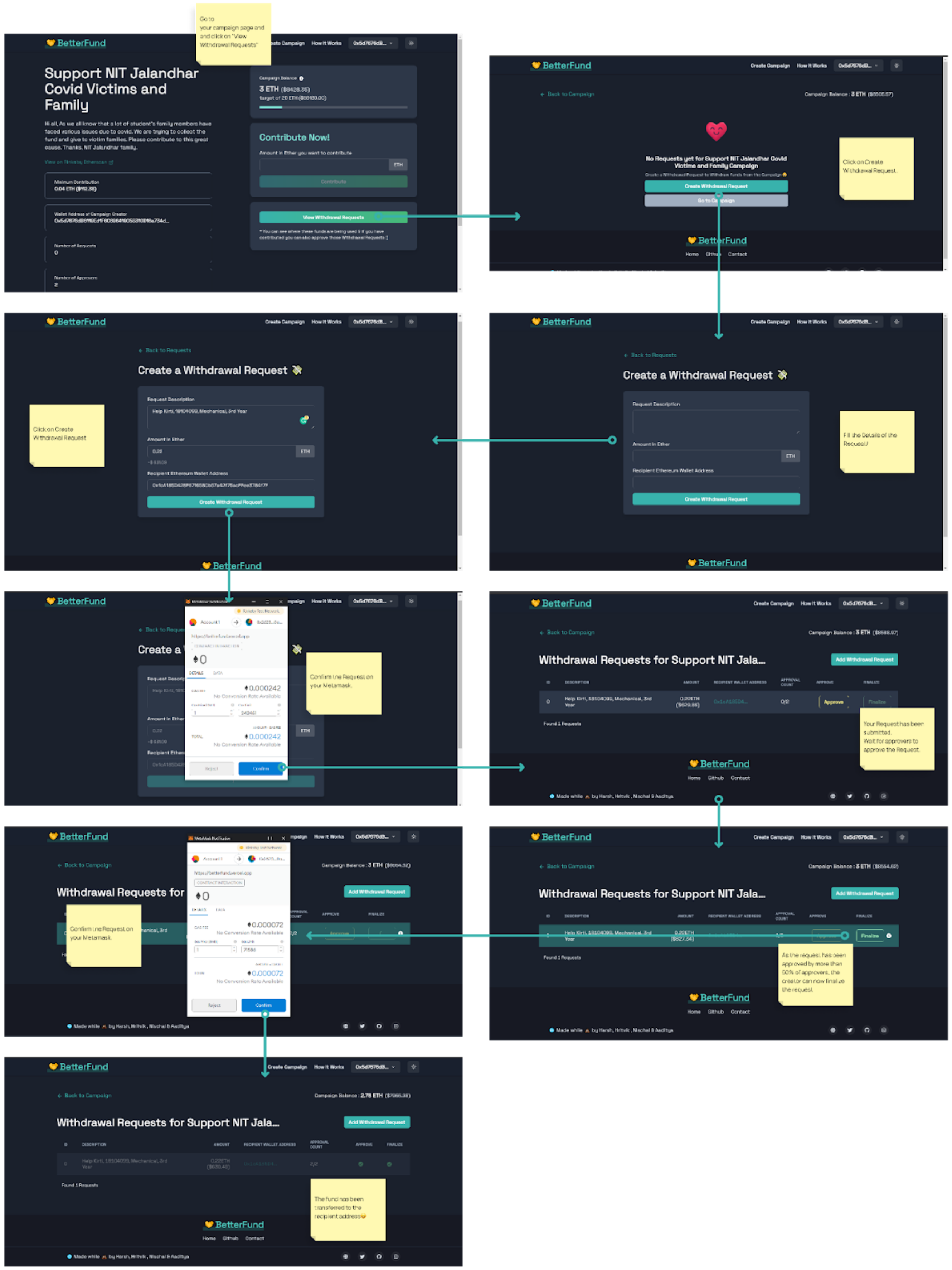

Go to your campaign page and click on "View Withdrawal Requests"
Support NIT Jalandhar Covid Victims and Family
Contribute Now!
View Withdrawal Requests
Click on Create Withdrawal Request.
No Requests yet for Support NIT Jalandhar Covid Victims and Family Campaign
Create Withdrawal Request
Create a Withdrawal Request
Fill the Details of the Request!
Click on Create Withdrawal Request
Confirm the Request on your Metamask.
Withdrawal Requests for Support NIT Jala...
Your Request has been submitted. Wait for approvers to approve the Request.
As the request has been approved by more than 50% of approvers, the creator can now finalize the request.
Confirm the Request on your Metamask.
The fund has been transferred to the recipient address😊

Fig 9: User journey to view and make withdrawal requests

Deployment and testing status

- The **frontend of the application** has been deployed and hosted to Production on Vercel and has been tested by unit tests as well as has been manually tested by a sample group of 10 users.

- The smart contract has been deployed to Goerli which is an Ethereum Test Network, typically used by developers to run rigorous tests of the application. The address of the smart contract is “0x2Bec4B5E67FE9e6Ba5768D83d49a71A60067B813” and all the transactions can be seen here:
  https://goerli.etherscan.io/address/0xd4524be96345ec203c6c2863f8bd93ba89c2b15a

- The Application is fully live and functional and can be used here:
  https://cryptocrowdfund.vercel.app/

Conclusion

Our Project, “CryptoCrowdFund: Crowdfunding Platform powered by Blockchain”, is complete, live and fully functional.

Conventional crowdfunding methods have long suffered from lack of transparency and fraud. It is an avoidable problem, and we believe that we have implemented a solid solution that can do away with these long-standing problems.

The aim to have a transparent, anti-fraudulent, decentralized platform has been achieved to a great extent. This project has covered the weak points of general crowdfunding platforms to provide transparency to the process of crowdfunding and build trust among people, so that they may contribute their wealth to good causes without fear of fraud.

Links & References

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2. CryptoRelief platform: https://cryptorelief.in
3. Next JS Documentation: https://nextjs.org/
4. Learning Solidity Language: https://cryptozombies.io/
5. web3.js - Ethereum JavaScript API: https://web3js.readthedocs.io/en/v1.3.4/
6. How data is stored in Ethereum Blockchain: https://laurentsenta.com/articles/storage-and-dapps-on-ethereum-blockchain/
7. Metamask Ethereum Wallet : https://metamask.io/