

Software Requirement Specification Document for FundWings

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Table 1: Document version history

Version	Date	Reason for Change
1.0	15-November-2023	Proposal First Version Specifications are added
1.2	Dec-2023	SRS First version's specifications are defined
2.0	14-Jan-2024	SRS First version's specifications are defined fully with an implementation of GUI for the website.

GitHub Backend repo: <https://github.com/yousef270902/blockchain.git>



Figure 1: GitHub repository

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Abstract

The main idea of FundWings is collecting small amounts of money from lots of people, to later donate to charities or financially support projects. The platform introduces a high level of secure processes. It's an online platform where you can donate money or invest in a project. Some people get scammed while doing so, so this system aims to prevent any of this. The goal is to make donations and fund transactions unconditionally secured. Also, it aims to lower payment processing fees and fees on total funds, and there are no fees on donations. The Software encourages the end users to create an account that allows users to invest/donate in a campaign, they can initiate their own campaign to scale up their businesses. It uses blockchain technology to provide a secure, tamper-proof, consensus-based environment. It will be a full-stack website. The software provides a secure channel for crowdfunding and donations.

1 Introduction

1.1 Purpose of this document

This document is meant to explain the details of our project. Fundwings is intended to facilitate your way to donating money or investing in a project with a technology called a blockchain. The document focuses on explaining how our software works and it will discuss the possible operational scenarios. It will act as a record for approving the necessary functions. Additionally, the document will show you a user interface to visually illustrate the system's appearance and functionality. This addition enhances the understanding of how the system will look and how users will interact with it.

1.2 Scope of this document

As for the scope of the document, it will include the design, development, and implementation of the system, so the document will show you the features of our system highlighting the most important aspects. The document will present a user interface to visually illustrate both the system's appearance and functionality. It will also highlight the functional and non-functional requirements and the main functions of the system. Fundwings will be a web platform and you'll see in this document a little glimpse of the website and the different stages we will go through until the deployment.

1.3 Business Context

It will make it easier for both the campaign initiator and the backer to create a campaign and invest in a project respectively. This specific business will create a huge profit, as the great ideas that are funded using the system will have huge potential, and probably a large audience. This system is important is crucial as it gives an opportunity to the youth to come up with great and unique ideas and dreams, not only that but it also promises them the required capital to make their dreams come true.

2 Similar Systems

2.1 Academic

1. Ms S Benila et al. "Crowdfunding using blockchain". In: GRD Journals 4.4 (2019)(Accessed 10 January 2024)[1]

The main problem statement: The proposed system was having multiple trusted issues such as lack of transparency, high charges, and no records. so they aimed to create a crowdfunding system using blockchain technology to gain more security, transparency, and interactive platforms. The researchers contributed: By proposing a crowdfunding system using blockchain technology to solve each of the issues that were presented as huge obstacles against the investors There was no dataset but they focused on conceptual and technological aspects related to blockchain-based crowdfunding. The main results of the researchers are only the modules and functionality of the proposed crowdfunding system with its different aspects. To criticize the paper, The paper failed to introduce any unique or creative ideas, also there were no case studies to determine the effectiveness of the mentioned approach. There were many concentrations on a specific implementation rather than expanding the discussions to show the scalability, and security that can be gained. [1].

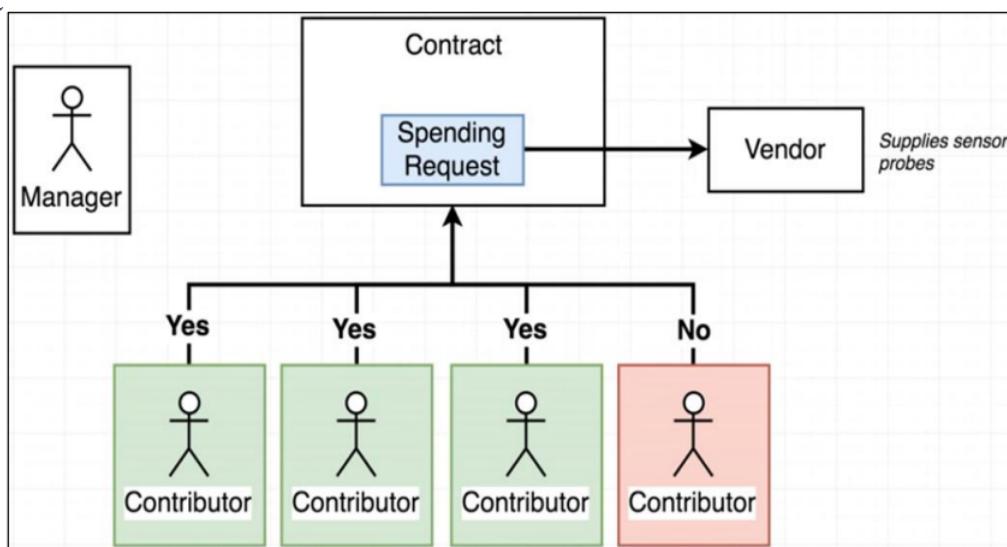


Figure 2: architecture diagram [1]

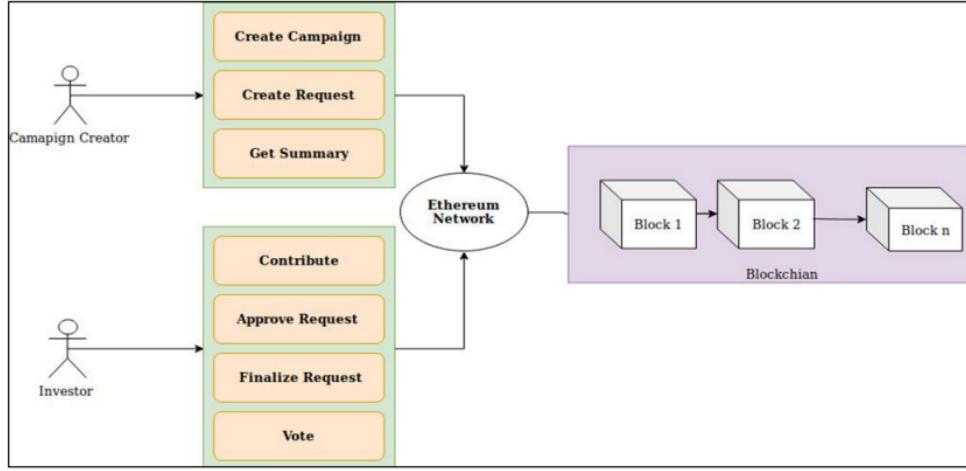


Figure 3: The Working Model [1]

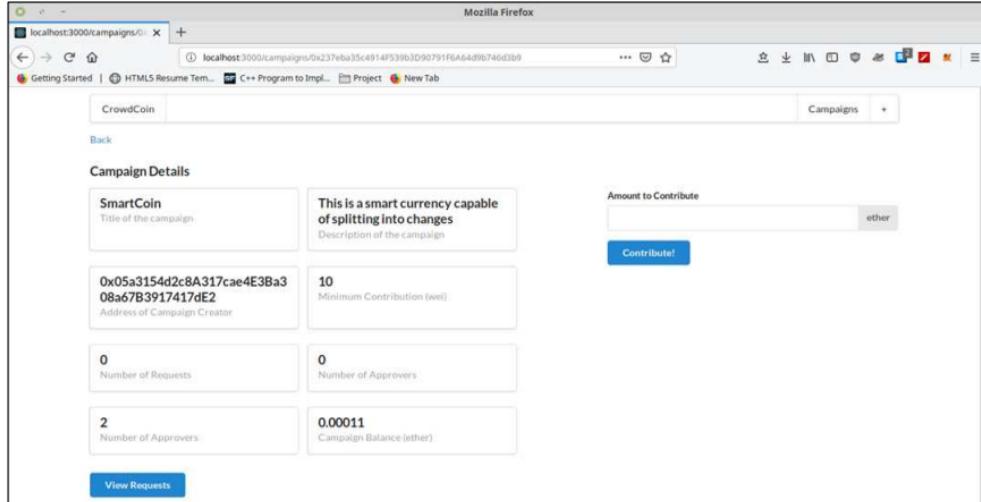


Figure 4: campaign summary [1]

2. SZichichi, M., Contu, M., Ferretti, S., D'Angelo, G. (2019). likestarter: a Smart-contract based Social DAO for Crowdfunding. (Accessed 10 January 2024) [2]:

The main problem statement: The proposed system talks about Like Starter, a social network platform built on the Ethereum blockchain where users can raise funds for others through a simple "like." likeStarter functions as a Decentralized Autonomous Organization (DAO) using smart contracts to manage and control funds and they will use a blockchain to secure this app. The researchers contributed: by presenting likeStarter, a blockchain-based decentralized platform built on the Ethereum blockchain. likeStarter functions as a Decentralized Autonomous Organization (DAO) and allows artists to gain funds easily and reach an audience. The main result that the proposed system reached: is that now users can vote on prices, suggest, make donations, and receive likons (tokens) for their projects through social interactions, such as receiving "likes" on their content, Smart contracts are used to control and

manage the funds. based on the excerpt, one potential criticism could be the lack of detailed information regarding the implementation and evaluation of the likeStarter platform. Additionally, the excerpt does not provide information on the scalability, security, or potential limitations of the proposed solution.

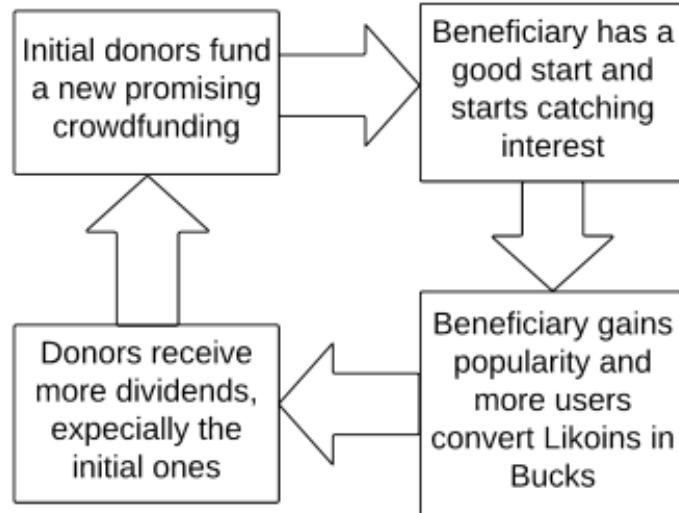


Figure 5: The autocatalytic cycle that incentivizes the social behavior [2]

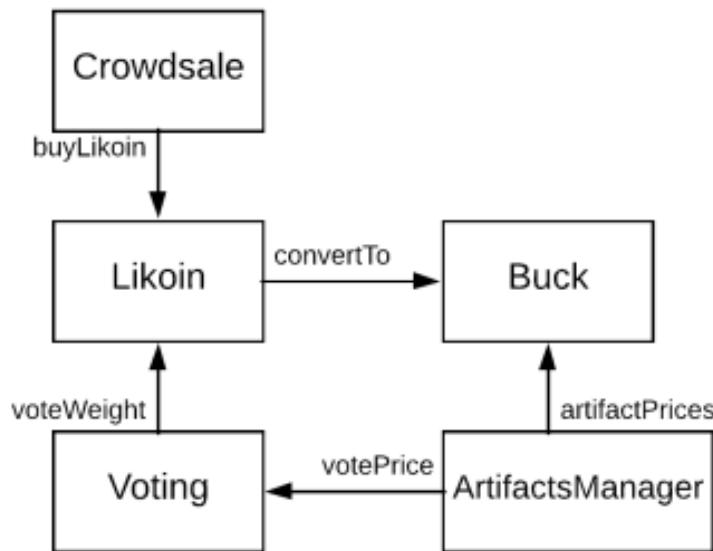


Figure 6: LikeStarter smart contracts architecture [2]

3. Gupta, V., Garg, N. ., Seth, S. ., Rastogi, N. ., Rawat, S. S. ., Kumar, R. (2023). Crowd-funding using Blockchain Technology: A Review: Blockchain Crowd-funding. (Accessed

10 January 2024) [3]

The main problem statement: The proposed system talks about how people donate money and invest in entrepreneurial start-ups but they don't provide a Donor Guarantee Policy and no system makes them track their money. researchers contributed to the problem: by securing the donations with a blockchain that will guarantee that their money will arrive safely and that no one will deceive them. The main results of the researchers' work are not explicitly mentioned in the provided content. However, based on the information provided, it can be inferred that they propose the integration of blockchain technology in crowdfunding as a solution to address the trust issues and increase donor participation. They also discuss the advantages of blockchain, such as decentralization, transparency, and the use of smart contracts. also, the proposed system lacks information on how the blockchain will secure the money and guarantee that the donor will feel safe and that he won't be deceived.

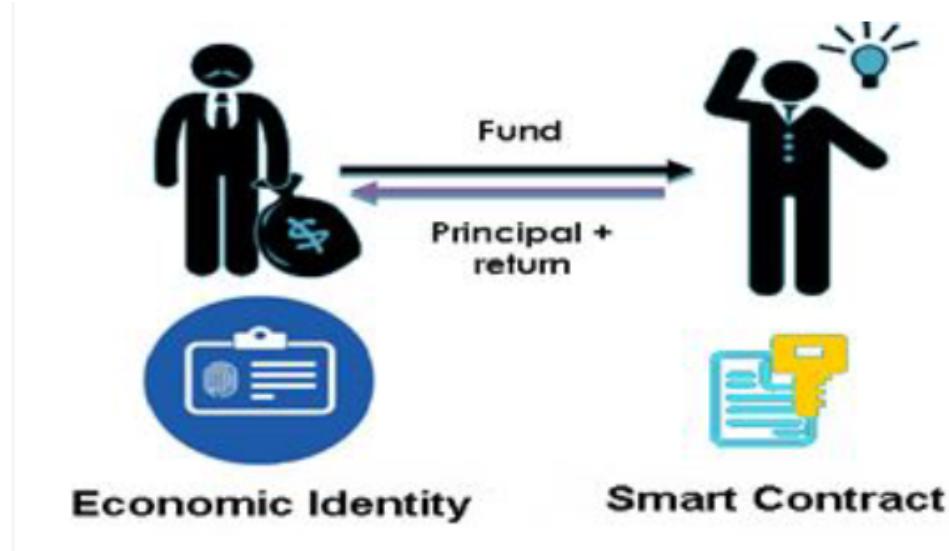


Figure 7: Crowdfunding Using Blockchain [3]

2.2 Business Applications

1. kickstarter [4]: "Bring a creative project to life" It is the most popular crowdfunding platform worldwide, its name is tied to the most famous and successful businesses. Its very large audience has served as a booster to their campaigns, reaching backers and investors almost certainly always. Perry, creator and co-founder, had an idea when a show in a jazz fest was canceled, which is what if there was a place where he could have proposed this and benefit from the public's support only if they agreed it is worthwhile. If you are confident about your project reaching the fund target, then Kickstarter is your destination

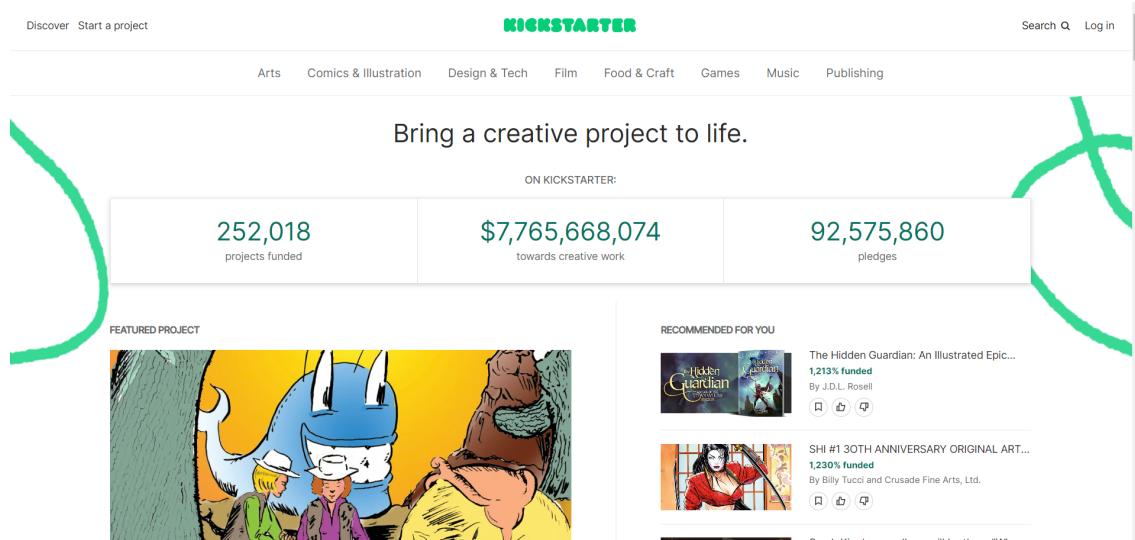


Figure 8: kickstarter main [4]

2. INDIEGOGO:[5] " Find it first on Indiegogo" Since 2008, it has brought more than 800,000 ideas to the light, extending its service to more than 230 countries. The main interesting thing about Indiegogo is its concern about discovery, from ready technologies to innovations and inventions. Indiegogo also offers a lot of great resources for campaigners, including a blog with tips and advice, an online course, and access to customer support.

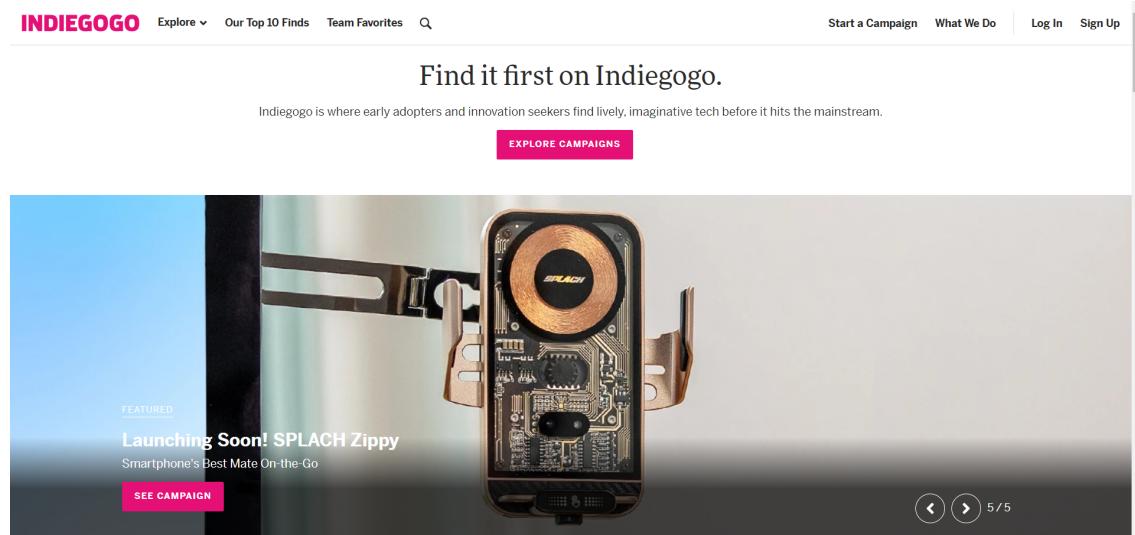


Figure 9: Indiegogo explore [5]

About Us

Millions of people around the world visit Indiegogo to find clever and unconventional things that solve everyday problems large and small. By giving entrepreneurs everywhere a platform to launch new and groundbreaking products, we help surface innovations in tech, design, and much more, all before they go mainstream.

[Press](#)
[Work At Indiegogo](#)
[Trust & Safety](#)
[Medium](#)
[Brand Resources](#)
[Contact Us](#)



Figure 10: Indiegogo explore [6]

3 System Description

3.1 Problem Statement

Fraud cases are very common when it comes to crowdfunding. For instance, a campaign initiator might mislead the investor with false information, or even show him fake illustrations, setting unrealistic/delusional goals, and leading him to believe in the success of that project. Furthermore, following the success of a campaign, initiators disappear, leaving investors with neither a profit nor a reward. Additionally, initiators sometimes use the raised money to their own interests, instead of actually doing what is promised in the campaign. Also, technical problems represent an umbrella of many technical issues. database centralization, which means that the database is controlled by one entity that presents SPOF, meaning that if it was attacked the data would be gone. another problem is the web crashing due to high traffic at the centralized database, Which could limit the possibility of sharing and receiving files. also, stored files could be tampered without considering other peers' opinions. Security of the shared files is a major concern, like masquerade, traffic monitoring, replays, and data leakage.

3.2 System Overview

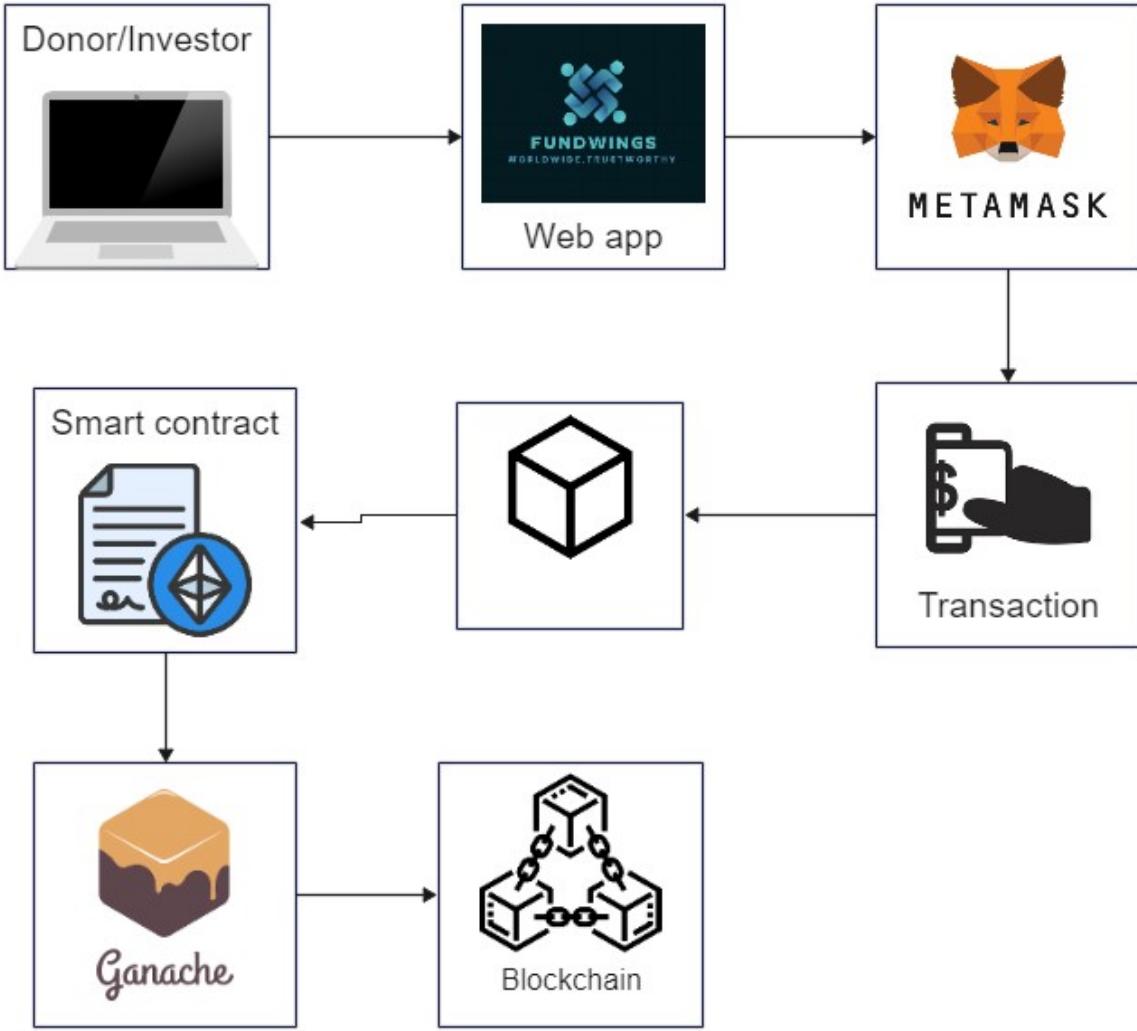


Figure 11: System Overview

In the system's flow, wherein initiating a campaign or making a donation is done by clicking one of two buttons. The system will begin collecting user input, including the image, title, description, target fund, and number of days, if the user chooses to start the campaign. Then the admin's approval of this request will be pending. If approved, a confirmation email is sent to the user to monitor the campaign, and the user receives their smart contract back. The system will begin collecting information from the user, such as the campaign ID and donation amount, if they choose to donate.

3.3 System Context

As shown in Fig.11 Both the investor and the campaign initiator can view ongoing or past campaigns after logging into the site. Following that, the investor might select a project to fund. Mean-

while, the campaign initiator submits their campaign information for approval. If their campaign meets the policy of the website, they may receive an acceptance email; otherwise, they may receive a rejection message. On the other hand, The system Takes the campaign details and displays them to Fundwings Support if they meet the policy of the website, and in case of approval, Fundwings Support starts the creation of the smart contract.

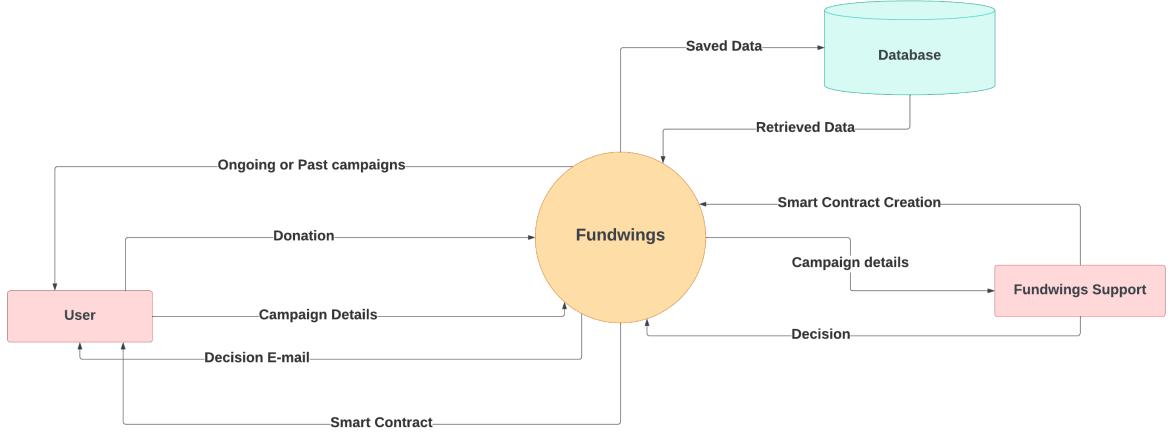


Figure 12: Context Diagram 1

3.4 System Scope

- the website will be only English.
- Admin will be able to create a smart contract.
- Solidity and Ethereum for smart contracts.
- AES and SHA-256 for encryption.
- Consortium as blockchain type.

3.5 Objectives

- User-friendly and neat GUI.
- Tamper-proof database.
- Tracking transactions.
- Decentralized database.
- Consensus-based validation.

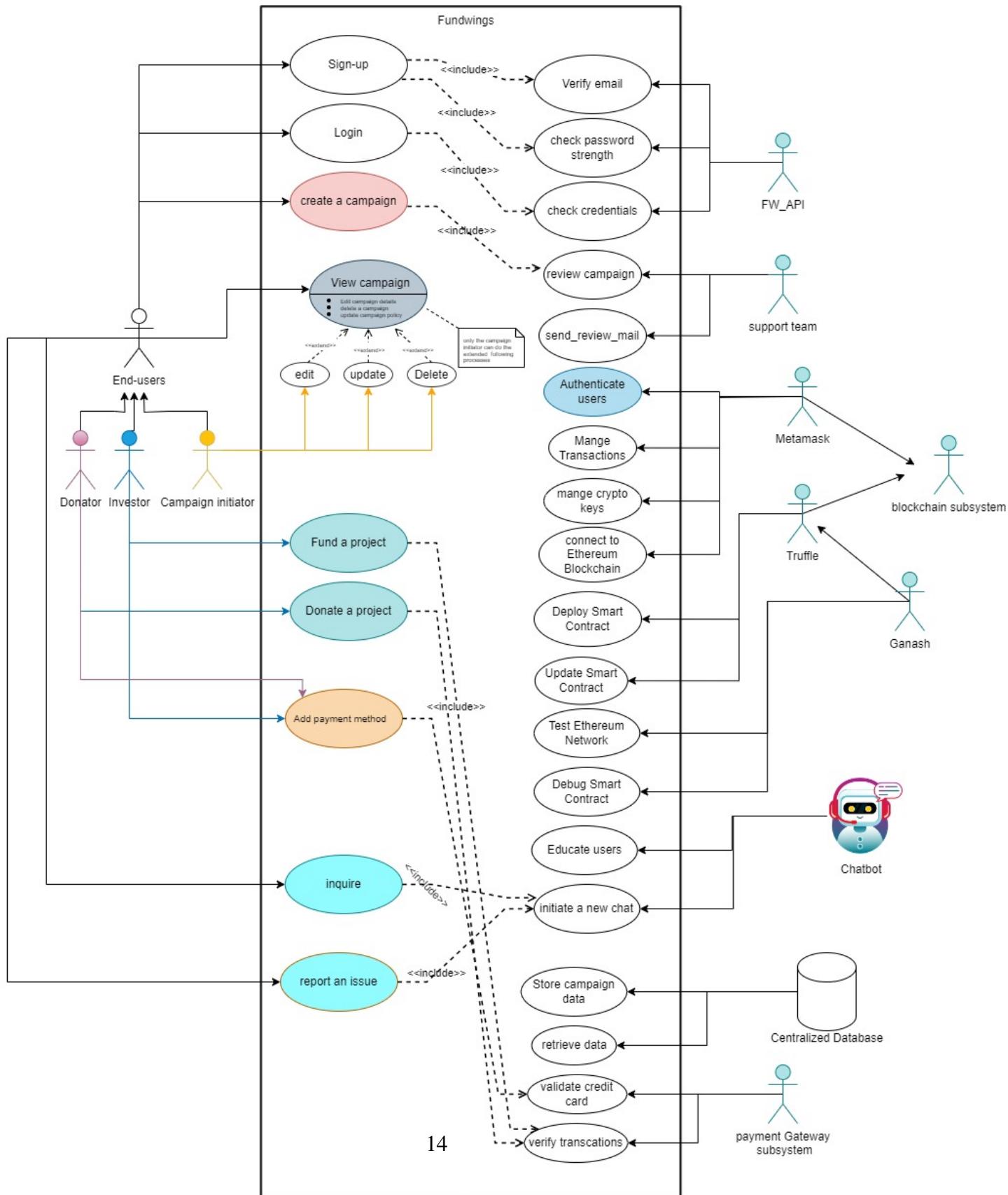
- Completely secure financial transactions.
- Transparency.
- Efficient transaction management.
- Lower restriction measures on submitted campaigns.

3.6 User Characteristics

- The user can be young or old as different age ranges should be able to use the system.
- The user can be a student or a graduate as different academic ranges should benefit from the system.
- The user can use the application for different purposes. Users can view ongoing or past campaigns, the User can choose a project to fund, the User can donate and the User can create a campaign.
- The user must have basic knowledge of English since it will be the website's default language.
- The user must have basic knowledge of how to deal with websites.

4 Functional Requirements

4.1 System Functions



ID:01 The user shall be able to Sign Up to create a new account.
 ID:02 The user shall be able to log in to his account.
 ID:03 The user can view ongoing or past campaigns.
 ID:04 The user can choose a project to fund.
 ID: 05 The user can donate.
 ID: 06 The user can create a campaign.
 ID:07 The user should be able to view the history of campaigns he initiated.
 ID:08 The user should receive a notification when his target is reached.
 ID:09 The user shall be able to edit his account.
 ID:10 The user shall be able to log out of his account
 ID:11 The user should be able to delete his account
 ID:12 Admin can review campaigns' details.
 ID:13 Admin can check campaign feasibility and either accept or refuse it.
 ID:14 In case of acceptance, the admin submits the campaign to the site.
 ID:15 In case of refusal, the admin sends an e-mail to the campaign initiator.
 ID:16 Admin can create a smart contract.

4.2 Detailed Functional Specifications

Table 2: view past campaigns Function Description

Name	view campaigns
Code	FR01
Priority	extreme
Critical	extreme
Description	The function is responsible for displaying the past campaigns in the system so the user can like it
Input	campaign id
Output	past campaigns
Pre-condition	User login and choose view past campaigns
Post-condition	all the past campaigns will appear in the screen in front of him
Dependency	-
Risk	no past campaigns in the website

Table 3: initiating campaign Function Description

Name	initiating campaign
Code	FR02
Priority	high
Critical	high .
Description	The function shall allow user to create their own campaign.
Input	title , description , number days of campaign and donation range .
Output	boolean : true if campaign created .
Pre-condition	meet the policy of website.
Post-condition	send email to user for success .
Dependency	-
Risk	don't accepted from admin.

Table 4: donate campaign Function Description

Name	donate campaign function
Code	FR03
Priority	Extreme
Critical	extreme .
Description	The function shall allow user to fund any campaign.
Input	donation range.
Output	-
Pre-condition	The user enter donation range for specific campaign .
Post-condition	--.
Dependency	-
Risk	campaign does not exist .

Table 5: smart contract Function Description

Name	smart contract function
Code	FR 04
Priority	Extreme
Critical	Extreme .
Description	this function makes a contract consisting of name of donator and amount of donation then returns the smart contract.
Input	donation range and name of donator .
Output	smart contract.
Pre-condition	The user enter donation range and name in the in the specific campaign.
Post-condition	return smart contract for user.
Dependency	The function FR04 depends on FR02 and FR03 .
Risk	wrong in compile smart contract.

Table 6: Search for campaign Function Description

Name	Search for campaign.
Code	FR05
Priority	extreme
Critical	Low
Description	The function is responsible for making the user able to filter and search campaigns or recommended .
Input	text field to search or button to choose the recommended.
Output	the specified campaign appear.
Pre-condition	-
Post-condition	the campaign founded in the website .
Dependency	-
Risk	The searched campaign does not exist.

Table 7: View history Function Description

Name	View history
Code	FR06
Priority	Extreme
Critical	low.
Description	The function is responsible for letting the user see his history and the past campaigns he is fund it or create it.
Input	-
Output	List of all the user's previous donated or created it .
Pre-condition	The user has donate or create a campaign.
Post-condition	-
Dependency	-
Risk	The users don't fund or initiate any campaign.

5 Design Constraints

1. Must have an internet connection
2. will be using Remix IDE API and Pinata API

6 Non-functional Requirements

6.1 Maintainability

Website maintenance is the process of keeping a website up-to-date and running smoothly as well as performing optimally. Website maintenance includes tasks like ensuring all the links on the site are working, regularly updating content, and fixing any broken links. It also means how much time it takes to fix an issue if it arises.

6.2 Scalability

If the workload increases, the system will still be able to carry out its functions, as it's highly maintainable, and upgradable. The system will target a specific area, and then grow to cover a larger one.

6.3 Performance

How efficient the system is with respect to returning results. The system should withstand being used by increasing concurrent users, and downtime should be kept as low as possible.

6.4 Security

how efficient the system is in defending against attacks, and how the databases and values are secured.

6.5 portabailty

The hardware, OS, and browser version the website runs on.

6.6 Usability

How easy is it to use the system, how efficient it is, and how it contributes to productive tasks.

7 Data Design

7.1 Data Description

FundWings has many databases division-ed into two parts centralized and decentralized. the centralization stores many information such as user information, and campaign details. the second part is the decentralization database (ipfs) which stores the smart contract of each user.

- username, email, password (user)
- title, image, description, donation range, and number of days (initiating campaign).
- hash file for each smart contract in the ipfs database.

7.2 Database design description

The database that we will use will be an SQL database for centralization, and the database choice for decentralization will be ipfs (pinata software) and it will be the perfect choice for us.

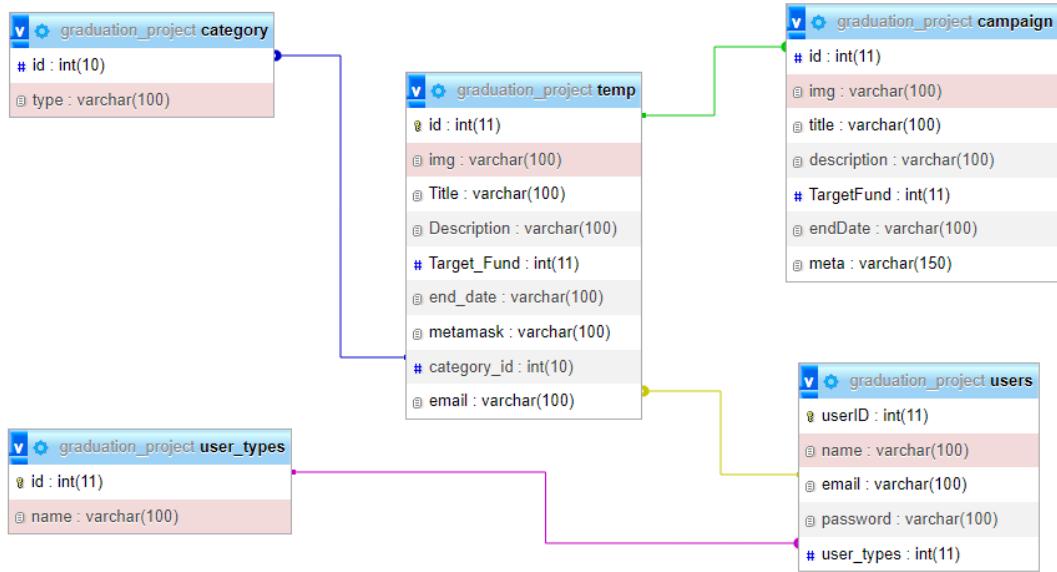


Figure 14: sql database

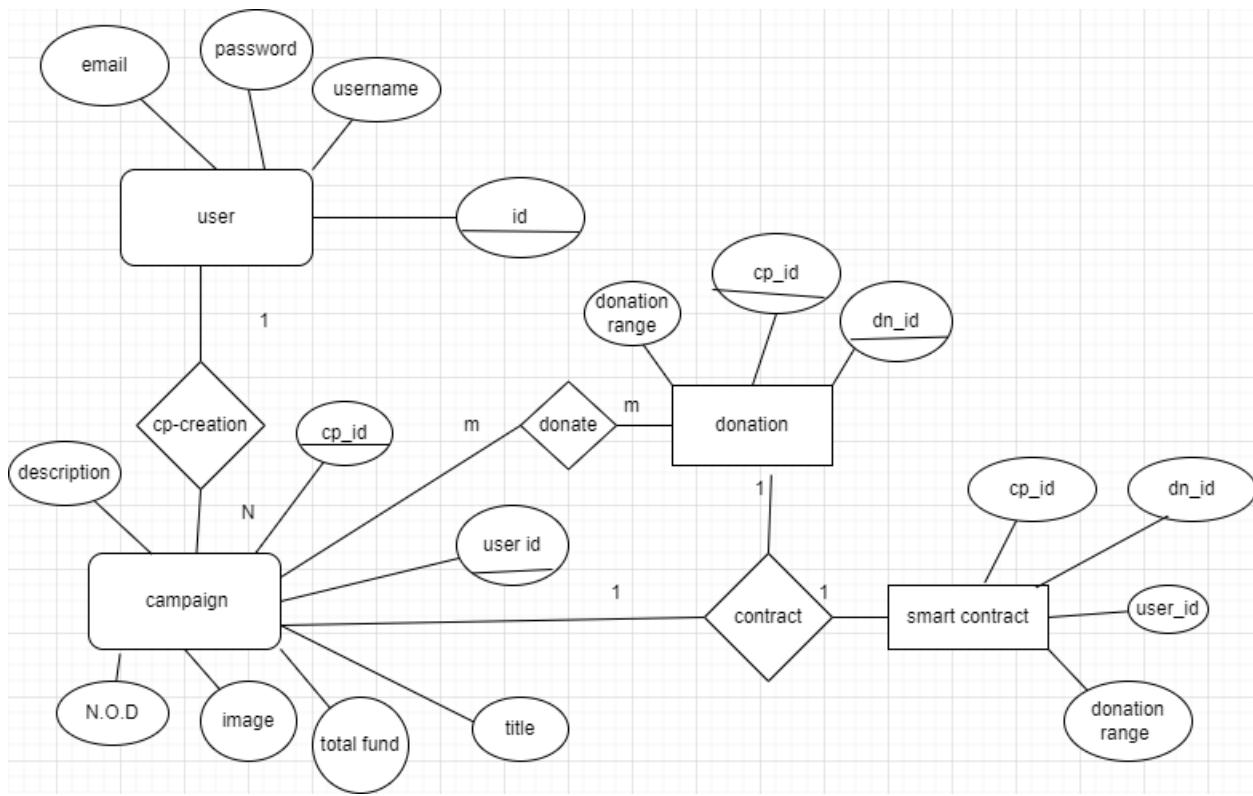


Figure 15: ERD Diagram

8 Preliminary Object-Oriented Domain Analysis

8.1 Class descriptions

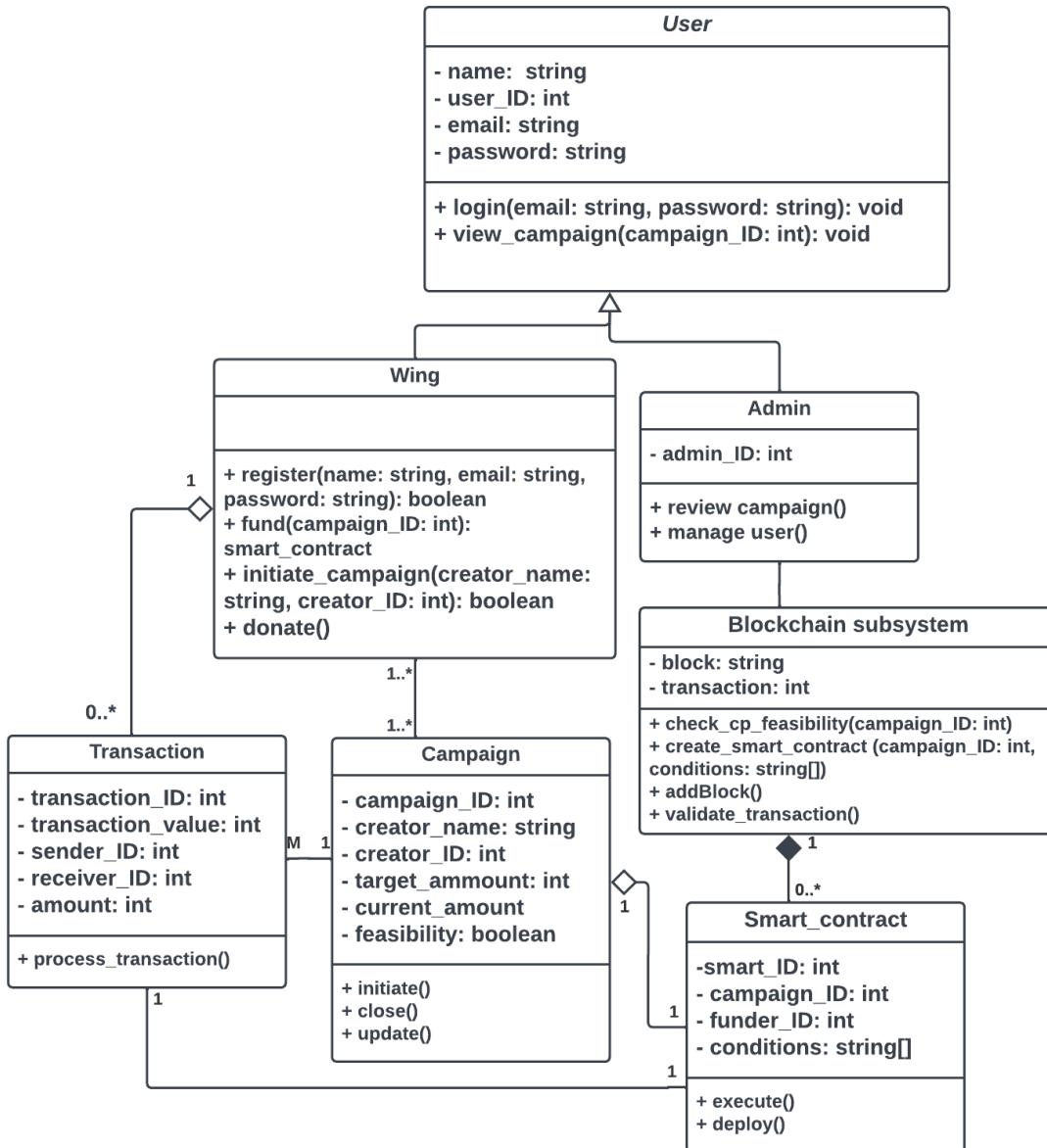


Figure 16: Class Diagram

Table 8: Class Name - User

Abstract or Concrete	Concrete
List of Superclasses	-
List of Subclasses	Investor, admin
Purpose	The purpose of the user class is to identify all the attributes and operations the user can perform.
Collaborations	-
Attributes	- name: string - user-ID: int - email: string - password: string
Operations	+ login(email: string, password: string): void + view-campaign(campaign-ID: int): void
Constraints	Password at least 8 characters Email (unique@email.com)

Table 9: Class Name - Wing

Abstract or Concrete	Concrete
List of Superclasses	User
List of Subclasses	-
Purpose	The purpose of the wing class is to identify all the attributes and operations the investor, donate and campaign initiator can perform.
Collaborations	campaign: The investor will invest in a campaign. Transaction: The investor will fund a project.
Attributes	-
Operations	+register(name: string, email: string, password: string): boolean + register(name: string, email: string, password: string): boolean + fund(campaignID : int) : smartContract + campaignInitiate(creatorName : string, creatorID : int) : boolean + donate()
Constraints	-

Table 10: Class Name - Blockchain subsystem

List of Superclasses	-
List of Subclasses	-
Purpose	The purpose of the blockchain subsystem class is to identify all the attributes and operations only the blockchain subsystem can perform.
Collaborations	Admin , Smart contract
Attributes	- block: string - transaction: int
Operations	$\text{check}_{cp} \text{ feasibility}(\text{campaignID} : \text{int}) : \text{boolean}$ $\text{+ create}_{smart} \text{contract}(\text{campaignID} : \text{int}, \text{conditions} : \text{string}[]) : \text{boolean}$ $\text{+ addBlock}()$ $\text{+ validate transaction}()$
Constraints	-

Table 11: Class Name - admin

List of Superclasses	User
List of Subclasses	-
Purpose	The purpose of the admin class is to identify all the attributes and operations only the admin can perform.
Collaborations	Blockchain subsystem.
Attributes	- adminID : int
Operations	$\text{+ review campaign}()$ $\text{+ manage user}()$
Constraints	-

Table 12: Class Name - Transaction

List of Superclasses	-
List of Subclasses	-
Purpose	The purpose of the fund class is to identify all the attributes of a transaction.
Collaborations	Wing: The investor makes a transaction. Campaign: each transaction goes to a campaign.
Attributes	- transactionID : int - transactionValue : int - senderID : int - receiverID : int - amount : int
Operations	$\text{+ process}_{transaction}()$
Constraints	-

Table 13: Class Name - campaign

List of Superclasses	-
List of Subclasses	-
Purpose	The purpose of the campaign class is to identify all attributes of a campaign.
Collaborations	Wing: each fund is funded by an investor. smart contract: each campaign has a smart contract.
Attributes	- campaign-ID: int - $campaignID : int$ - $creatorName : string$ - $creatorID : int$ - $targetAmount : int$ - $currentAmount : int$ - $feasibility : boolean$
Operations	+ initiate() + close() + update()
Constraints	-

9 Operational Scenarios

1. **Scenario 1:** The user can open our website and start viewing the campaigns or search for a specific one in order to donate. If he/she decides to donate, they must register on our platform before proceeding with this step. After donating, he/she could open the history and review the recently donated campaigns.
2. **Scenario 2:** In case they need to create a campaign, Firstly, They must proceed with the registration form and then, will have to fill out all the required fields to be able to publish their own campaign. He will have to wait for the response from our support staff in case of rejection or acceptance of the campaign provided.
3. **Scenario 3:** In case a user invests in any desirable campaign, they will be represented as an investor at our platform for the campaign of their choice. After the end of the campaign, they would get the agreed percentage from the project's profit.

10 Project Plan

ID	Tasks	Start Date	End Date	Duration	Team Member
1	Ideas and Supervisors	30/7/2023	9/11/2023	48	All
2	Information Collection and Research	2/11/2023	14/11/2023	15	All
3	Survey and Proposal Preparation	9/11/2023	15/11/2023	35	All
4	Proposal Presentation (10%)	14/11/2023	15/11/2023	7	All
5	Paper 1 Preparation	12/11/2023	15/11/2023	24	Yara,Abdelrahman
6	Paper 1 technical work	13/11/2023	15/11/2023	20	Farouk,Youssef
7	Paper 1 Submission	15/11/2023	15/11/2023	1	Youssef
8	SRS Preparation	5/1/2024	14/1/2024	21	All
9	Feature Extraction	15/1/2024	6/2/2024	21	All
10	Documentation	6/2/2024	27/2/2024	21	All
11	SRS Presentation (35%)	27/2/2024	2/3/2024	5	All
12	SDD Preparation	2/3/2024	12/4/2024	40	All
13	Database Preparation	12/4/2024	22/5/2024	40	All
14	SDD Presentation (65%)	22/5/2024	28/5/2024	6	All
15	Main Technical Work Implementation	28/5/2024	27/7/2024	59	All
16	Final classification method implementation	27/7/2024	28/8/2024	31	All
17	System Prototype Submission (80%)	28/8/2024	3/9/2024	5	Youssef
18	Test and Validate	3/9/2024	24/9/2024	21	All
19	Technical Evaluation (90%)	24/9/2024	2/10/2024	8	All
20	Final Thesis (100%)	2/10/2024	21/10/2024	19	All

11 Appendices

11.1 Supportive Documents

1. Survey

According to the survey we made "fundwings: a crowdfunding app secured by using a blockchain", We have concluded a few points that 85.2% are familiar with the term fundraising but we found that in Fig.17

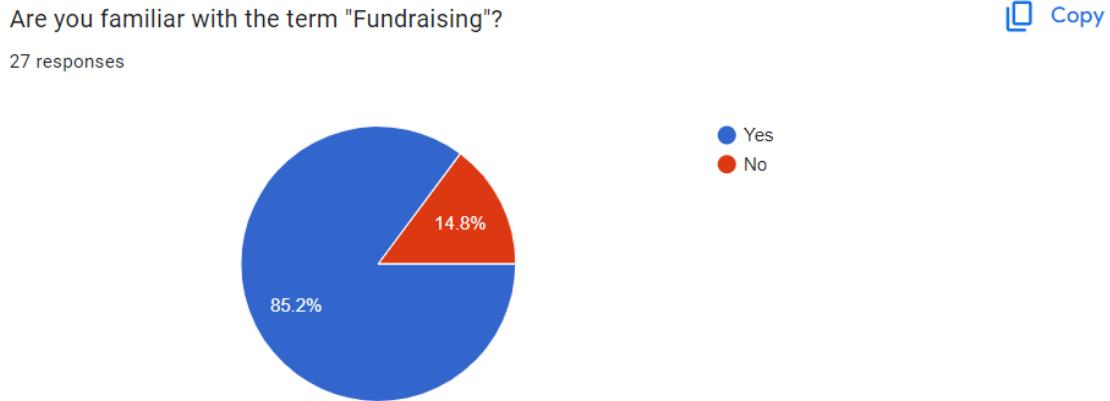


Figure 17: Statistics 1

Out of 27 responses, 18.5% of the people have never fundraised through an online platform

Have you ever fundraised to a cause or project through an online platform?
27 responses

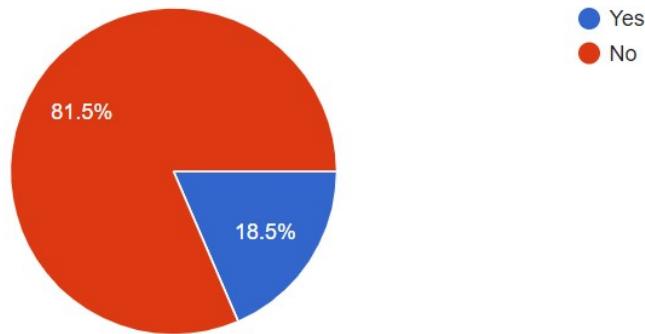


Figure 18: Statistics 2

then we asked the people why they have never fundraised through an online platform and people responded by saying that they don't use it as they are scared of fraud and scams as it's mentioned in Fig.19

What would be your fears in case you wanted to donate online?

16 responses

money loss and scams

I might not be sure about donating money to the purposed entity

Internet crashing problems or i didn't get a receipt

To donate a money to a fraud organization

Getting scammed

To be a scam page

Not trusted enough

That money don't reach it supposed place

Fraud

Figure 19: Statistics 3

Out of 27 responses, 85.2 % of people were interested in using the online donation platform if it was secured by blockchain it'll help them.

Would you use an online donation platform if it was secured by a blockchain?

27 responses

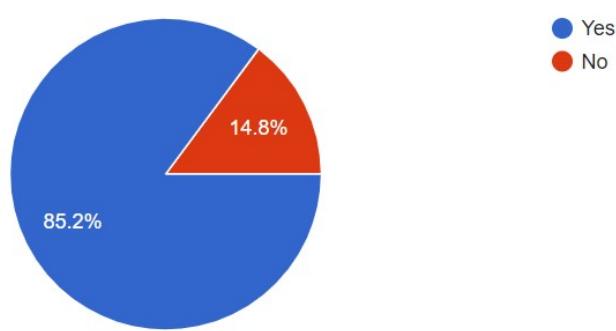


Figure 20: Statistics 4

12 References

References

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