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"Secure way of Crowdfunding using Blockchain"

Priyanka Gupta[1], Vedika Sangle[2], Rutuja Patil[3], Anjali Jadhav[4], Mayuri Aher[5], Shruti Khivansara[6]

Assistant Professor, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44, Maharashtra, India[1]
Student, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44,Maharashtra, India[2-6]
pgupta@dypcoeakrudi.ac.in[1], vedikasangle@gmail.com[2], patil09rutu@gmail.com[3], anjalij.1717@gmail.com[4], mayuriaher0902@gmail.com[5] khivansarashruti@gmail.com[6].

ABSTRACT :

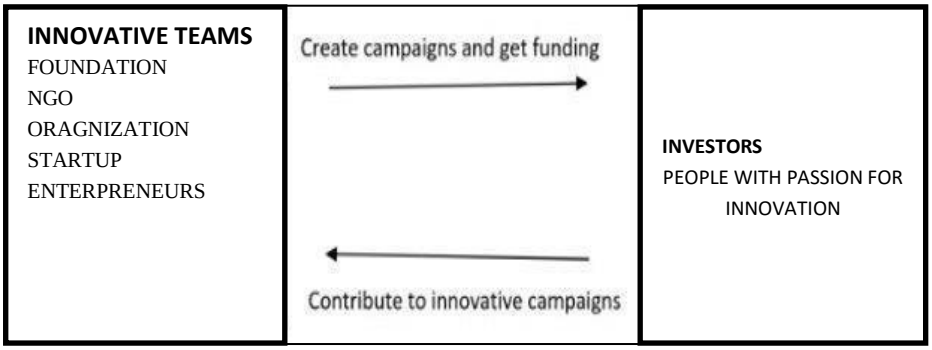
Crowdfunding is a financing approach in which a project is funded by relatively little donations from a large number of people, rather than big sums from a small number of investors. This Crowd-Funding platform, driven by blockchain technology, eliminates the need for a third-party intermediary in a variety of ways, thereby improving and supporting the practice. Increased security in hostile circumstances is only one of the several benefits that blockchain technology provides across a wide range of sectors. The purpose of this paper is to provide interactive forms for campaign creation, donation, and request approval, allowing both campaign creators and donors to quickly establish and support campaigns. The donor can trace the money that was sent to them.The Blockchain will record all the transaction and store as a block.

Keywords: Blockchain Technology, Crowd Funding, Smart Contract, Soildity.

1. Introduction :

Crowdfunding is a new financial system with its own set of characteristics that is regarded as both innovative and disruptive. It has grown significantly throughout the years. It is a low-cost means of obtaining funding, which expands the possible audience for ideas and initiatives, minimizes investment risk, and provides better targeted financing options for a wide range of projects. It provides an alternative to traditional borrowing as a means of fundraising. Crowdfunding, in general, is open to everyone, including private individuals and businesses. As an increasingly popular investment and funding channel, both investors and businesses confront new opportunities and risks. There is a substantial body of literature on blockchain from various sources, such as blogs, wikis, forum posts, codes, conference proceedings and journal papers. Tschorsch and Scheuermann (2016) made a technical survey about decentralised digital currencies including Bitcoin [1].

Crowdfunding is a decentralized application based on the Ethereum blockchain platform that allows users to contribute money to campaigns that interest them. By utilizing blockchain, we can ensure that investors engage in low-risk support of new ventures, and venture creators can get more worldwide supporters, making it easier for them to raise huge amounts of capital in a short period of time. Currently, there are many initiatives launched by individuals or small distributed teams who aim to generate funds by issuing tokens to investors, particularly in the blockchain sector. Crowdfunding platforms simplify the entire process of raising funds with the help of the worldwide public, who may be interested in the campaign in exchange for a beneficial reward for the investment. Crowdfunding has become one of the most popular methods of raising funds for any project, cause, or individual in need. With the launch of Covid, Crowdfunding activities have been increased all around the world, ranging from tiny campaigns to help individuals acquire oxygen and medical assistance to huge funds like PM Cares. Contributors, crowdfunding platforms, and project administrators were the primary players in the crowdfunding event. Kickstarter.com, Indiegogo.com, and Mystartr.com are some of the most popular crowdfunding platforms. A blockchain is an accumulation of blocks that hold data. Each block contains the previous block's cryptographic key [2], timestamp, and transaction information.The biggest advantage of crowdfunding is that it can quickly raise the funds required. This project report delves into the core concepts, design, development, and implications of Crowdfunding. It offers a comprehensive exploration of the project's objectives, methodologies, outcomes, and the potential it holds for transforming the Crowd Funding sector. Additionally, it highlights the advantages, limitations, and real-world applications of this blockchain-based alternative approach in the broader context of Crowdfunding.



2. Literature Review

This paper [3] includes research on Smart contracts can find a wide spectrum of potential application scenarios in the digital economy and intelligent industries, including financial services, management, healthcare, and Internet of Things, among others, and also have been integrated into the mainstream blockchain-based development platforms, such as Ethereum and Hyperledger. However, smart contracts are still far from mature, and major technical challenges such as security and privacy issues are still awaiting further research efforts. For instance, the most notorious case might be "The DAO Attack" in June 2016, which led to more than $50 million Ether transferred into an adversary's account. In this paper, we strive to present a systematic and comprehensive overview of blockchain-enabled smart contracts, aiming at stimulating further research toward this emerging research area.

This paper [4] includes People may have excellent business ideas, but they may not have money to start them. Getting a loan may not be an easy task for a novice businessman. On the other hand, there can be many people who are seeking investment opportunities. However, they may not have sufficient funds to invest in business alone. When investing as groups, conflicts in negotiations will rise. Moreover, the issue of trust will increase.

This paper [5] includes Blockchain has numerous benefits such as decentralisation, persistency, anonymity and auditability. There is a wide spectrum of blockchain applications ranging from cryptocurrency, financial services, risk management, internet of things (IoT) to public and social services. Although a number of studies focus on using the blockchain technology in various application aspects, there is no comprehensive survey on the blockchain technology in both technological and application perspectives. To fill this gap, we conduct a comprehensive survey on the blockchain technology. In particular, this paper gives the blockchain taxonomy, introduces typical blockchain consensus algorithms, reviews blockchain applications and discusses technical challenges as well as recent advances in tackling the challenges. Moreover, this paper also points out the future directions in the blockchain technology.

This paper [6] includes A blockchain is a virtual chain of data blocks that is a decentralized technology. Any transaction or change in the blocks is done after the decentralized validator entity, not a single person. smart contract is a unique facility stored on the blockchain that gets executed when the predetermined conditions are met. Paper presents a framework where smart contracts are used for insurance contracts and stored on blockchain. In the case of a claim, if all the predetermined conditions are met, the transaction happens; otherwise, it is discarded. conditions are immutable. At means there is scope for alteration from either side.

This paper [7] Applications of Blockchain in Crowdfunding Zhao Hongjiang et al presented The Applications of Blockchain Technology in Crowdfunding, 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 in the industry.

This paper [8] Blockchain Based Crowdfunding Md Nazmus Saadat et al proposed a Blockchain based crowdfunding system where the fundraisers will receive money from the blockchain based on the voting approval of the investors. The fundraiser can create the campaign and the investors can contribute to the campaign. In order to specify how the funds raised will be utilised, the fundraisers may also create requests. The donors cast a vote for or against the request, determining whether the costs are appropriated. Money will be paid to the vendors in the form of ether if it is authorised by the majority of supporters. A smart contract is used to do this, and it will handle the ether transaction between fundraisers, investors, and vendors. The system has a network connection to Ethereum. Users' transactions are encouraged in this system via the use of a proof-of-authority blockchain called the Rinkeby network.

They paper [9] Crowd funding is an online cash raising technique that started as a path for the people to contribute limited quantity of money to enable innovative individuals to fund the venture. Using crowdfunding, people can put resources into pioneering businesses through a middle medium or platform. The issue with the current crowd funding technique is that, third party medium don't give the assurance of the money investor contributed for the project and 6 The smart contract runs the Auctioning Algorithms and Searches for the The block is added in the blockchain and linked withthe previously existing blocks The block is then verified and approved Wi n Sm Time Pre vi Investor wants to add a new Project in the decentral ized Crowdfund The block is delivered to all the nodes in the developer's network, and they start bidding their values for time, cost, support period and votes to win A block containing the timestamp, Project details, Expected cost, investor don't have control over the cash they contributed. This paper proposes the blockchain based crowd funding by using which the platform can give a private, secure and decentralized path for crowdfunding. The main objective of this paper is to let investors contribute to any project effectively by creating smart contracts through which the contributors can have a control over the invested money and also both the project creators and investors can effectively make and reserve funding for the project. Many development happened in this field of technology

3. Technologies

3.1 VS Code: Visual Studio Code is a source- code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

3.2 Node.js: Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting-running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser.

3.3 Remix IDE: Remix IDE is an open source web and desktop application. It fosters a fast development cycle and has a rich set of plugins with intuitive GUIs. Remix is used for the entire journey of contract development as well as act as a playground for learning and teaching Ethereum.

3.4 Ethereum: Ethereum is an open-source public distributed computing platform and operating system based on blockchain technology first used by Bitcoin. Ethereum extends the usefulness on Blockchain well beyond cryptocurrencies by making the blockchain programmable according to developer's needs.

3.5 Hardhat: It makes Ethereum development environment for professionals It helps run Solidity locally, deploy your smart contract, running local blockchain and provides libraries Ethers.js.

3.6 Solidity: Solidity is a statically typed curly- braces programming language designed for developing smart contracts that run on Ethereum.

3.7 Polygon: Polygon is a protocol and a framework for building and connecting Ethereum-compatible blockchain networks. Polygon is a Layer 2 scaling solution created to provide faster and cheaper transactions on Ethereum.

3.8 Database Management: Depending on your project's requirements, you may need a database management system (e.g., MySQL, PostgreSQL) to store non-blockchain-related data or metadata associated with crowdfunding campaigns.

3.9 Version Control System: Using a version control system like Git and a platform like GitHub or GitLab can help you manage and collaborate on your project's codebase effectively.

3.10 Web Development Tools: We need web development tools and frameworks (e.g., HTML, CSS, JavaScript, React, Angular, or Vue.js) to build the user interface.

3.11 Deployment and Hosting: Depending on your project's scale and requirements, you may need cloud hosting services (e.g., AWS, Azure, or Google Cloud) for deploying your blockchain nodes, web applications, and databases.

4.1 Proposed Model

Traditional crowdfunding platforms face challenges like lack of transparency, high transaction costs, limited accessibility, security concerns, and globalization issues. To tackle these, we propose creating a blockchain-based crowdfunding platform for transparency, reduced costs, wider accessibility, enhanced security, and global reach, aiming to secure crowdfunding and support innovative projects.

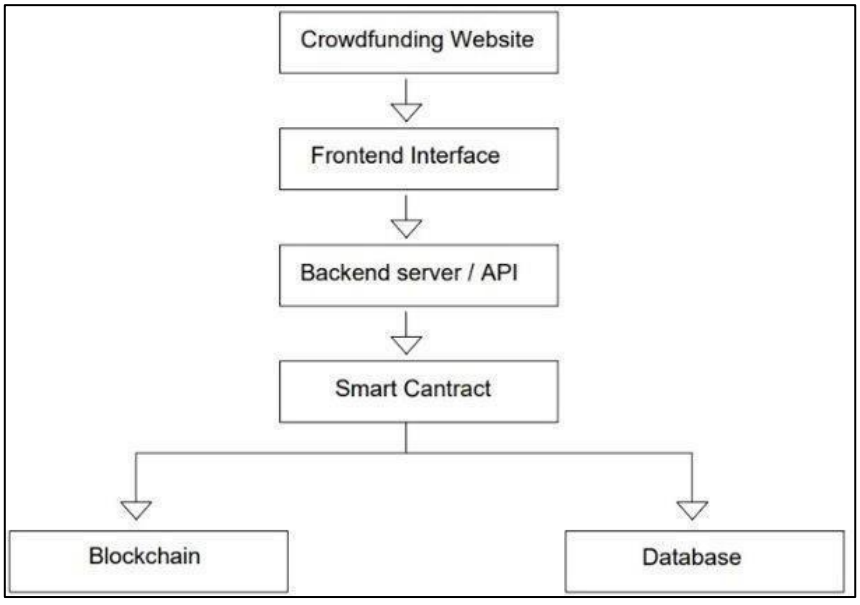


Figure 2: Flow of Application

4.1 Crowdfunding Website: This is the user- facing platform where project creators create campaigns, and backers browse and support these campaigns.

4.2 Frontend Interface: The frontend is responsible for displaying the user interface, including campaign listings, donation options, and user profiles.

4.3 Backend Server/API: The backend server handles user authentication, campaign creation, payment processing, and communicates with the smart contract.

4.4 Smart Contract: The heart of the system, the smart contract, manages the crowdfunding logic. It handles the acceptance of funds, the release of funds to project creators when funding goals are met, and the refund process if the goals are not met.

4.4 Blockchain (e.g., Ethereum): The blockchain platform serves as the decentralized ledger for recording transactions and smart contract interactions.

4.5 Database (e.g., PostgreSQL): The database stores non-blockchain-related data, such as user profiles, campaign descriptions, and transaction records.

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

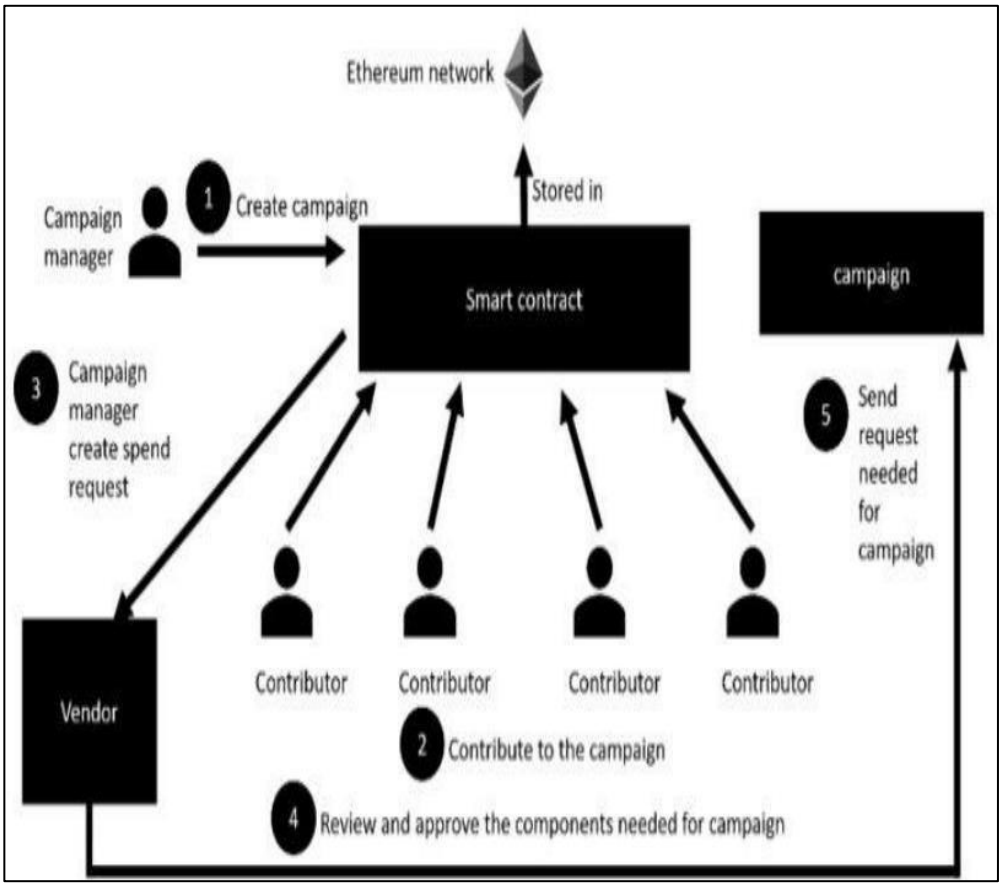


Figure 3: Proposed System

Figure 3 shows the methodology of the proposed model where in a user who creates the campaign becomes the campaign manager and if any preexisting campaigns are available users can contribute to the available campaigns. All the transactions are secure and transparent with the help of smart contract. Since users use their wallets to contribute their identity is known only to them and them alone which provides a sense of security and also eliminates any intermediary that are present in conventional crowdfunding[10].

In Crowd-Funding System, to log in to the system the admin can log in with a username and password. The admin has access to the company's information as well as all previous and pending projects. Additionally, the admin has the authority to accept or reject the project proposal.

The admin can view all the projects that have been approved, filter them by category or domain, and view investor transactions from this platform (along with a status indicating whether the transaction was manipulated). A list of all rejected projects can be viewed, along with information about the project and the company. In the transaction, a list of approved projects is displayed along with details about whether or not they tampered with the crowdsourcing process. The admin can view the list of registered users and their information. For users to access information, they have to register their account and log in using a username and password.

They can view transactions by investors from this platform with a status of whether the transaction is manipulated and apply filters by domain or category, project and company details, and more. Invest the money; if even one transaction is discovered to have been manipulated, investing will not be permitted by the system.

4.2 Traditional fundraising problem and solution

Banks and venture capital firms have traditionally been the primary sources of finance to bridge funding gaps. A startup founder would contact a bank or venture capitalist with his proposal pitch for funding, and if they are interested in the project, the bank or venture capitalist would fund it in exchange for some returns, such as equity in the case of venture capitalists or loan interest in the case of banks. However, there are restrictions to this method of obtaining donations. Fundraising demands a significant amount of time, money, and precious resources, which project developers in underdeveloped nations or remote locations do not have. If we view a bank loan as a method for funding a project, then the bank may become bottleneck in the project as a bank needs concrete proof of how the project generates revenue and also it requires the founder to provide a collateral for the amount loaned. Crowdfunding is the solution to the issues with traditional approach of fund raising. In crowdfunding, a person or a team with an idea to solve a problem can raise capital from a huge number of individuals who are interested in funding the venture. Crowdfunding provides a platform to anyone who has an idea to pitch in front of investors ready with money to invest. The major benefits of crowdfunding are: Access to large number of accredited investors who can see and interact with the campaign. Get a top- level view of traction, addressable market and value proposition of the idea. Presenting the concept to many investors helps the start-up founder to validate and refine his offerings. The best thing about online crowdfunding is its ability to centralize and streamline the campaign creator's fundraising efforts by building a single, comprehensive profile that targets to all the potential investors eliminating the need to pursue each one of them individually [11].

5. Results

Campaign Creation Output

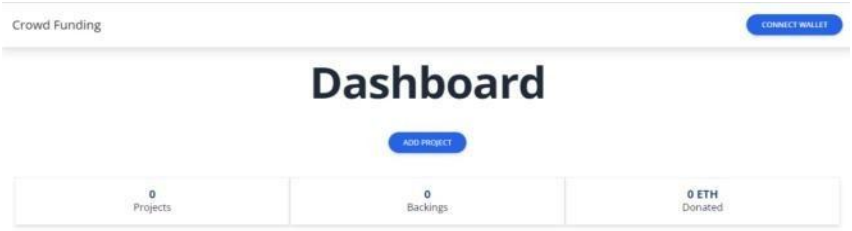


Figure 4: Main Dashboard

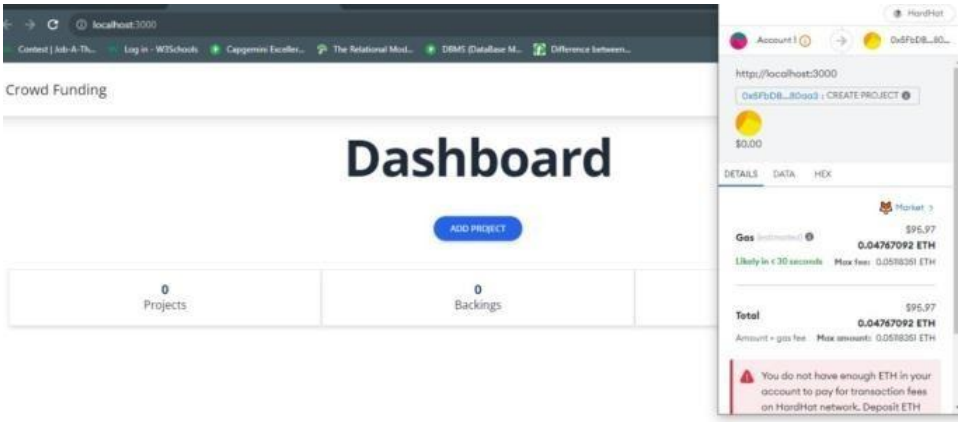
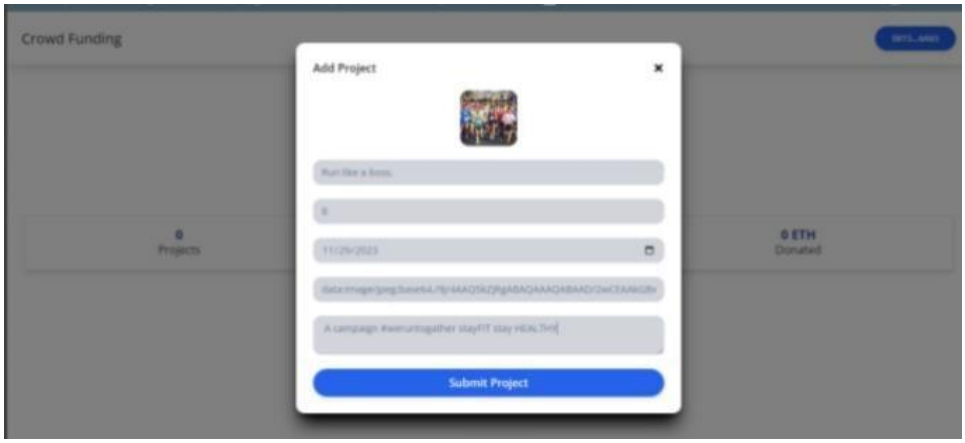


Figure 5: MetaMask Wallet Connection



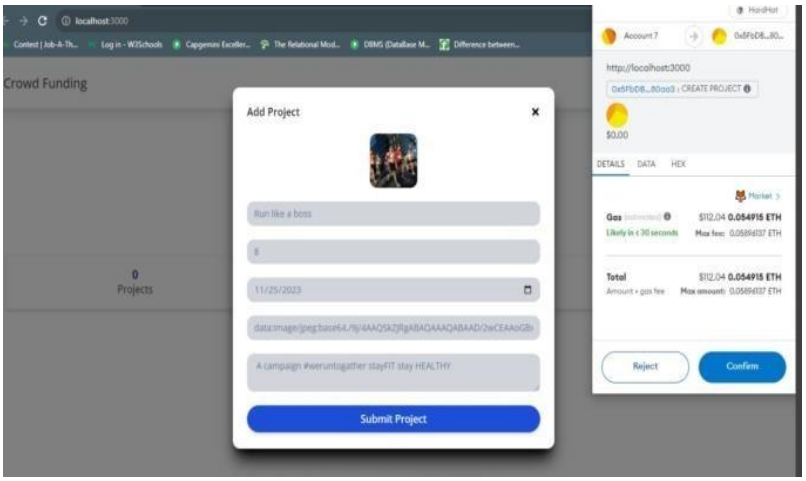


Figure 7: Confirming by MetaMask Wallet

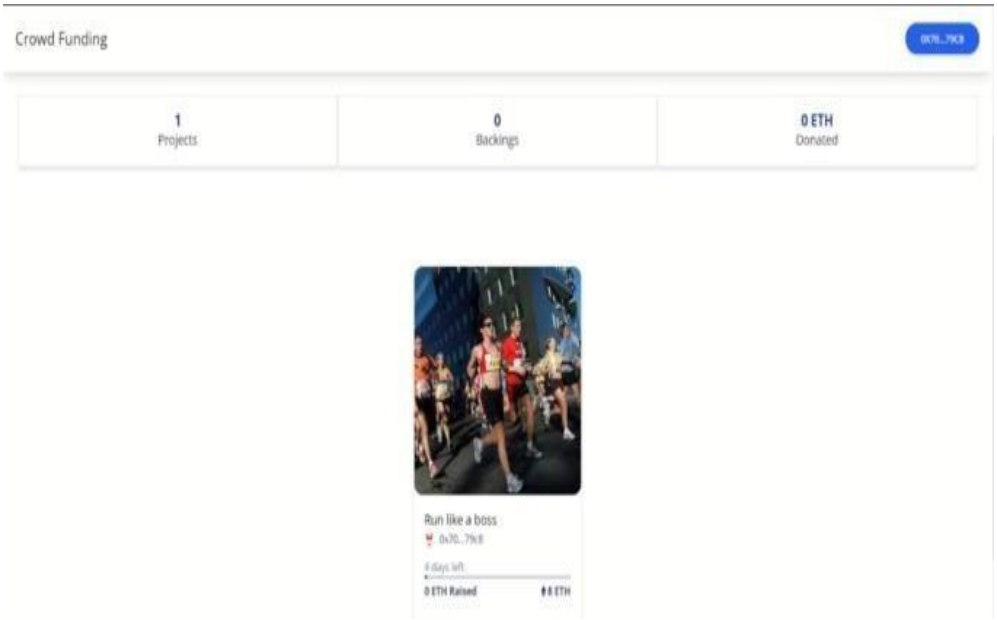


Figure 8: Campaign on Dashboard

5.2 Future Scope

This project involves creating a Crowdfunding system on blockchain technology. Users can securely manage policies, process claims, and access funding records in real-time. The system will automate tasks using smart contracts, ensuring efficiency and reducing fraud. The scope covers design, development, testing, and deployment, focusing on user experience, data security, and operational efficiency in the insurance sector.

6 Conclusion

In conclusion, Online crowdfunding help and enables people to raise funds for their project. Interested people in this project can donate by making an online transaction. The donated money in this project goes to the project manager, which he/she uses to complete the project or to make a product. Blockchain in crowdfunding is relatively a new concept to the community or entire world. The world is still adjusting to Blockchain and Cryptocurrencies which will take couple of years more for Ethereum based Dapps to become popular and to be recognized by the community/world. In such situation, Blockchain based crowdfunding application is a very tough concept to be understood by everyone. Crowdfunding platform based on Blockchain is proposed to provide more transparent transactions in a decentralized structure or way. So, this project can educate one about funding

mechanisms. This project could be a better source for raising finance. We wish to provide an easier and safer way for all ideas to get a life through our crowdfunding application. Without much efforts campaign creators and campaign investors can perform their intended activities using the crowdfunding platform. There are new emerging blockchain platforms such as EOS, Stellar, Cardano and NEO that provide more language choices and platform configuration choices compared to Ethereum but these platforms haven't proved themselves yet. EOS looks like a promising platform and in future this project can be moved to EOS if it proves to be a better choice than Ethereum.

The blockchain is highly appraised and endorsed for its decentralised infrastructure and peer-to-peer nature. However, many researches about the blockchain are shielded by Bitcoin. But blockchain could be applied to a variety of fields far beyond Bitcoin. Blockchain has shown its potential for transforming the traditional industry with its key characteristics: decentralisation, persistency, anonymity and auditability. In this paper, we present a comprehensive survey on the blockchain[1].

Finally, it is determined that blockchain-powered crowdfunding is a relatively new concept in the ICT community. Solidity code for the campaign contract has been successfully written and compiled using the solidity compiler. Solidity compiler generated bytecode, which was then distributed into the blockchain. After project deployment, a decentralized web app is generated with an interface for launching new projects, contributing to existing ones, creating requests, and approving and finalizing them. The blockchain implementation in crowdfunding is still in its exploratory stage, with several legal and specialist difficulties to be addressed. As blockchain evolves, our suggested work has a bright future and a significant possibility for improvement. and evolution. In the future, the proposed research work can progress further in an easier and safer way for all ideas that are achieved through the proposed crowdfunding application.

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