Web3 Crowdfunding Platform

A major project report submitted in partial fulfillment of the requirement for the award of degree of

Bachelor of Technology

in

Computer Science & Engineering / Information Technology

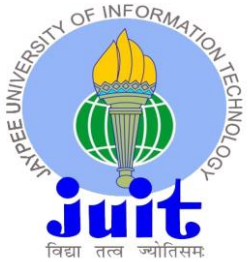
Submitted by

Tanvi Sharma (201320)

Geetali Goel (201210)

Under the guidance & supervision of

Dr. Ruchi Verma



Department of Computer Science & Engineering and Information Technology

Jaypee University of Information Technology,

Waknaghat, Solan - 173234 (India)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

PLAGIARISM VERIFICATION REPORT

Date: …….

Type of Document (Tick): PhD Thesis | M.Tech Dissertation/ Report | B.Tech Project Report | Paper

Name: _____ __**Department:** _____ **Enrolment No** _____

Contact No. _____**E-mail.** _____

Name of the Supervisor: _____

Title of the Thesis/Dissertation/Project Report/Paper (In Capital letters): _____

_____

_____

UNDERTAKING

I undertake that I am aware of the plagiarism related norms/ regulations, if I found guilty of any plagiarism and copyright violations in the above thesis/report even after award of degree, the University reserves the rights to withdraw/revoke my degree/report. Kindly allow me to avail Plagiarism verification report for the document mentioned above.

Complete Thesis/Report Pages Detail:

- Total No. of Pages =
- Total No. of Preliminary pages =
- Total No. of pages accommodate bibliography/references =

(Signature of Student)

FOR DEPARTMENT USE

We have checked the thesis/report as per norms and found **Similarity Index** at ……..(%). Therefore, we are forwarding the complete thesis/report for final plagiarism check. The plagiarism verification report may be handed over to the candidate.

(Signature of Guide/Supervisor) **Signature of HOD**

FOR LRC USE

The above document was scanned for plagiarism check. The outcome of the same is reported below:

<table>
<tr><th>Copy Received on</th><th>Excluded</th><th>Similarity Index (%)</th><th colspan="2">Generated Plagiarism Report Details (Title, Abstract & Chapters)</th></tr>
<tr><td rowspan="2"></td><td rowspan="4">• All Preliminary Pages
• Bibliography/Images/Quotes
• 14 Words String</td><td rowspan="2"></td><td>Word Counts</td><td></td></tr>
<tr><td rowspan="2">Report Generated on</td><td>Character Counts</td><td></td></tr>
<tr><td rowspan="2"></td><td>Submission ID</td><td>Total Pages Scanned</td><td></td></tr>
<tr><td></td><td>File Size</td><td></td></tr>
</table>

Checked by
Name & Signature **Librarian**

……

Please send your complete thesis/report in (PDF) with Title Page, Abstract and Chapters in (Word File) through the supervisor at plagcheck.juit@gmail.com

CERTIFICATE

This is to certify that the work which is being presented in the project report titled **'Web3 Crowdfunding Platform'** in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering/Information Technology** and submitted to the Department of Computer Science And Engineering, Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by Tanvi Sharma & Geetali Goel with Roll Number 201320 & 201210 respectively under the supervision **Dr. Ruchi Verma**(Assistant Professor(SG))

Student Name: Tanvi Sharma
Roll No.: 201320

Student Name: Geetali Goel
Roll No.: 201210

The above statement made is correct to the best of my knowledge.

Supervisor Name: Dr. Ruchi Verma
Designation: Assistant Professor (SG)
Department: Computer Science and Engineering and Information Technology

DECLARATION

We hereby declare that the work presented in this report entitled **'Web3 Crowdfunding Platform'** in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science & Engineering / Information Technology** submitted in the Department of Computer Science & Engineering and Information Technology**,** Jaypee University of Information Technology, Waknaghat is an authentic record of my own work carried out over a period from August 2023 to May 2024 under the supervision of **Dr. Ruchi Verma** (Assistant Professor(SG), Department of Computer Science & Engineering and Information Technology).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Student Name: Tanvi Sharma
Roll No.: 201320

Student Name: Geetali Goel
Roll No.: 201210

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

Supervisor Name: Dr. Ruchi Verma

Designation: Assistant Professor (SG)
Department: Computer Science and Engineering and Information Technology
Dated:

ACKNOWLEDGEMENT

Firstly, we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes it possible for us to complete the project work successfully.

We are really grateful and wish my profound indebtedness to Supervisor **Dr. Ruchi Verma**, Assistant Professor (SG), Department of CSE Jaypee University of Information Technology, Wakhnaghat. Deep Knowledge & keen interest of my supervisor to carry out this project. Her endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stages have made it possible to complete this project.

We would like to express our heartiest gratitude to **Dr. Ruchi Verma**, Associate Professor (SG), Department of CSE, for his kind help to finish this project.

We would also generously welcome each one of those individuals who have helped us straightforwardly or in a roundabout way in making this project a win. In this unique situation, we might want to thank the various staff individuals, both educating and non-instructing, which have developed their convenient help and facilitated our undertaking.

Finally, we must acknowledge with due respect the constant support of our parents.

Tanvi Sharma, 201320
Geetali Goel, 201210

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviations	Meaning	Page No.
P2P	Peer-to-Peer	2
POW	Proof of work	7
POS	Proof of stake	7
dApps	Decentralized applications	7
DeFi	Decentralized finance	14
NFTs	Non-fungible tokens	14
DAOs	Decentralized autonomous organizations	14
CFP	Crowdfunding platform	15
EVM	Ethereum Virtual Machine	19
IoT	Information of technology	21
UI/UX	User Interface/User Experience	24
EOS	Earth observing system	27
NEM	New economy movement	27
APIs	Application Programming interface	27

ABSTRACT

Crowdfunding has evolved into an innovative and revolutionary form of financing that offers an affordable way to raise capital and reduce investment risk. The project aims to evaluate the concept of using blockchain technology for crowdsourcing. This is a project meant to build a giant network incorporating Ethereum blockchain.

Investors can also sponsor such initiatives, whereby these companies will post up their financial targets and timelines for completion at their websites. Therefore, smart contracts will play the role of monitors, as the money will be forwarded only when important processes such as assignment deletion have been done. The other shortcomings addressed in the project include capacity and governance. scalability and user experience.

Thereafter, we shall understand the way in which blockchain-based crowdfunding platforms would transform the financial field and the benefits they embody, together with constraints. It will also explore how crowd funding by blockchain can contribute to financial inclusion. Possibilities under which blockchain may finance unbanked individuals and organizations are envisaged by this study.

Current studies show that blockchain based crowdfunding is very suitable for a lot of starting companies as well as many entrepreneurs who would have access through "democratization," thus uniting such activity and enriching financial streams.

Keywords: blockchain, transparency, security, distributed platform and smart contracts

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

Crowdfunding is one of the most popular ways to raise funds for any project to help any individual in need. With the onset of COVID, we have seen a rise in crowdfunding activities across the globe, which range from small campaigns to help people get oxygen and medical help to large funds such as PM Cares.

1.1.1 CURRENT CROWDFUNDING PLATFORMS

Despite the exciting potential of crowdfunding, there are several challenges that both creators and backers face on existing platforms. The current platforms might not have robust mechanisms to assess the legitimacy and viability of projects. This can leave backers unsure of where their money is going and increase the risk of fraudulent campaigns.

Transparency is paramount to building trust with potential backers. Unfortunately, many crowdfunding campaigns lack detailed information. Insufficient project information can make it difficult for backers to evaluate the potential and trustworthiness of a campaign. This can lead to backers being hesitant to contribute.

In addition, the current platforms like Kickstarter and GoFundMe with all-or-nothing models can be discouraging for creators, especially for those with ambitious goals. Even if a project generates significant interest, falling short of the target can mean receiving no funding at all.

1.1.2 WEB3 CROWDFUNDING PLATFORM

- Ethereum's blockchain solves the above issues with its transparent and immutable data. All transactions, from donations to distributions, are carefully recorded on the blockchain, providing instant visibility to all parties involved. This better understanding not only builds trust but also increases the accountability of project sponsors.
- Blockchain records ensure secure tracking of funds and project details, fostering trust between creators and backers.

- Decentralisation potentially cuts out platform fees, benefiting both creators (keeping more funds) and backers (potentially higher returns).
- Smart contracts automate tasks, improving efficiency and reducing administrative burdens.
- Ownership or profit-sharing of campaigns can be represented by tokens, offering new investment opportunities to backers.
- Direct creator-backer interaction fosters a sense of community and potentially allows backers to influence projects.

1.1.3 BENEFITS OF WEB3 CROWDFUNDING PLATFORM

The Web3 crowdfunding platform is a significant step forward in the evolution of the crowdfunding process. The system will make the process more efficient, more accurate, and more beneficial for both creators and backers.

For campaign creators, the platform will:

- Web3's borderless nature allows creators to tap into a wider pool of international backers, potentially increasing funding potential and audience reach.
- Streamlined processes with smart contracts can expedite funding disbursement, allowing creators to access funds quicker and focus on project development.
- Direct connection with backers fosters a stronger sense of community around projects. Backers become more than just investors, potentially transforming into brand advocates and engaged participants.

For backers, the platform will:

- Reduced platform fees and innovative tokenized investment models could lead to potentially higher returns for backers compared to traditional crowdfunding platforms.
- Provide a more accurate and comprehensive view of faculty performance.
- Make it easier to identify and reward outstanding faculty members.

Overall, Web3 crowdfunding offers a win-win scenario for both creators and backers. Creators gain access to more efficient fundraising with potentially lower fees and a wider audience, while backers benefit from increased transparency, the potential for higher returns, and more engaging investment opportunities.

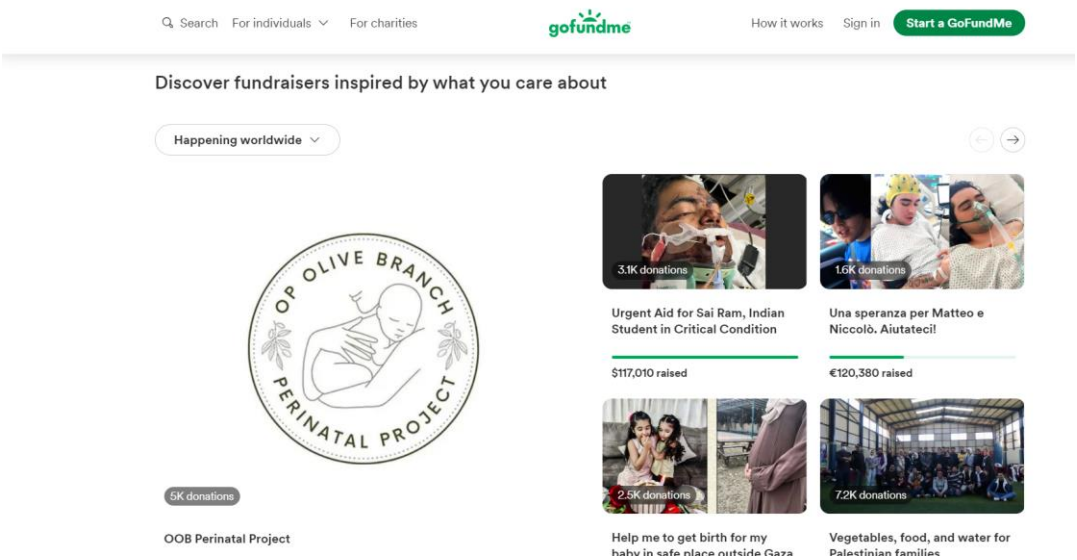


Fig 1.1.1 Existing crowdfunding platform

1.2 PROBLEM STATEMENT

The current centralised model that is the foundation of traditional fundraising faces constant scrutiny for flaws that hinder its effectiveness in promoting transparency and security in fundraising.

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 secured. Although stringent measures such as symmetric encryption are in place to make e-payments safe and secure, they are still vulnerable to hacking.
- **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.

- **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.

The platform must address the following key challenges:

- **Opaque Fund Allocation**: Centralised platforms often lack transparency in the allocation of funds, leaving participants unaware of how their contributions are used in the project. Transparency undermines the trust and confidence of fans.
- **Limited Accountability**: Not having an immediate view of how money is being spent can lead to liability issues. The decision to give project sponsors the power to manage funds without oversight raises concerns about dissent and abuse.
- **Susceptibility to Hacking**: Centralised content management impacts the integrity of fundraising by making platforms vulnerable to hacking and data breaches.
- **Data Privacy Concerns**: Inadequate security measures can increase the risk of information leakage or misuse, and sponsors may be afraid to participate because they are concerned about the security of their personal information.
- **Deterrent to Participation**: These challenges hinder and limit the participation of individuals and organisations in the activities of the masses, thereby limiting opportunities for innovation, economic growth, and change.
- **Inhibitor of Potential Socio-economic Impact**: Failure to overcome these obstacles inhibits the economic community's influence on economic competition, limiting their ability to drive change and progress.

The benefits of these challenges limit the flexibility of existing crowdfunding models. They act to create an inclusive, transparent and safe fundraising environment that supports innovation, social change and global collaboration.

Overcoming these limitations requires moving to a more robust, decentralised, and transparent system. This is what blockchain-powered crowdfunding is trying to address.

1.3 OBJECTIVES

The project objectives encompass a comprehensive exploration of technical elements within the blockchain and crowdfunding domain:

1.3.1. FACILITATE FUNDRAISING FOR CREATORS:

- Increase the discoverability of projects by providing a platform for creators to showcase their ideas and connect with potential backers.
- Offer various funding models (all-or-nothing, flexible goals) to cater to different project needs and creator preferences.
- Provide user-friendly tools and resources to simplify the fundraising process for creators, including campaign creation, management, and communication with backers.

1.3.2 FOSTER TRUST AND TRANSPARENCY:

- Implement robust security measures to protect financial information and ensure secure transactions between creators and backers.
- Encourage clear and transparent communication from creators by requiring detailed project information and regular updates for backers.
- Establish mechanisms to address potential conflicts between creators and backers, promoting fairness and trust within the platform.

1.3.3 EMPOWER BACKERS AND ENCOURAGE INVESTMENT:

- Offer a diverse range of projects for backers to explore and invest in, catering to various interests and risk tolerances.

- Foster a sense of community among backers, allowing them to connect with other backers and creators, share ideas, and participate in discussions.
- Provide opportunities for backers to potentially earn returns on their investments through successful projects (profit-sharing models, tokenized rewards).

1.3.4 PLATFORM GROWTH AND SUSTAINABILITY:

- Continuously improve platform features and functionalities to attract a wider audience of creators and backers, fostering a vibrant crowdfunding ecosystem.
- Implement a fair and transparent fee structure that incentivizes creators to use the platform while ensuring the platform's sustainability.
- Stay at the forefront of the crowdfunding industry by embracing new technologies and adapting to evolving market trends.
- Leverage insights to improve platform features, optimize marketing strategies, and personalize the user experience.

1.3.5 INTUITIVE AND USER-FRIENDLY WEB-BASED INTERFACE:

- Create a website that is easy to navigate for both creators and backers, with clear menus, search functions, and user guides.
- Ensure the website is accessible and functions seamlessly across different devices (desktop, mobile, tablets).
- Integrate accessibility features like screen reader compatibility, clear font styles, and alt text for images to cater to users with disabilities.
- Integrate secure and user-friendly payment gateways for both creators and backers to facilitate smooth transactions.

1.3.6 PROMOTE SOCIAL IMPACT:

- Facilitate Social Cause Fundraising: Provide dedicated sections or functionalities for social cause campaigns and impact investing.

- Partner with NGOs: Collaborate with non-profit organizations to leverage the platform for social good initiatives.

1.3.7 FOSTER FINANCIAL INCLUSION:

- Open up investment opportunities and make crowdfunding accessible to a broader audience by offering low minimum investment amounts and user-friendly interfaces.
- Explore Alternative Payment Methods: Integrate alternative payment methods and offer multilingual website options beyond traditional credit cards to cater to a wider global audience.

1.4 SIGNIFICANCE AND MOTIVATION OF THE PROJECT WORK

Crowdfunding epitomises the fundamental forces driving innovation, empowerment, and community engagement in today's business environment. Its theme is free access to capital, providing a springboard for innovative and progressive projects that would otherwise struggle to find financing. This freedom empowers individuals, startups, and entrepreneurs around the world, creating a level playing field where new ideas replace traditional problems.

However, there is another key piece that is missing from this equation: trust.

This project is dedicated to carefully researching the development of the Ethereum blockchain in financial aid. Its main goal is to complete the analysis of the complexity of the Ethereum blockchain and smart contracts and demonstrate their integration and impact on the crowd. Additionally, it aims to measure the far-reaching impact of decentralization, transparency, security and participation that Ethereum-powered crowdfunding can bring to the financial market.

The motivation behind this research comes from the ability to reinterpret important concepts. Donation. Leveraging the power of the Ethereum blockchain. The program is committed to fostering a new era of safe, transparent, and accessible fundraising worldwide. Enabling individuals and organizations to seamlessly

participate in fundraising events without geographical restrictions or financial barriers is the driving force behind the overall review of blockchain-powered crowdfunding.

It empowers the community to participate in an initiative. Supporters become stakeholders by creating collaborative networks that provide support, technical advice, and advocacy for project success. A sense of community expands the impact of the project and encourages collaboration and relationships beyond financial aid.

Crowdfunding can also play a useful role in demonstrating business needs or gaining acceptance of an idea or product. This recognition reduces risk and supports economic growth by supporting small businesses, encouraging the advancement of technology, and recognizing ideas that meet business needs.

Ultimately, crowdfunding goes beyond financial support and embodies a global catalyst for innovation, empowerment, community building, and socio-economic development.

1.5 ORGANIZATION OF PROJECT REPORT

1.5.1 CHAPTER 1: INTRODUCTION

In this chapter, I introduce the project's main idea and purpose. The project description and benefits, as well as a summary of scope and duration, are also included on the first page.

1.5.2 CHAPTER 2: LITERATURE SURVEY

Papers and journals are from reputable sources such as Blockchain, Smart Contracts, and Metamask, as well as Web3. The literature review presents a critical analysis of the existing literature, pointing out the gaps in the current studies on the topic.

1.5.3 CHAPTER 3: SYSTEM DEVELOPMENT

This part of the book describes the principal information about the system's

structure, comprising hardware, software, and networks. Also, it includes the pseudo code of the main functions of the system and the diagram of the structure of the database.

1.5.4 CHAPTER 4: TESTING

This chapter entails test details of the system, the methodology applied, and the result of the test.

1.5.5 CHAPTER 5: RESULTS AND EVALUATION

This chapter reports the initial results of the system and summarizes the key findings as well as users' feedback. It also talks about the challenges encountered while creating the system.

1.5.6 CHAPTER 6: CONCLUSIONS AND FUTURE SCOPE

The chapter sums up the project while outlining the future scope for the project. It highlights the transformative potential of blockchain to transform the fundraising landscape, guides future research, and has yet to implement new innovative approaches in this new release.

CHAPTER 2: LITERATURE SURVEY

2.1 OVERVIEW OF RELEVANT LITERATURE

Table 2.1.1

Title	**Web3: A Comprehensive Review on Background, Technologies, Applications, Zero-Trust Architectures, Challenges and Future Directions** [1]
Authors	**Partha Pratim Ray**
Year of Publication	**2023**
Publishing Details	**Internet of Things and Cyber-Physical Systems, Volume X, Issue X, Pages XXX-XXX, ISSN: 2667-3452**
Summary	The study explores how Web3, the evolution of the internet, embraces decentralization and user empowerment. Ray's review explores its technologies like DApps, DeFi, NFTs, and DAOs. It scrutinizes Web3's impact on AI, IoT, and smart cities, highlighting its potential societal benefits. The paper emphasizes zero-trust architectures' role in Web3's security, tackling scalability, regulatory, and energy issues. Offering a historical Internet evolution overview, it emphasizes Web3's significance in revolutionizing internet functionality. It presents a practical approach to anonymous authentication using wallet addresses, showcasing faster login times compared to traditional methods, heralding a shift towards decentralized authentication mechanisms.

Table 2.1.2

Title	**Emerging Trends in Blockchain Technology and Applications: A Review and Outlook** [2]
Authors	**Ahmed G. Gad, Diana T. Mosa, Laith Abualigah, and Amr A. Abohany**
Year of Publication	**2022**
Publishing Details	**Details: Journal of King Saud University-Computer and Information Sciences, Volume 34, Issue 2, March 2022, Pages 1-15**
Summary	This review dives deep into the world of blockchain technology, specifically its journey since 2013. The authors explore how blockchain has evolved and impacted various fields. To gather their information, they combed through influential articles, conferences, and reviews found within the Web of Science, a respected scientific database. The review doesn't just summarize existing knowledge; it highlights key discoveries and breakthroughs made in blockchain research. It also identifies exciting new trends that are emerging in this rapidly developing field. Additionally, the review acknowledges the role of funding bodies in supporting and advancing blockchain research. The paper goes beyond theory and explores the real-world applications of blockchain technology. It delves into how blockchain is used in diverse areas like the Internet of Things (IoT) and healthcare. This

	showcases the versatility and potential of blockchain to impact many aspects of our lives. Overall, this review offers a comprehensive picture of blockchain technology. It analyzes recent research, explores its applications, and identifies both its potential and current limitations. This information is valuable for researchers and practitioners who are interested in understanding the current state of blockchain and its exciting possibilities for the future.

Table 2.1.3

Title	**Smart Contract Using Solidity (Remix-Ethereum IDE)** [3]
Authors	**Dr. Santosh Kumar Singh, Dr. Varun Tiwari, and Dr. Vikas Rao Vadi**
Year of Publication	**February 2023**
Publishing Details	**IJARCCE Vol. 12, Issue 2**
Summary	Singh's paper, published in the February 2023 issue of the International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), dives into the world of Solidity programming for smart contracts on the Ethereum blockchain. The paper starts by explaining the role of smart contracts in managing the state of the Ethereum network. Smart contracts are essentially self-executing programs that can automate agreements and transactions. Singh then

	delves into Solidity, a programming language specifically designed for creating these smart contracts. The paper explores the influence of Solidity, its syntax (the way code is written), and the various applications it has in building self-enforcing business mechanisms. To make the concepts clear, the article goes through the details of Solidity syntax, including inheritance contracts (a way to reuse code) and the execution steps involved in running a smart contract. It even provides a practical example using Remix IDE, a popular development environment for working with Solidity. Beyond the specifics of Solidity, Singh's paper emphasizes the foundational knowledge needed for understanding smart contracts. This includes the basics of blockchain technology, the Ethereum Virtual Machine (EVM), which is the computer that executes smart contracts on Ethereum, and smart contract security, a critical aspect of ensuring trust and reliability in these decentralized systems. Overall, the paper aims to elucidate the fundamental interplay between Solidity programming, blockchain technology, and decentralized applications (dApps). By understanding these components, developers can build secure and effective smart contracts that power the future of decentralized applications.

Table 2.1.4

Title	**Crowdfunding using Blockchain Technology** [4]
Authors	**Saniya Zad, Zishan Khan, Tejas Warambhe, and**

	Rushikesh Jadhav
Year of Publication	**2023**
Publishing Details	**Available at SSRN: https://ssrn.com/abstract=4330476**
Summary	Zad's paper explores the exciting world of crowdfunding that leverages blockchain technology. It delves into the inner workings of this innovative system, providing a comprehensive overview of its mechanisms, the benefits it offers, and the challenges it faces. The paper starts by highlighting the evolution of crowdfunding and its emergence as an alternative financing method compared to traditional channels like banks or venture capitalists. Zad emphasizes the potential of blockchain-based crowdfunding to support a wide range of projects, from creative endeavors to social causes. The authors then delve deeper, explaining the motivations behind using blockchain for crowdfunding. These motivations can include the ability to raise funds rapidly or the potential to foster innovation through a more accessible funding model. However, the paper also acknowledges the key challenges associated with this new approach. Issues like establishing trust between project creators and backers, and choosing the right platform for a project, are addressed. To solidify their analysis, Zad incorporates literature surveys and explores proposed systems within the blockchain crowdfunding landscape. This comprehensive approach offers valuable insights

	into the ever-expanding world of this transformative financing avenue. By understanding both the potential and the challenges, readers gain a well-rounded perspective on the future of blockchain-powered crowdfunding.

Table 2.1.5

Title	**A Secure and Decentralised Authentication Mechanism Based on Web 3.0 and Ethereum Blockchain Technology** [5]
Authors	**Adrian Petcu, Bogdan Pahontu, Madalin Frunzete, and Dan Alexandru Stoichescu**
Year of Publication	**2023**
Publishing Details	**Appl. Sci. 2023, 13(4), 2231**
Summary	A recently published paper by Petcu et al. (2023) explores the concept of Web3 authentication and its significance in decentralising the way users log in to online services. The paper highlights the limitations of the current centralised approach used in Web 2.0, exemplified by protocols like OAuth 2.0. In contrast, Web3 authentication leverages the Ethereum blockchain to provide a secure and decentralised alternative. The study offers a historical perspective, tracing the evolution of user authentication from Web 1.0's rudimentary methods to the more sophisticated, but still centralised, systems of Web 2.0.

	Petcu et al. then delve into the details of Web3 authentication, explaining its potential applications and the technical aspects of its implementation. They emphasise the advantages Web3 holds over traditional Web2.0 methods, focusing on security and decentralisation. As a practical example, the paper explores the use of anonymous authentication through wallet addresses on the Ethereum blockchain. This approach not only offers enhanced security but also boasts faster login times compared to conventional methods. Overall, the paper presents a compelling case for Web3 authentication as a paradigm shift towards a more secure and user-centric way of managing online identities.

Table 2.1.6

Title	**Smart Contracts in Blockchain Technology: A Critical Review** [6]
Authors	**Hamed Taherdoost**
Year of Publication	**2023**
Publishing Details	**Information 2023, 14(2), 117**
Summary	In a 2023 review paper, Taherdoost dives deep into the world of smart contracts within blockchain technology. Focusing on the period between 2012 and 2022, the study analyses 252 articles published in English journals, excluding other formats like

	conference proceedings or books. The core objective is to assess the current state of smart contracts and their role within blockchain technology. The paper explores the evolution of blockchain technology, highlighting the pivotal roles played by Bitcoin and Ethereum. It then delves into the concept of smart contracts, explaining how they function and their growing popularity across various applications. However, Taherdoost doesn't shy away from limitations. The review emphasises the challenges associated with smart contracts, including security vulnerabilities. Since smart contracts are immutable, any bugs or errors in their code can be exploited and potentially lead to financial losses. Additionally, the complexities of maintaining smart contracts over time are another hurdle. As the world around them evolves, smart contracts may need to be updated, which can be a challenging and resource-intensive process. By understanding both the potential and the hurdles, Taherdoost's research provides valuable insights into the current landscape of smart contracts and their future trajectory within the ever-evolving world of blockchain technology. As developers and researchers work to address the challenges, smart contracts have the potential to revolutionise how we interact with digital information and conduct transactions in a secure, transparent, and automated manner.

Table 2.1.7

Title	**Decentralised Crowdfunding Platform: A Blockchain-based Approach** [7]
Authors	**A. Rathore and S. W. A. Rizvi**
Year of Publication	**2023**
Publishing Details	**Journal of Informatics Electrical and Electronics Engineering (JIEEE), ISSN (Online): 2582-7006, A2Z Journals**
Summary	In their 2023 publication, Rathore and Rizvi set their sights on improving the crowdfunding landscape by exploring decentralised crowdfunding platforms. Their research tackles the shortcomings of current models, which can be plagued by issues like difficulty in establishing trust, project delays, and hefty intermediary fees. To address these problems, the authors propose a novel solution: blockchain-based crowdfunding platforms. The core benefit of this approach lies in the power of smart contracts. These self-executing programs stored on the blockchain can automate key aspects of the crowdfunding process, ensuring features like: ● **Transparent Fund Usage**: Every transaction is recorded immutably on the blockchain, providing clear visibility into how funds are being used by the project creators. This fosters trust and accountability between creators and backers.

	• **Global Accessibility**: The borderless nature of blockchain technology removes geographical barriers, allowing projects to attract backers from around the world and potentially increasing their funding potential. • **Reduced Fee**s: By eliminating the need for intermediaries, blockchain-based platforms can significantly reduce fees associated with crowdfunding campaigns, benefiting both creators (who keep a larger share of the raised funds) and backers (who potentially see higher returns). • **Fraud Prevention**: The tamper-proof nature of the blockchain makes it highly resistant to fraud. All transactions are permanently recorded and verifiable, minimising the risk of misuse of funds. Rathore and Rizvi's study goes beyond simply outlining the concept. They delve into the technical aspects of their proposed system, detailing the methodology and the specific technologies used. This includes platforms like Thirdweb for blockchain development, React.js for user interface development, and Solidity for smart contract programming. To demonstrate the feasibility of their approach, the authors showcase a functional prototype built on the Ethereum blockchain. This prototype serves as a tangible example of how a decentralised crowdfunding platform could operate in practice.

	Looking towards the future, Rathore and Rizvi envision further enhancements to their system. They plan to incorporate features like anonymous investments, catering to backers who may prefer privacy. Additionally, they aim to create a truly decentralised environment that can support a wide range of projects, fostering a more community-driven approach to crowdfunding. This emphasis on community engagement, coupled with cost-effectiveness and enhanced security, suggests that blockchain-based crowdfunding platforms have the potential to revolutionise the way projects are funded and supported.

Table 2.1.8

Title	**Crowdfunding platforms: a systematic literature review and a bibliometric analysis** [8]
Authors	**Alexandra Mora-Cruz & Pedro R. Palos-Sanchez**
Year of Publication	**2023**
Publishing Details	**International Entrepreneurship and Management Journal, Volume 19, Pages 1257–1288**
Summary	In a comprehensive study published in 2023, Mora-Cruz and Palos-Sanchez explored the burgeoning world of crowdfunding platforms (CFPs) in Latin America. Their research, meticulously analysing 1,032 articles retrieved from Scopus and Web of

	Science databases, focused on three key categories: Reward, Equity, and Lending. By applying rigorous selection criteria, they identified 55 highly relevant articles, serving as a testament to the growing interest in CFP research within the region. This surge in interest is likely fuelled by the increasing need for alternative financing options, particularly in the wake of the economic challenges posed by the COVID-19 pandemic. Entrepreneurs and small businesses in Latin America are increasingly turning to CFPs as a viable source of capital to support their ventures. The study by Mora-Cruz and Palos-Sanchez highlights the significance of CFPs in this evolving landscape. However, the research also emphasises the need for further investigation, with a specific focus on the technological aspects of these platforms. As CFPs continue to evolve and integrate new technologies, a deeper understanding of the tech infrastructure powering these platforms is crucial. This focus on the technological underpinnings will ensure that future research remains relevant and insightful. Overall, Mora-Cruz and Palos-Sanchez's study offers a valuable resource for both professionals and researchers interested in exploring the diverse avenues of crowdfunding in Latin America. By highlighting the growing interest in CFPs and underscoring the importance of technology-centric research, this study paves the way for further exploration and innovation in this dynamic field.

Table 2.1.9

Title	**Ethereum Transaction Using MetaMask Wallet** [9]
Authors	**Dr. Kumud Saxena, Vaibhav Kushwaha, Umang Gupta, Vanshika Saxena, and Shweta Srivastav**
Year of Publication	**May 2023**
Publishing Details	**International Research Journal of Modernization in Engineering Technology and Science, Volume 05/Issue 05, e-ISSN: 2582-5208, Impact Factor: 7.868**
Summary	This research dives into the world of Ethereum transactions, aiming to make the technology more accessible and engaging for a wider audience. It leverages two key tools: MetaMask, a popular crypto wallet, and React JS, a JavaScript library for building user interfaces. The focus is on showcasing the core strengths of blockchain technology, namely its emphasis on trust, security, and the decentralised nature of Web 3.0. The study explores the role of Solidity, a programming language specifically designed for creating smart contracts on Ethereum. By building user-friendly interfaces with Solidity, the research team aims to make interacting with smart contracts more intuitive and approachable. The research itself delves into the practical applications of smart contracts, examining real-

	world use cases like privacy-focused transactions and decentralised lending within the Ethereum ecosystem. To further enhance the user experience, the system streamlines transactions using MetaMask wallets, allowing users to easily interact with the blockchain. Additionally, it leverages EtherScan.io, a popular blockchain explorer, to provide users with access to relevant data and information. Uniquely, the research incorporates humour through memes to boost user engagement. This unexpected blend of entertainment with core blockchain principles aims to attract a broader audience who might not otherwise be familiar with Ethereum or smart contracts. Ultimately, the research offers valuable insights into these technologies, making them more understandable and engaging for a wider range of people.

2.2 KEY GAPS IN THE LITERATURE

2.2.1 "Web3: A Comprehensive Review on Background, Technologies, Applications, Zero-Trust Architectures, Challenges and Future Directions"

While Ray's review offers a comprehensive exploration of Web3 technologies and their potential impact on various sectors like AI, IoT, and smart cities, some key areas remain under-addressed in the current literature. One critical gap is the integration and interoperability between different Web3 elements. Existing research often focuses on specific components, like DeFi or NFTs, in isolation. Further studies are needed to explore how these technologies can work together seamlessly to create a unified and interoperable Web3 ecosystem.

Another gap lies in the lack of in-depth case studies. While Ray's review highlights the potential societal benefits of Web3, there's a dearth of research that analyses real-world implementations and the practical challenges faced during deployment. Case studies exploring successful Web3 applications across different industries would provide valuable insights for future development.

Furthermore, the review doesn't delve deeply into the ongoing discussions about regulation and governance. As Web3 technology evolves, the need for clear regulatory frameworks becomes increasingly important. Research that explores the current regulatory landscape and its potential impact on Web3 adoption would be beneficial.

In conclusion, while Ray's review provides a strong foundation for understanding Web3, bridging the gaps in integration, real-world application analysis, and regulatory considerations will be crucial for its successful future and widespread adoption.

2.2.2 "Emerging Trends in Blockchain Technology and Applications: A Review and Outlook"

The provided review offers a valuable overview of blockchain technology's evolution, applications, and future potential. However, some key gaps in the current literature remain to be addressed:

- **Integration and Interoperability**: While the review explores blockchain's versatility across various domains, it may not delve deeply into how different

  blockchain platforms work together. A gap exists in research exploring how these platforms can interact and share data seamlessly, fostering a more interconnected blockchain ecosystem.

- **Scalability and Sustainability**: The review might not extensively address the ongoing challenges of scalability and sustainability with blockchain technology. Further research is needed to explore solutions for handling large transaction volumes and reducing the environmental impact of blockchain operations.

- **Standardisation and Security**: Standardisation across different blockchain protocols and security best practices remain evolving areas. The review could benefit from including research exploring advancements in these areas to ensure the overall robustness and security of the blockchain ecosystem.
- **Social Impact and Ethical Considerations**: The potential social and ethical implications of blockchain technology warrant further exploration. Studies that examine areas like decentralised governance, access to information, and potential biases within blockchain systems would provide valuable insights.

By addressing these gaps, future research can contribute to a more comprehensive understanding of blockchain technology and its potential to revolutionise various aspects of our digital world.

2.2.3 "Smart Contract Using Solidity (Remix-Ethereum IDE)"

While Singh's paper provides a solid foundation for understanding Solidity and its role in building smart contracts, there are some key gaps that could be addressed in future research:

- **Advanced Smart Contract Applications**: The paper focuses on the fundamentals of Solidity and smart contract creation. A gap exists in research exploring more advanced applications of smart contracts, such as decentralised finance (DeFi) protocols, non-fungible tokens (NFTs), and decentralised autonomous organisations (DAOs).
- **Security Auditing and Best Practices**: Smart contract security is a critical concern. While Singh touches on security principles, further research is needed to explore best practices for secure smart contract development and auditing methodologies to identify and mitigate potential vulnerabilities.
- **Formal Verification and Testing Frameworks**: Formal verification techniques and automated testing frameworks play a crucial role in ensuring the reliability and correctness of smart contracts. The literature could

benefit from studies exploring the application of these advanced methods for smart contract development.

- **Interoperability with Other Blockchains**: While the paper focuses on Ethereum, future research could explore the challenges and potential solutions for interoperability between Solidity smart contracts and other blockchain platforms, fostering a more interconnected ecosystem.
- **Real-World Use Case Studies**: In-depth case studies analysing successful deployments of smart contracts in various industries would be valuable. Understanding the practical challenges and solutions encountered in real-world applications would benefit future development efforts.

By addressing these gaps, future research can contribute to a more comprehensive understanding of Solidity and its role in shaping the future of decentralised applications and blockchain technology.

2.2.4 "Crowdfunding using Blockchain Technology"

Zad's paper on blockchain-based crowdfunding offers valuable insights, but some key gaps remain in the current literature:

- **Regulator Landscape:** The regulatory environment surrounding blockchain-based crowdfunding is still evolving. Further research is needed to explore the current regulations and their potential impact on the growth and adoption of this innovative financing model.
- **Security and Fraud Prevention**: While Zad addresses trust challenges, a deeper dive into security best practices and potential vulnerabilities specific to blockchain crowdfunding platforms would be beneficial. Research on fraud prevention techniques and mitigation strategies is also crucial.
- **Long-Term Project Sustainability**: The paper focuses on the fundraising stage. However, exploring how blockchain-based crowdfunding platforms can support long-term project sustainability and community engagement beyond the initial funding stage would be valuable.
- **Comparative Analysis with Traditional Crowdfunding**: In-depth comparisons between traditional crowdfunding platforms and their

blockchain-based counterparts are needed. This could highlight the advantages and disadvantages of each approach for different types of projects and investors.

- **Case Studies and Empirical Analysis**: The literature would benefit from real-world case studies analysing successful blockchain-based crowdfunding campaigns.

By addressing these gaps, future research can contribute to a more comprehensive understanding of the potential and challenges of blockchain-based crowdfunding, paving the way for its wider adoption and success in the financial landscape.

2.2.5 "A Secure and Decentralised Authentication Mechanism Based on Web 3.0 and Ethereum Blockchain Technology"

Petcu et al.'s (2023) paper offers a compelling exploration of Web3 authentication and its potential to revolutionise how we log in online. However, some key gaps in the current literature could be further addressed:

- **Scalability and Performance**: While the paper highlights the potential benefits of Web3 authentication, scalability and performance considerations need further exploration. How will Web3 authentication mechanisms handle large user bases and ensure efficient login times as user adoption grows?
- **User Experience and Usability**: The research focuses on the technical aspects of Web3 authentication. Future studies could explore the user experience and usability considerations. "Are there any potential challenges or complexities for users accustomed to traditional login methods?"
- **Integration with Existing Systems**: Widespread adoption hinges on seamless integration with existing login systems. Research exploring how Web3 authentication can integrate with the current website and application infrastructure would be valuable.
- **Standardisation and Interoperability**: Standardisation across different Web3 authentication protocols is crucial. Future research could explore efforts to establish common standards that ensure interoperability between

various platforms and service providers.

- **Security and Privacy Concerns**: While the paper mentions security advantages, a deeper dive into potential security risks and privacy concerns associated with Web3 authentication is necessary.

By addressing these gaps, future research can contribute to a more comprehensive understanding of the feasibility and challenges of Web3 authentication. This will pave the way for its wider adoption and a more secure and user-centric authentication landscape for the future of the web.

2.2.6 "Smart Contracts in Blockchain Technology: A Critical Review"

While Taherdoost's (2023) review offers a valuable analysis of smart contracts between 2012 and 2022, some key gaps in the literature remain:

- **Future Trends and Advancements**: The review focuses on the current state and limitations of smart contracts. Further research could explore emerging trends and advancements in the field. This might include areas like self-healing smart contracts, interoperable contract languages, and advancements in privacy-preserving smart contracts.
- **Real-World Case Studies**: The review highlights diverse applications of smart contracts, but in-depth case studies analysing successful implementations across various industries are lacking. Understanding the practical challenges and solutions encountered in real-world deployments would be valuable for future development.
- **Legal and Regulatory Landscape**: The legal and regulatory environment surrounding smart contracts is still evolving. Further research is needed to explore how legal frameworks can adapt to accommodate smart contracts and the potential challenges and opportunities they present.
- **Standardization and Interoperability**: Standardization across different smart contract platforms and languages would foster a more interconnected ecosystem Research exploring advancements in standardization efforts and their impact on interoperability would be beneficial.
- **Social and Ethical Considerations**: The potential social and ethical

implications of smart contracts require further exploration. Studies examining areas like bias mitigation, access to participation, and potential societal impacts of widespread smart contract adoption would provide valuable insights.

By addressing these gaps, future research can contribute to a more comprehensive understanding of smart contracts and their potential to reshape various aspects of our digital world.

2.2.7 "Decentralised Crowdfunding Platform: A Blockchain-based Approach"

While Rathore and Rizvi's (2023) exploration of blockchain-based crowdfunding platforms offers a promising solution, some key gaps in the literature remain to be addressed:

- **Incentives and Governance**: The study outlines the benefits for project creators and backers, but a deeper dive into incentive structures and governance mechanisms within these decentralised platforms is needed. "How will participation be encouraged, and how will decisions be made in a community-driven environment?"
- **Regulatory Uncertainty**: Regulations surrounding tokenized fundraising and decentralized finance (DeFi) are still evolving. Further research is needed to explore how these platforms can navigate this regulatory landscape and ensure compliance with future regulations.
- **Scalability and Network Congestion**: The scalability of blockchain technology can be a hurdle for mass adoption. Future research should explore how these platforms can handle large numbers of users and transactions while avoiding network congestion issues.
- **Sustainability and Long-Term Project Support**: The study focuses on the fundraising stage. However, exploring how these platforms can foster long-term project sustainability and community engagement beyond the initial funding stage would be valuable.
- **Security Audits and Risk Management**: While smart contracts offer

security advantages, thorough security audits and risk management strategies are crucial. Research on potential vulnerabilities specific to these platforms and best practices for mitigation would be beneficial.

By addressing these gaps, future research can contribute to a more comprehensive understanding of the feasibility and potential challenges of blockchain-based crowdfunding platforms. This will pave the way for their wider adoption and a more secure, efficient, and community-driven crowdfunding landscape.

2.2.8 "Crowdfunding platforms: a systematic literature review and a bibliometric analysis"

While Mora-Cruz and Palos-Sanchez's (2023) study offers a valuable analysis of crowdfunding platforms (CFPs) in Latin America, some key gaps in the literature remain:

- **In-depth Case Studies**: The research highlights the increasing popularity of CFPs, but it lacks in-depth case studies that explore the practical implementation and impact of these platforms across different Latin American countries. Examining successful campaigns and the challenges faced would provide valuable insights for future development.
- **Impact on Financial Inclusion**: The study touches on the role of CFPs as an alternative financing option, but a deeper analysis of their impact on financial inclusion within the region is needed. Research could explore how CFPs are reaching underserved communities and entrepreneurs and their potential to contribute to broader financial development.
- **Long-Term Project Success Rates**: The focus is on the fundraising stage. Further research could explore the long-term success rates of projects funded through CFPs in Latin America. Understanding factors that contribute to project sustainability would be valuable for both creators and investors.
- **Platform Comparison and Best Practices**: A comparative analysis of different CFP platforms operating in Latin America would be beneficial. This could identify best practices in terms of user experience, regulatory

compliance, and risk management strategies.

- **Integration with Traditional Financial Systems**: The potential for CFPs to integrate with traditional financial systems in Latin America for a more comprehensive financing ecosystem warrants further exploration.

By addressing these gaps, future research can contribute to a more nuanced understanding of the role of CFPs in fostering financial innovation and economic growth in Latin America.

2.2.9 "Ethereum Transaction Using MetaMask Wallet"

While this research offers an innovative approach to educating users about Ethereum and smart contracts through a user-friendly interface, some key gaps in the literature remain:

- **Scalability and Performance Evaluation**: The research prioritizes user engagement, but a more in-depth evaluation of the system's scalability and performance under heavy user loads is needed. "Can this approach handle a large number of concurrent transactions efficiently?"
- **Long-Term User Engagement Strategies**: The use of memes for user engagement is a creative approach, but further research is needed to explore long-term strategies for keeping users interested and actively participating in the Ethereum ecosystem.
- **Comparative Analysis with Existing Educational Tools**: A comparison with existing educational tools for blockchain technology would be valuable. This could highlight the unique strengths and weaknesses of this gamified approach and identify areas for potential improvement.
- **Formal Learning Outcomes Assessment**: While fostering user engagement is important, evaluating the effectiveness of this approach in terms of user knowledge acquisition and comprehension of complex blockchain concepts would be beneficial.

By addressing these gaps, future research can contribute to a more comprehensive understanding of the effectiveness of gamified learning methods in promoting blockchain education and user adoption.

CHAPTER 3: SYSTEM DEVELOPMENT

To us, it was quite an intriguing undertaking that brought about the evolution of the crowdfunding system. To put it in simple words, it will imply designing an adaptable system that will be customised in future for specific requirements.

3.1 REQUIREMENTS AND ANALYSIS

3.1.1 FUNCTIONAL REQUIREMENTS

- User Registration: Detailed specifications for user registration, login, and profile creation.
- Campaign Creation: Functionalities enabling campaign creation, description, goals, and deadlines.
- Donation Mechanism: Specifications for donation processes, including payment methods and tracking contributions.
- Smart Contract Functionality: Requirements for smart contracts managing fund allocation, disbursement, and execution of crowdfunding terms.

3.1.2 NON-FUNCTIONAL REQUIREMENTS

- Security: Specification of security measures, encryption standards, and data protection protocols.
- Performance: Criteria for scalability, handling high transaction volumes, and maintaining platform speed.
- Compliance: Requirements ensuring adherence to regulatory frameworks and legal standards.
- User Experience: Specifications for intuitive UI/UX design, seamless navigation, and user engagement.

3.1.3 MANDATORY REQUIREMENTS

3.1.3.1 BLOCKCHAIN INTEGRATION:

- Ethereum-based Smart Contracts: Use smart contracts to securely handle the establishment of campaigns, donations, and fund distribution on the Ethereum network.
- Web3.js Integration: Web3.js is used to interface with Ethereum nodes for blockchain activity within the backend of the platform.
- The Ethereum blockchain's smooth integration is essential to the project's success. For the purpose of automating fund disbursement and maintaining stakeholder trust and transparency, comprehensive specifications for smart contract implementation are essential.

3.1.3.2 FRONTEND TECHNOLOGY:

- Framework: Choose React.js, Angular, or Vue.js for frontend development to create dynamic and responsive user interfaces.
- Web3.js or Ethers.js Integration: Incorporate Web3.js or Ethers.js libraries to interact with the Ethereum blockchain from the frontend interface.
- UI/UX Design: Focus on user-friendly design, intuitive navigation, and mobile responsiveness for an engaging user experience.

3.1.3.3 BACKEND TECHNOLOGY:

- Server-Side Framework: Select Node.js, Python Django, or Ruby on Rails for backend development, facilitating robust business logic and interaction with smart contracts.
- Database: Implement a database system like MySQL or MongoDB to store user profiles, campaign details, and transaction records securely off-chain.

3.1.3.4 PLATFORM FUNCTIONALITY:

- The project requires a precise specification of the platform's features that appeal to

campaign creators and supporters. Strong user account creation tools, efficient project submission procedures, a variety of contribution options, and open fund allocation procedures are all included in this.

- Ensuring a smooth user experience for project discovery and involvement requires the design of an intuitive interface.

3.1.3.5 SECURITY PROTOCOLS:

- It is critical to find and apply strong security solutions to prevent potential vulnerabilities in smart contracts. In order to protect against potential vulnerabilities or hacking attempts and guarantee the integrity of payments and data, the project requires extensive security mechanisms.
- Smart Contract Auditing: Utilise security tools such as Solidity or MythX to conduct comprehensive audits of smart contracts in order to find vulnerabilities.
- Encryption and Hashing: To protect sensitive information, private keys, and user data, employ hashing algorithms and encryption.
- Access Control and Authentication: To protect platform integrity, deploy secure user authentication methods and role-based access control.

3.1.3.6 REGULATORY COMPLIANCE:

- Respecting the changing legal structures pertaining to cryptocurrencies and crowdsourcing websites is essential.
- It is essential to perform a comprehensive examination of legal responsibilities and compliance criteria in order to reduce regulatory risks and guarantee the legality and validity of the platform.

3.1.3.7 SCALABILITY SOLUTIONS:

- Scalability solutions need to be investigated in order to handle possible high transaction volumes.

- For a smooth user experience, ways to manage growing demand without sacrificing platform performance must be evaluated.

3.1.4 ANALYSIS APPROACH

Identifying user personas, assessing the competitive landscape, and conducting market research are all necessary steps in a comprehensive analysis. This includes doing research or surveys to understand consumer preferences and needs on the current crowdfunding platforms.

3.1.4.1 TECHNICAL ANALYSIS

- Blockchain Selection: Analysis and justification for selecting Ethereum as the foundational blockchain.
- Smart Contract Development: thorough examination of best practices, Solidity coding standards, and smart contract design.
- Integration Protocols: Prerequisites for connecting the blockchain platform with external APIs or systems.
- Technical Feasibility: Examine the technical viability of combining smart contracts, blockchain technology, and user interfaces while taking resource limitations and technology stack compatibility into account.
- Stakeholder Analysis: Determine and include important parties, such as platform administrators, backers, regulators, and campaign producers.

3.1.4.2 USE CASE ANALYSIS

- Case Studies: examining current blockchain-based crowdfunding platforms as use cases to get insight about their features, shortcomings, and achievements.
- User Feedback: Obtaining information from prospective customers in order to comprehend their needs, interests, and problems.
- Use Case Modelling: Create thorough use cases that cover the development of campaigns, handling of donations, interacting with users.

3.2 PROJECT DESIGN AND ARCHITECTURE

3.2.1 PROJECT CREATION:

Using the Ethereum blockchain to create a smart contract, establish a crowdfunding project. The terms and conditions of the crowdfunding campaign, including the funding target, the deadline, and the rewards for backers, are outlined in this smart contract.

3.2.2 DEPLOYMENT:

After that, a supplier such as Infura is used to deploy the smart contract to the Ethereum blockchain. By serving as a portal to the Ethereum network, Infura enables the deployment and interaction of smart contracts.

3.2.3 FRONTEND DEVELOPMENT:

A web browser-accessible frontend interface was created for the crowdfunding project. Utilising tools like HTML, CSS, and JavaScript, the frontend communicates with the smart contract via a supplier like Metamask.

3.2.4 IPFS INTEGRATION:

To store and retrieve large files, including documents, videos, and images, IPFS will be integrated into the crowdfunding project. Compared to conventional centralized systems, IPFS's decentralized file storage system enables quicker and more affordable file transfers.

3.2.5 USER INTERACTION:

Using the frontend interface, backers can then communicate with the crowdfunding project. They have access to project details, pledge funds, and get incentives. Pledgers use Metamask to sign a transaction, which is subsequently processed by the Ethereum blockchain's smart contract.

3.2.6 VERIFICATION OF THE TRANSACTION:

The Ethereum network then processes and verifies the transaction, updating the smart contract's state in the process. This guarantees the security, transparency, and immutability of the crowdsourcing project.

3.2.7 TRANSFER OF FUNDS:

The money is moved from the smart contract to the project creator's account when the funding target is met or the deadline is past. The funds are automatically returned to the backers if the funding target is not met.

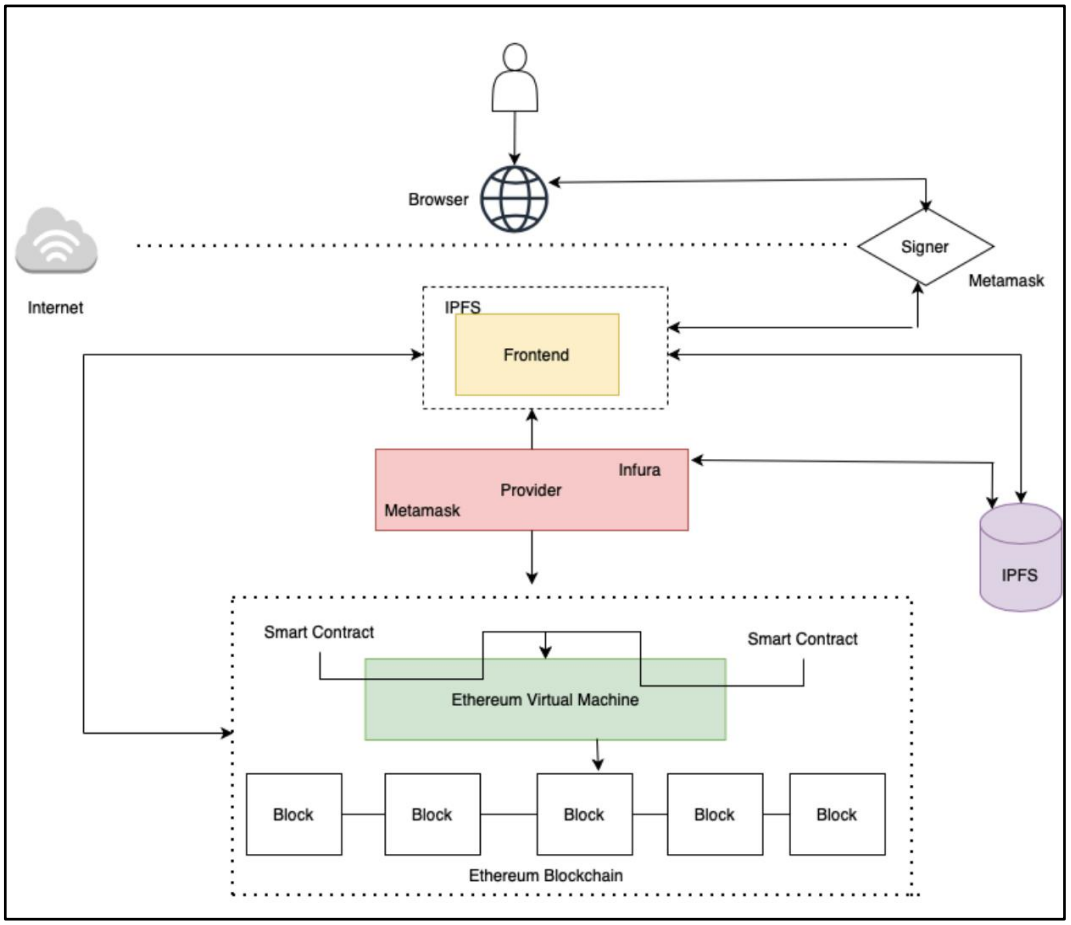


Figure 3.2.1: Integration of Blockchain in Crowdfunding

This flowchart illustrates the crowdfunding campaign through a blockchain. The first step undertaken is crafting a smart contract with the terms and conditions

describing the crowdfunding campaign using Ethereum as a platform blockchain. Then follows a process of providers like Infura, who launches the smart contract into the Ethereum network, and finally, a frontend interface where the users can interact with the project. The large files can

be stored and retrieved by the IPFS integration, the transactions can be signed, and communication with the smart contract can be facilitated by the Metamask. The user goes to Metamask to sign the transaction and submit it to the network when they make the pledge that is transferred to the Ethereum chain. In case of the goal of reaching a target or the deadline, the money goes from the smart contract to the project creator's account. IPFS and the Ethereum blockchain are the decentralized technologies that make the project accountable, protected, and unchangeable, while the frontend interface is the user-friendly and convenient tool for backers to communicate with the project. In conclusion, the flowchart depicts the application processes that can be used to develop a crowdsourcing platform that is secure and transparent.

UML 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.

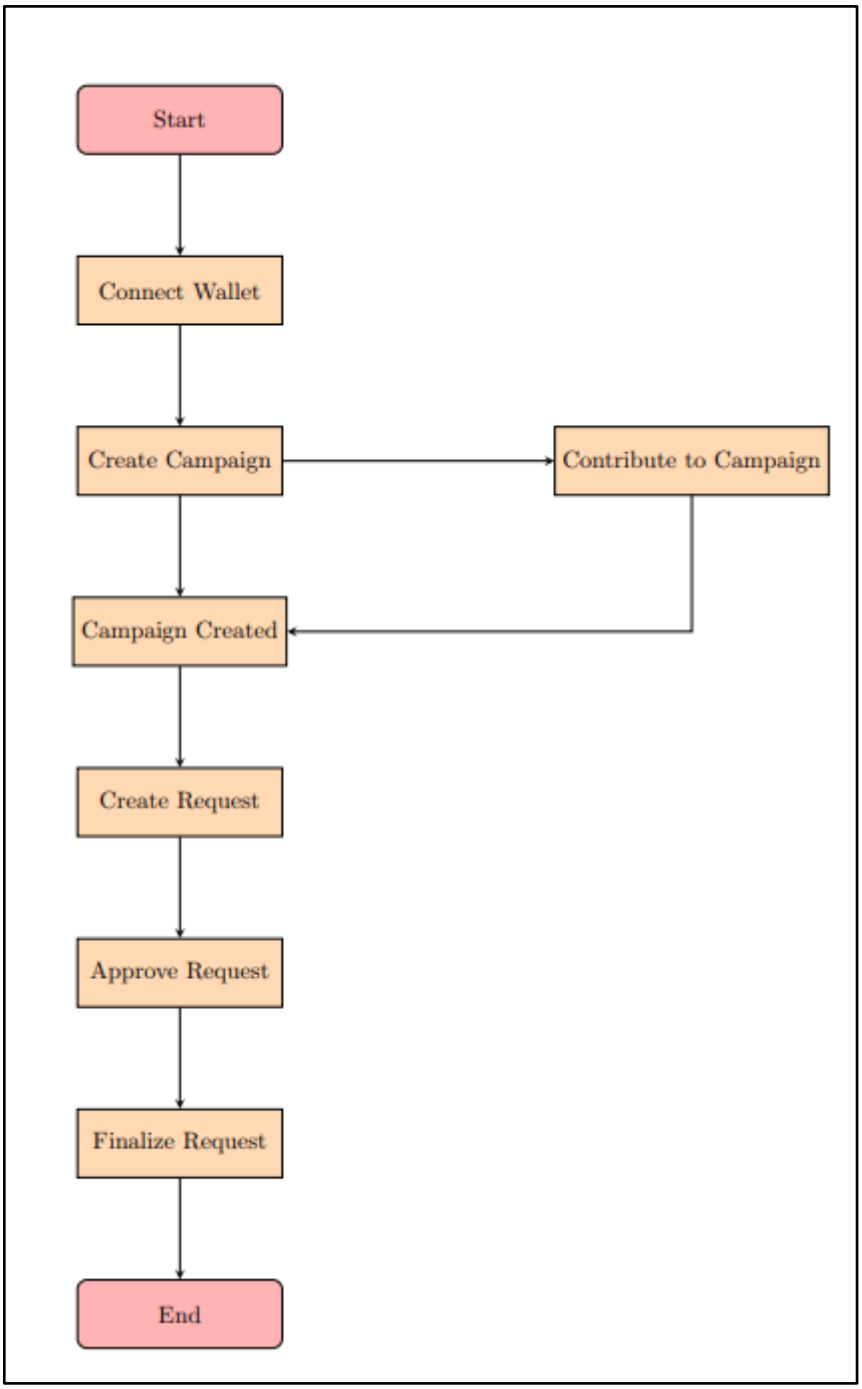


Figure 3.2.2: UML Diagram

Components:

1. Web applications can be developed and integrated to blockchain using Web3.js.Ethereum blockchain. Users can post, view, and also make a donation of any project directly via the blockchain.

2. Crowdfunding is managed using smart contracts in Ethereum which ensures transparency and security. It involves project development, financing, token distribution and many more.

3. The platform is connected with the Ethereum blockchain. Use of metamask, enabling users to use their Ethereum wallets for interaction with the platform.

4. The identity uses the Mac network and is for free in order to achieve higher business scale and efficiency.

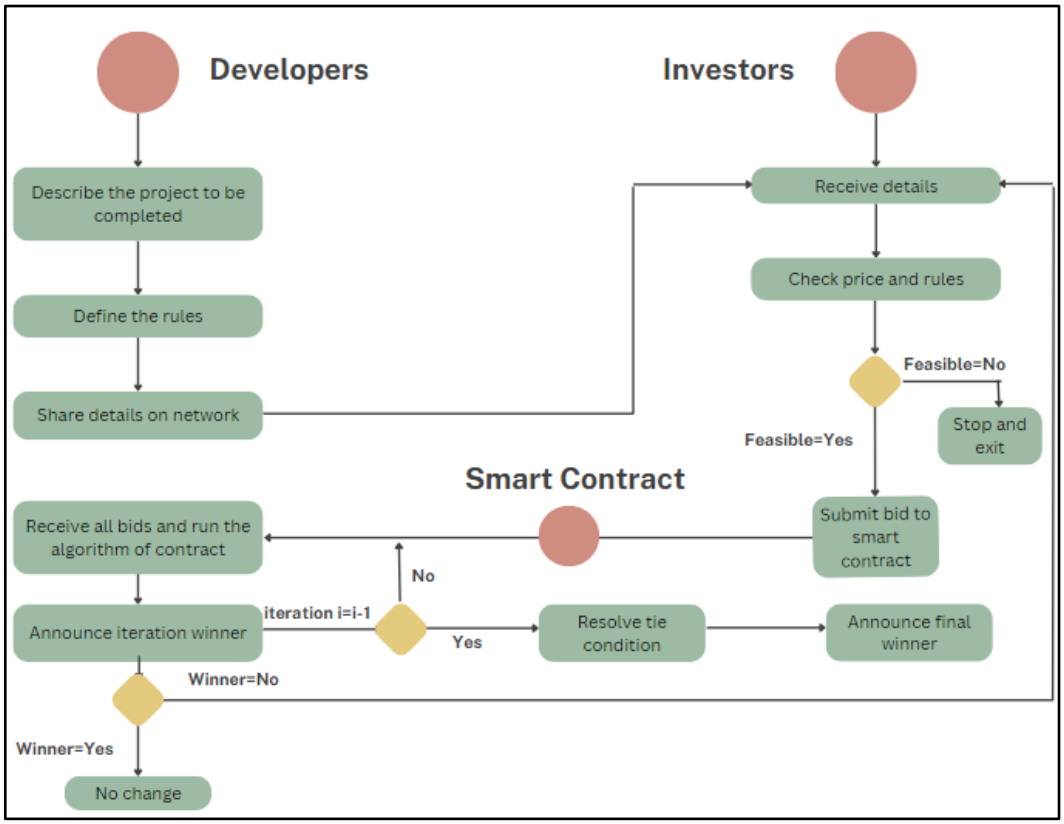


Figure 3.2.3: Working of Smart Contract

3.3 DATA PREPARATION

3.3.1 USER DATA COLLECTION:

- Organising user data to include transaction history, authentication information, and personal data.
- Gather public keys or authentication information for blockchain transactions.
- Gather information about user interactions, such as feedback, engagement metrics, and contribution history.
- Putting encryption and anonymization methods into practice to protect private user information and maintain blockchain transparency.

3.3.2 PROJECT INFORMATION COLLECTION:

- Compile project information, such as deadlines, financial targets, and descriptions.
- Gather information related to the project, such as its author, location, and category.
- Acquire the deliverables or milestones related to each project.

3.3.3 TRANSACTION RECORDS:

- Keep track of transactional information such as transaction IDs, timestamps, and donations.
- Record the payment methods, amounts contributed, and cryptocurrencies used.
- For transparent fund allocation, associate transactions with certain customers or projects.

3.3.4 TESTING AND QUALITY ASSURANCE DATA

- Test Data Creation: Creating test datasets to assess data processing procedures, smart contract behaviour, and platform functionality.

- Quality Assurance Logs: Creating logs for quality assurance (QA) to monitor and examine system behaviours during testing.

3.4 IMPLEMENTATION

3.4.1 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 to connect the wallet, which can be used to authorise transactions for cryptocurrency.

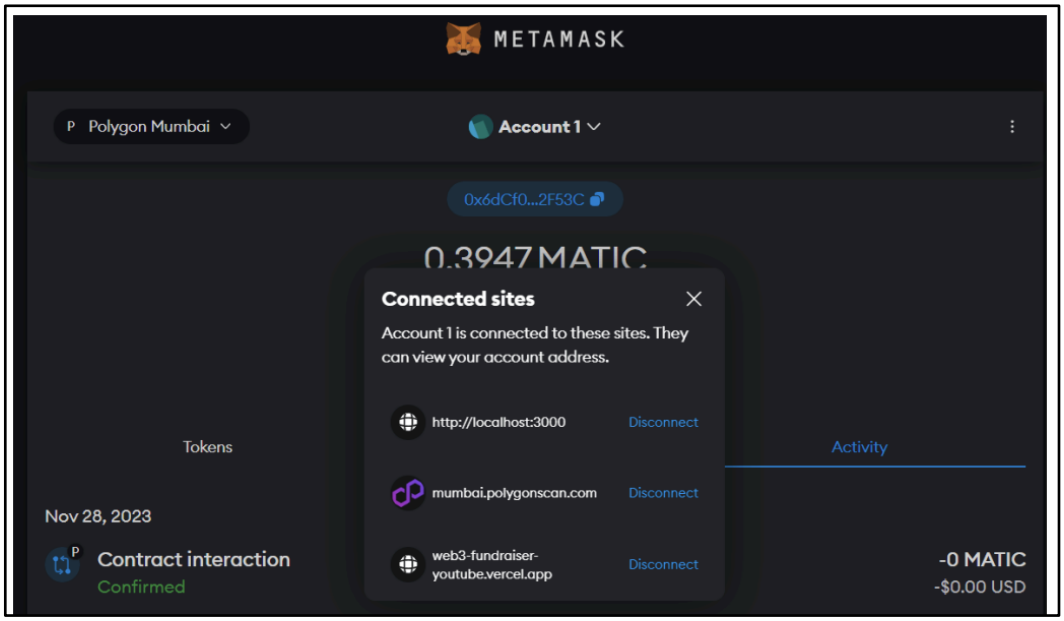


Figure 3.4.1.1: Wallet Connected

3.4.2 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 process is as shown in the below flow:

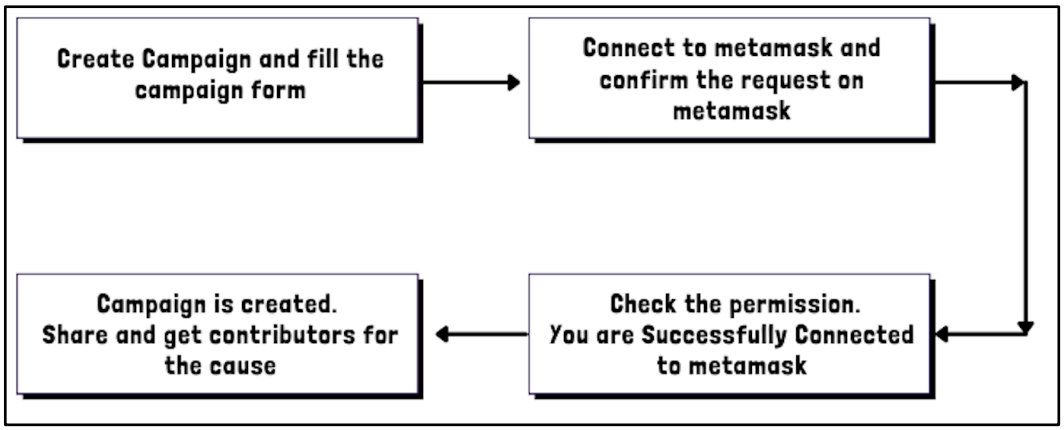


Figure 3.4.2.1: User journey to create a campaign

Output:

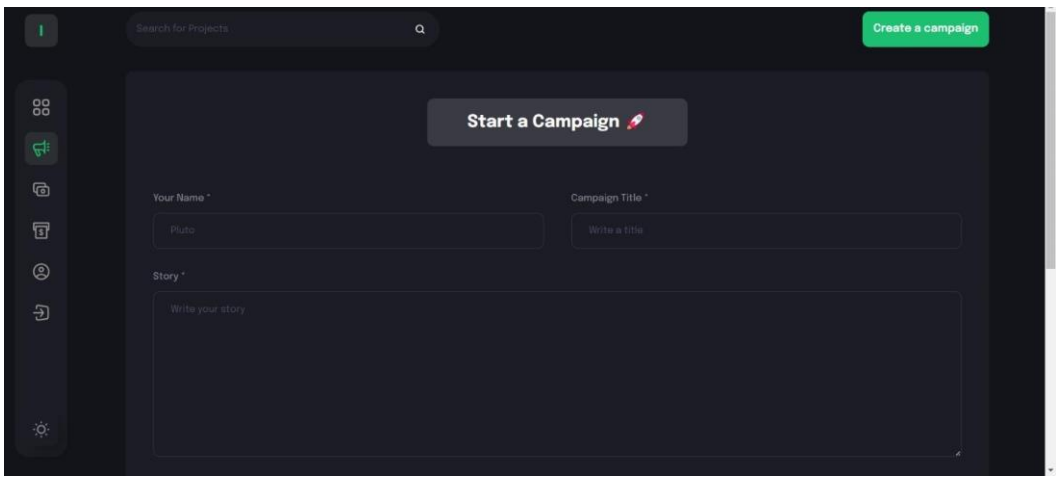


Figure 3.4.2.2: Create a Campaign page

3.4.3 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).

The process is as shown in the below flow:

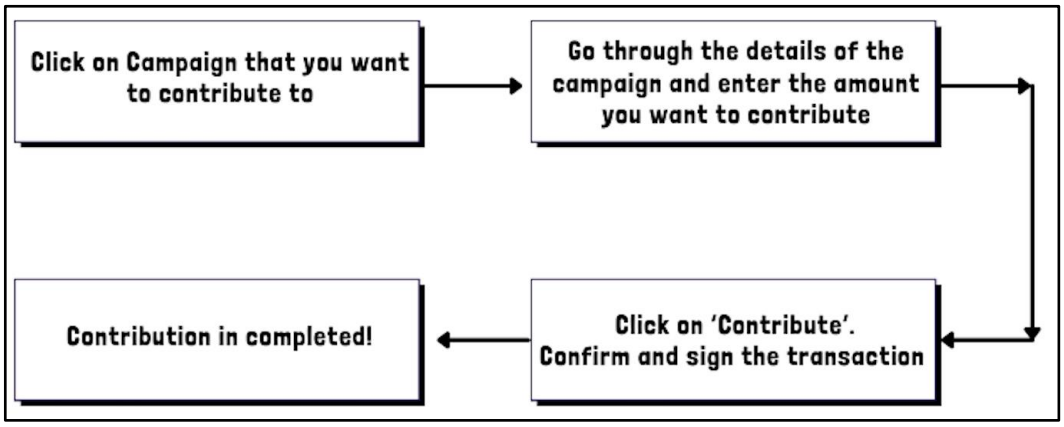


Figure 3.4.3.1: User journey to contribute to a campaign

Output:

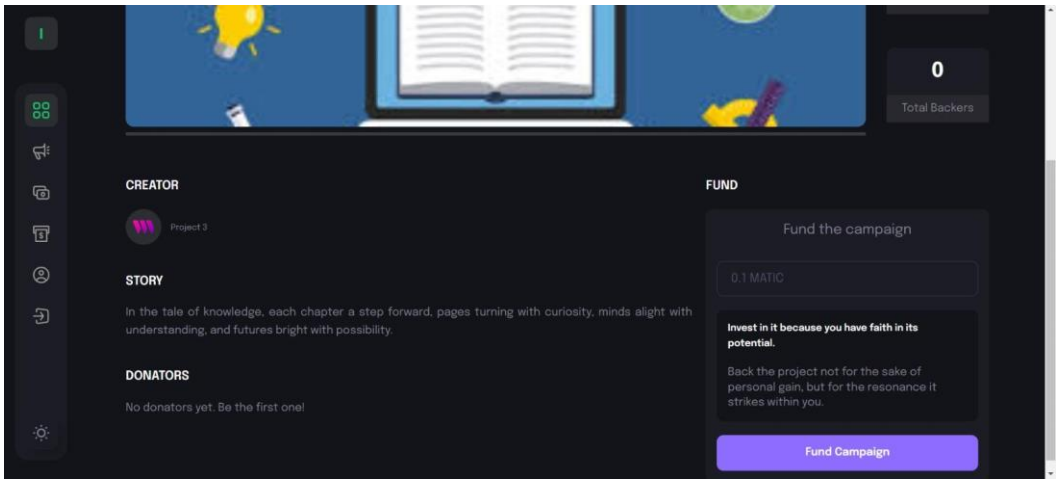


Figure 3.4.3.2: Contribute to a Campaign page

3.4.4 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 using 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.

A number of funds can be withdrawn without the approval of at least 50% of the approvers.

The process is simple:

- Click on the 'Create Withdraw Request' button on the campaign management page.
- 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.
- Authorise the creation of the request with Metamask.
- A page will show up that 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.
- Once a request has gained majority approval, the funds can be withdrawn.
- 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 in the transfer of funds.

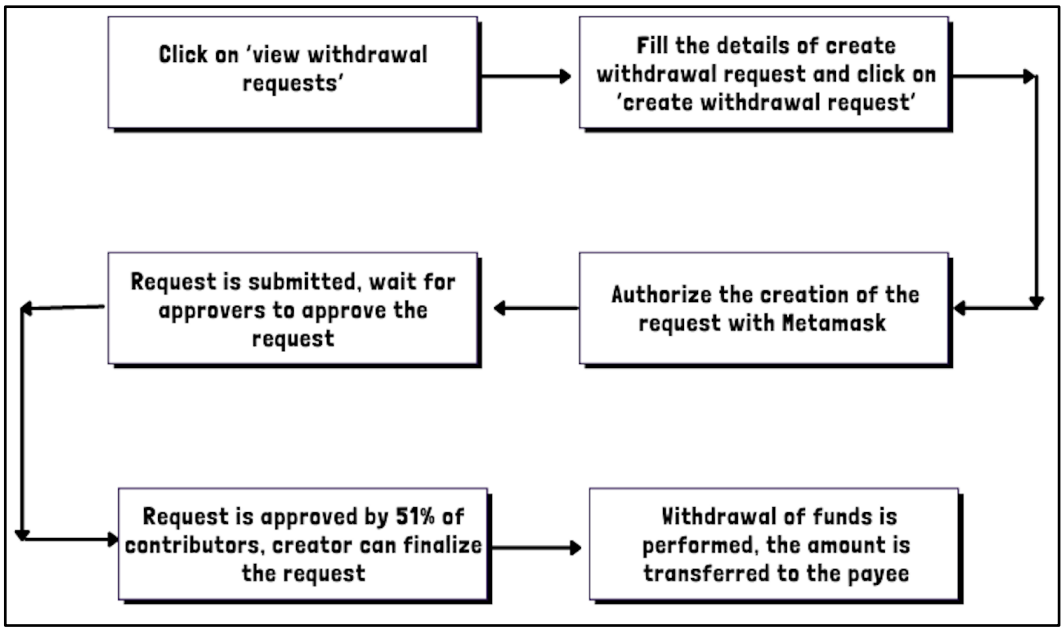


Figure 3.4.4.1: User journey to view and make withdrawal requests

3.5 KEY CHALLENGES

3.5.1 REGULATORY COMPLIANCE COMPLEXITY:

- Challenge: Navigating the ever-changing and complicated regulatory landscape that surrounds crowdfunding sites and cryptocurrencies.
- Addressing Strategy: Work together with legal professionals to understand and respect regulatory requirements in various jurisdictions. To guarantee continued adherence, put strict compliance mechanisms in place, carry out frequent audits, and respond quickly to changes in regulations.

3.5.2 SCALABILITY AND TRANSACTION COST:

- Challenge: Due to Ethereum's scalability issues, huge transaction volumes might negatively affect platform performance, resulting in delays and higher expenses.
- Addressing Strategy: Investigate scalability options to reduce congestion on the main Ethereum network, such as layer-2 solutions (such as sidechains and state channels). Employ fee optimization strategies and

investigate more scalable alternative blockchain networks while preserving Ethereum compatibility.

3.5.3 USER ADOPTION AND EDUCATION:

- Challenge: Instructing users on the features of the site, blockchain technology, and cryptocurrency.
- Addressing Strategy: Provide logical instructions and user-friendly interfaces. Initiate extensive instructional initiatives, webinars, and guides to assist with user onboarding. Encourage a helpful community by providing forums and Q&A sessions to address questions and issues raised by users.

3.5.4 SMART CONTRACT SECURITY RISKS:

- Challenge: Weaknesses in smart contracts that could be used for hacking or other potential exploitation.
- Addressing Strategy: To find and fix vulnerabilities, experienced security professionals should conduct thorough smart contract audits. Adopt secure coding standards, conduct code reviews, and use testing suites as recommended procedures for developing smart contracts.

3.5.5 TECHNICAL EXPERTISE AND RESOURCES:

- Challenge: Scarce technical resources and experienced blockchain developers.
- Addressing Strategy: Invest in programs for upskilling, training, and talent acquisition. Partner with seasoned blockchain development companies or open-source groups to gain access to specialised knowledge and resources.

3.5.6 SECURITY AND VULNERABILITY:

- Challenge: Smart contracts are vulnerable to flaws and hackers.
- Resolution: Use cutting-edge encryption techniques, conduct thorough security audits, update contracts frequently, adhere to best practices, and strengthen security measures.

3.5.7 CONTINUOUS IMPROVEMENT:

- Challenge: Adjusting to the changing demands of users and technologies.
- Resolution: Apply agile development approaches, ask users for input, and give regular updates and feature improvements top priority.

CHAPTER 4: TESTING

4.1 TESTING STRATEGY

A strong testing approach is essential to guaranteeing a blockchain-based crowdfunding platform's dependability, security, and functionality.

4.1.1 SMART CONTRACT TESTING

- Tools:

  Truffle Suite: Utilize Truffle for smart contract development, testing, and deployment.

  Hardhat: It is another popular tool for smart contract development and testing with built-in testing environments.

- Testing Approach:

  Unit Testing: Write unit tests using frameworks such as Mocha or Chai to test smart contract functionalities and logic.

  Scenario Testing: It is used to conduct scenario-based testing to validate various contract states and edge cases.

4.1.2 BLOCKCHAIN INTEGRATION TESTING

- Tools:

  Ganache: Employ Ganache for local blockchain development and testing environments.

  Ethereum Testnets: Test on Ethereum test networks to simulate real-world conditions.

- Testing Approach:

  Integration Testing: To guarantee smooth communication, validate interactions between the blockchain, frontend, and backend components.

  Performance Testing: To assess the scalability and performance of the platform, simulate large transaction volumes.

4.1.3 SECURITY AUDITS

- Tools:

  MythX: Use MythX for smart contract security analysis and vulnerability detection.

  Solvent: Use Solvent to detect possible security vulnerabilities and do solidity linting.

- Testing Approach:

  Automated Security Audits: To find security flaws and hazards in smart contracts, run automated security analysis tools.

4.1.4 DOCUMENTATION AND REPORTING

- Approach:

  For traceability and future reference, keep thorough test plans, test cases, and test result documentation.

  Provide thorough test reports that detail the coverage of the test, any problems that are discovered, and their fixes.

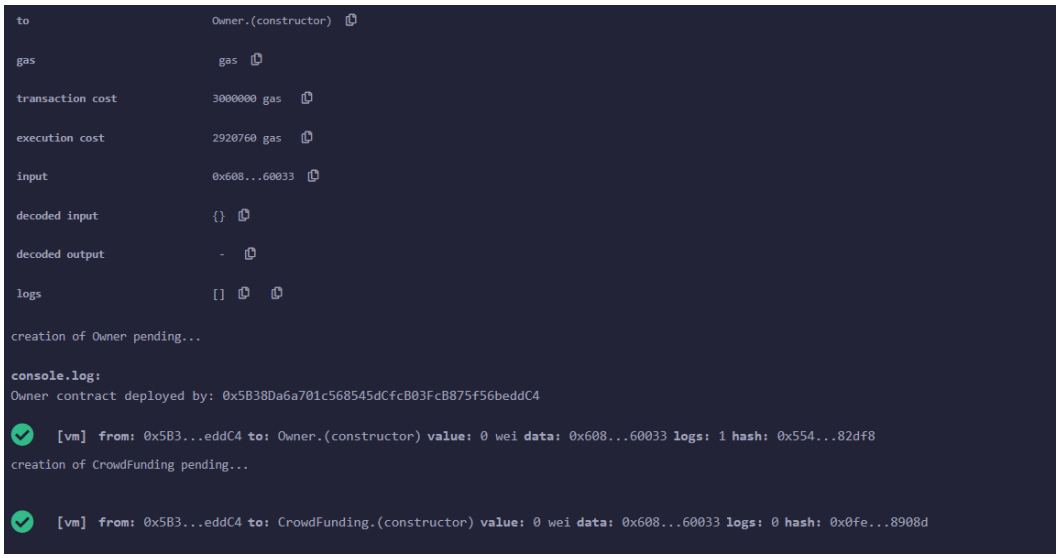


Figure 4.1.1: Remix IDE prompt

4.2 TEST CASES AND OUTCOMES

4.2.1 TEST CASE: VALIDATE CAMPAIGN CREATION CONSTRAINTS

- Scenario: Try to start a campaign with a past-due deadline.
- Expected Outcome: A reply with the subject "The deadline should be a date in the future" is anticipated.

4.2.2 TEST CASE: DONATE TO CAMPAIGN

- Scenario: Send Ether to a campaign as a donation.
- Expected Outcome: The successful donation transaction results in the transfer of Ether to the campaign owner and an increase in the total amount raised for the campaign.

4.2.3 TEST CASE: RETRIEVE CAMPAIGN DETAILS

- Scenario: Use getCampaigns() or getDonators() to obtain specific campaign details.
- Expected Outcome: Information about the campaign, including the title, description, goal amount, deadline, amount raised, donors, and donations, was successfully retrieved.

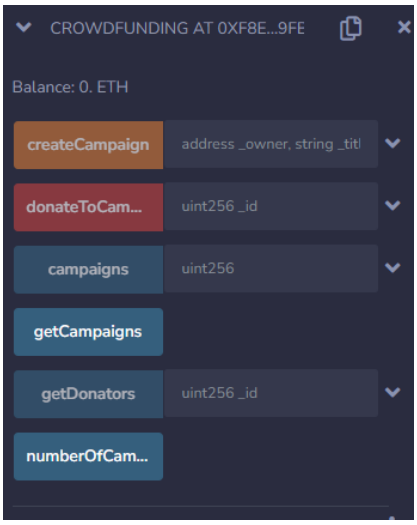


Figure 4.2.1: Remix IDE Deploy and run portal

4.2.4 TEST CASE: MULTIPLE DONATIONS TO THE SAME CAMPAIGN

- Scenario: Different users contribute to the same campaign in different quantities.
- Expected Outcome: Precise documentation of every donation and its corresponding donor address in the arrays for donors and donations for the campaign.
-

4.2.5 TEST CASE: DONATING ZERO ETHER

- Scenario: Make an effort to contribute 0 Ether to a campaign.
- Expected Outcome: A revert informing that the donation amount needs to be more than zero is the anticipated outcome.

4.2.6 TEST CASE: CAMPAIGN COUNT

- Scenario: After generating numerous campaigns, get the total number of campaigns.
- Expected Outcome: The number of campaigns generated and the overall number of campaigns match.

4.2.7 TEST CASE: CAMPAIGN DONATIONS

- Scenario: Verify the amount donated in relation to the overall money raised for the campaign.
- Expected Outcome: The total amount raised for the campaign is equal to the sum of the contributions made by each individual donor.

4.2.8 TEST CASE: RETRIEVE CAMPAIGNS WHEN NONE EXIST

- Scenario: If no campaigns have been established, retrieve campaigns.
- Expected Outcome: There are no campaigns available, as indicated by the function's empty array result.

4.2.9 TEST CASE: OUT-OF-BOUNDS CAMPAIGN ACCESS

- Scenario: Get access to an invalid campaign ID.
- Expected Outcome: A revert or exception is anticipated as a result of trying to access a campaign that doesn't exist.

4.2.10 TEST CASE: CAMPAIGN IMAGE RETRIEVAL

- Scenario: Gain access to the campaign's picture.
- Expected Outcome: Retrieval of the campaign image successfully, in accordance with the terms of the contract.

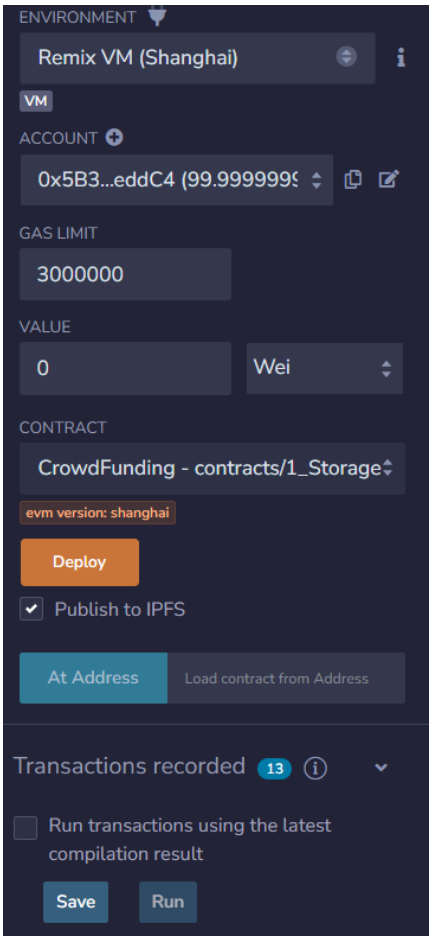


Figure 4.2.2: Remix IDE Environment for transactions

CHAPTER 5: RESULTS AND EVALUATION

5.1 RESULTS

The following snapshot represents the code for the Homepage of our campaign . It represents the User Interface for our project.

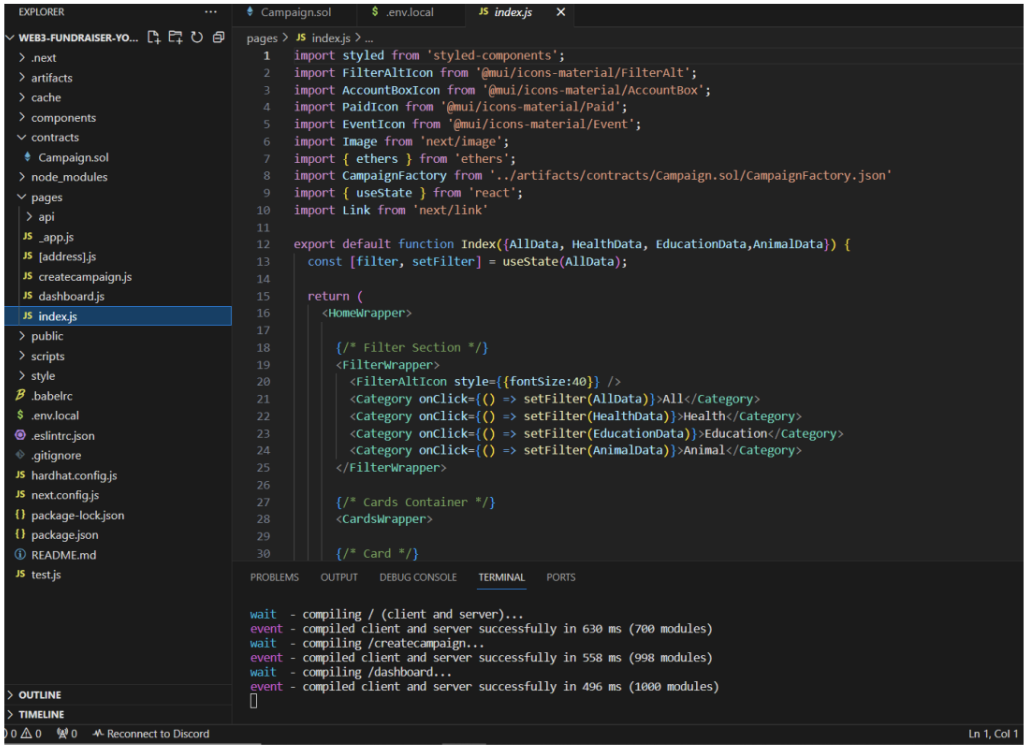


Fig 5.1.1 Home page code snippet

The figure below depicts the network of our wallet through the Metamask app. The process of choosing the network settings for the MetaMask wallet is crucial for connecting the wallet and for running a fundraising campaign on the Polygon Mumbai network. We start the process by installing the polygon Mumbai RPC URL and chain ID using MetaMask. The chain ID is a network-specific identifier, and the RPC URL is the endpoint that MetaMask uses to get connected to the Polygon Mumbai network. Now that these settings are over, you can then utilise

Metamask to switch to the Polygon Mumbai network and view all your MATIC tokens, which represents the fee you pay to cover the transaction fees made on the network.

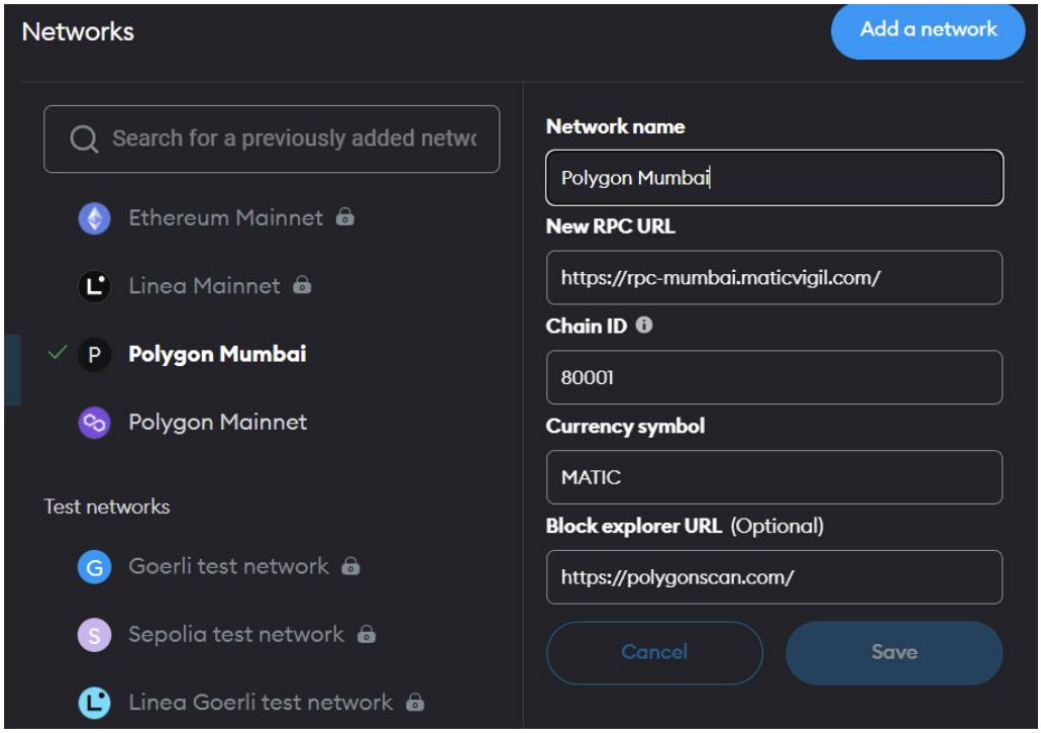


Fig 5.1.2 Polygon Test Net Network

The following snapshot shows our Metamask wallet which has 0.3947 Matic tokens which are test tokens provided by Polygon Mumbai network. Our metamask wallet is connected to the following sites which are local host, polygon scan network.

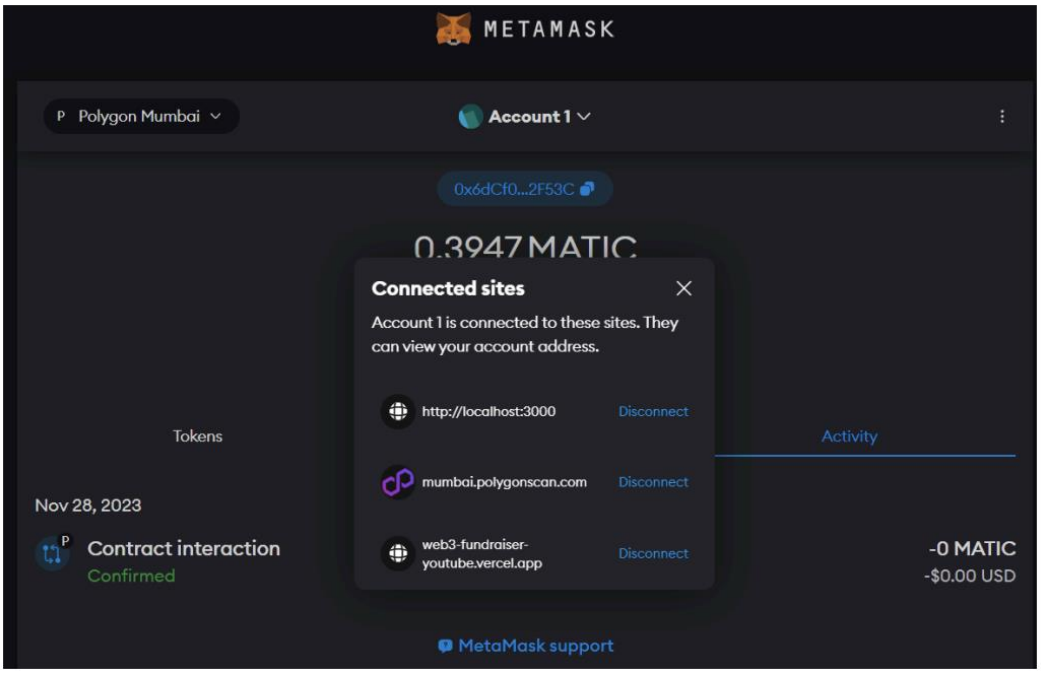


Fig 5.1.3 Connected Sites

The above snapshot is an illustration of the home page on our crowdfunding platform. People will be able to make their own campaigns using Create a campaign button, which will display after people connect their metamask with it to the local host. We have to include the following factors below, so the campaign would go like this: creator's name, title of the project, story and URL for the image.

The following snapshot shows all the campaigns we have created through our platform. In order to create a campaign we need the following details like Campaign name, Campaign Story, Campaign completion date , the amount to be raised and a photo URL. After providing all this information we are ready to go to create a Campaign.

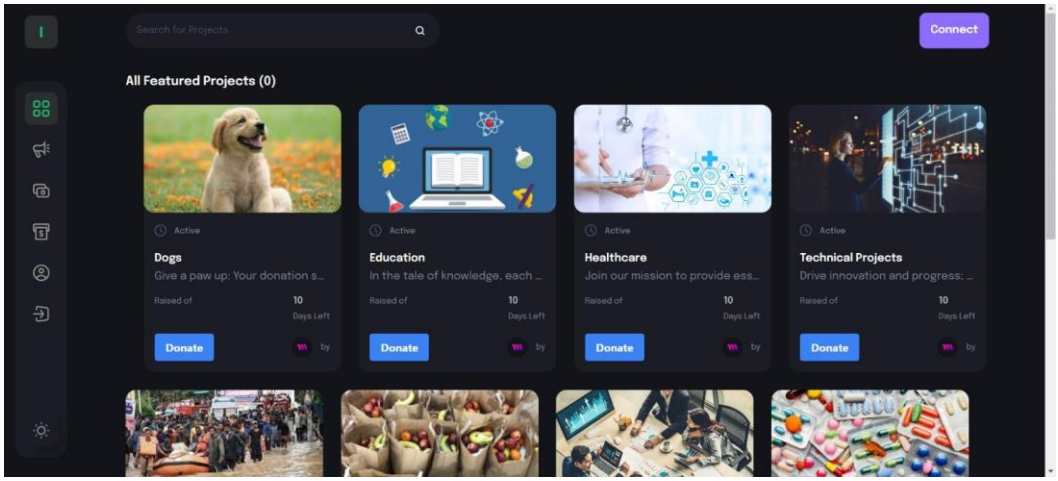


Fig 5.1.4 Dashboard for the campaigns created

The following snapshot shows one of our Campaigns based on “Education”. One can contribute to the Campaign through the button fund campaign. It shows a story which the Campaign creator can add to create a special impact on the campaign which might attract the funders .

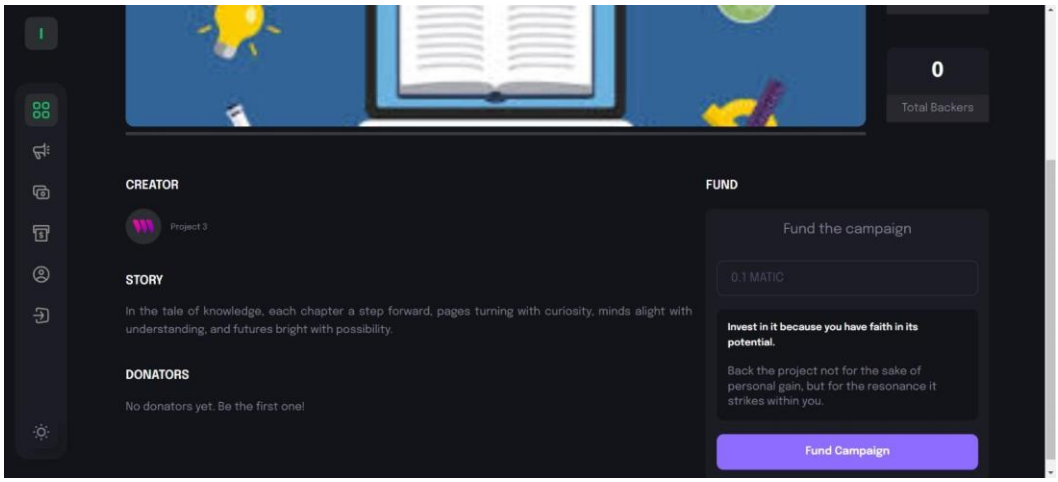


Fig 5.1.6 Campaign Dashboard

5.2 COMPARISON WITH EXISTING SOLUTIONS

5.2.1 FUNCTIONALITY

The platform and its features focus on using smart contracts to create, manage and share campaigns. By integrating with Polygon's network, the platform ensures event scalability and cost efficiency.

Using Metamask and Web3.js enables seamless interaction with the blockchain, allowing users to easily create, view and participate in crowdfunding campaigns. This service allows individuals to purchase real estate, independently engage in trading businesses, and release themselves from conventional initial capital and geographical obstacles.

5.2.2 SECURITY

This gives people an opportunity to invest in real estate, to conduct their own, independent business, and overcome the traditional capital and geographical barriers to commerce. Security which brings a high level of confidence and safety within the public and high levels of transparency that are provided by blockchain technology integrated with smart contracts makes this platform highly reliable, trusted, fair, cheap and simple.

It is because of their unique character that they can reach a compromise when resolving mediation difficulties on the same business goal. However, users will be required to undergo continuous security checks and upgrades including improved authentication technology that will make it difficult for hackers or intruders to compromise such a system.

5.2.3 USER INTERFACE

A user-friendly platform that enables the creation, viewing and sharing of a social media project in an easy manner. This makes its use more effective and it is also a dual platform for compatibility with two seamless MetaMask wallets and is highly mobile.

This platform also offers enhanced user authentications, advanced security checks and upgrades thus making it resistant to any intrusion attempts.

5.2.4 MAINTENANCE AND UPGRADABILITY

The platform and its maintenance and upgradeability are essential to its continued success and relevance. The platform integrates with the Polygon network to enable large-scale and efficient operations and uses blockchain technology and smart contracts to ensure trust and integrity.

The platform and potential for market growth and continuous innovation highlight its potential for further improvement and development. Regular updates and improvements to the platform and security protocols, scalability, user experience, community engagement and management, interoperability and continuous innovation ensure its continued success and relevance.

In short, my project and blockchain-based crowdfunding platform using Ethereum and Web3.js and the Polygon network and Metamask integration have positively impacted the crowdfunding industry by providing a safe, open and decentralised way to support initiatives. and concepts. The platform and its functionality, security, user experience and maintenance and upgradeability were positively discussed, giving individuals the opportunity to invest in real estate, democratising access to investment opportunities and increasing user confidence.

The platform and opportunities for market growth and continuous innovation highlight its potential for further improvement and development, and are compatible with Internet crowdfunding and blockchain technology.

CHAPTER 6: CONCLUSION AND FUTURE SCOPE

6.1 CONCLUSION

In conclusion, a decentralised crowdfunding app built on blockchain technology has the potential to revolutionise the crowdfunding industry by eliminating intermediaries, increasing transparency, and reducing transaction costs. By leveraging smart contracts, blockchain-based crowdfunding platforms can automate the crowdfunding process and provide predefined rules and conditions for transactions, thereby reducing the risk of disputes and errors.

The aim to have a transparent, anti-fraudulent, decentralised 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.

While there are still challenges to be addressed, such as scalability, usability, and regulatory issues, the benefits of using blockchain technology in crowdfunding are significant. Decentralised crowdfunding can provide access to funding for individuals and businesses who may not have been able to access traditional funding sources, democratising access to capital. It can also provide greater accountability, transparency, and security for all parties involved in the crowdfunding process.

Overall, a decentralised crowdfunding app built on blockchain technology has the potential to transform the crowdfunding landscape, enabling more individuals and businesses to access funding for their projects or ventures. It is an exciting development that has the potential to create a more inclusive and accessible economy.

6.2 FUTURE SCOPE

- As we are using blockchain for the entire process, all the funds are collected
- using smart contracts, and they can be used further by the fundraiser itself for personal use by misguiding the contributors. So to gain control over withdrawals of collected funds, we will be incorporating the withdrawal request feature.
- This will allow contributors to take control over the transactions the fundraiser would make by gaining an accept or reject vote from a particular number of respective contributors and then only making the transaction successful.
- Provide more transparency by displaying all the withdrawal transactions on the platform.
- Integration with other cryptocurrencies and fiat currencies.
- Creating a shareable link for funds

REFERENCES

[1] Partha Pratim Ray (2023) Web3: A Comprehensive Review on Background, Technologies, Applications, Zero-Trust Architectures, Challenges and Future Directions, https://www.sciencedirect.com/science/article/pii/S2667345223000305

[2] Ahmed G. Gad , Diana T. Mosa , Laith Abualigah , Amr A. Abohany (2022). Emerging Trends in Blockchain Technology and Applications: A Review and Outlook, https://www.sciencedirect.com/science/article/pii/S1319157822000891

[3] Varun Tiwari, Santosh Kumar Singh, Vikas Rao Vadi (2023). Smart Contract Using Solidity(Remix-Ethereum-IDE), https://www.researchgate.net/profile/Santosh-Singh-8/publication/368882835_Smart_Contract_Using_Solidity_Remix_-Ethereum_IDE/links/63ff5f4b0cf1030a5660c907/Smart-Contract-Using-Solidity-Remix-Ethereum-IDE.pdf

[4] Saniya Zad, Zishan Khan, Tejas Warambhe, Rushikesh Jadhav, Vinod Alone (2023). Crowdfunding Using Blockchain Technology, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4330476

[5] Adrian Petcu, Bogdan Pahontu, Madalin Frunzete and Dan Alexandru Stoichescu (2023). A Secure and Decentralized Authentication Mechanism Based on Web 3.0 and Ethereum Blockchain Technology, https://www.mdpi.com/2076-3417/13/4/2231

[6] Hamed Taherdoost (2023). Smart Contracts in Blockchain Technology: A Critical Review, https://www.mdpi.com/2078-2489/14/2/117

[7] Arohi Rathore, Syed Wajahat Abbas Rizvi (2023).

Decentralized Crowdfunding Platform: A Blockchain-based Approach, https://jieee.a2zjournals.com/index.php/ieee/article/view/79/68

[8] Mora-Cruz, A., Palos-Sanchez, P.R. (2023). Crowdfunding platforms: a systematic literature review, https://link.springer.com/article/10.1007/s11365-023-00856-3#citeas

[9] Dr. Kumud Saxena, Vaibhav Kushwaha, Umang Gupta, Vanshika Saxena, Shweta Srivastav (2023). Ethereum Transaction Using MetaMask Wallet, https://www.irjmets.com/uploadedfiles/paper/issue_5_may_2023/40495/final/fin_irjmets1685250727.pdf

[10]. Allon, G., & Babich, V. (2020). Crowdsourcing and Crowdfunding in the Manufacturing and Services Sectors, Manufacturing & Service Operations_Management, 22(1), 102–112.

https://doi.org/10. 1287/msom.2019.0825

[11] Butticè, V., & Vismara, S. (2021). Inclusive digital finance: The industry of equity_crowdfunding. The Jour- nal of Technology Transfer.
https://doi.org/10.1007/s10961-021-09875-0

[12]Cerpentier, M., Vanacker, T., Paeleman, I., & Bringmann, K. (2022). Equity crowdfunding, market tim- ing, and firm capital structure. The Journal_of Technology Transfer, 47(6), 1766–1793. https://doi. org/10.1007/s10961-021-09893-y

[13] Chakraborty, S., & Swinney, R. (2021). Signaling to the crowd: Private quality_information and rewards- based crowdfunding. Manufacturing & Service Operations Management, 23(1), 155–169.
https:// doi.org/10.1287/msom.2019.0833

[14] Chan, C. S. R., Parhankangas, A., Sahaym, A., & Oo, P. (2020). Bellwether and the herd? Unpacking the u-shaped relationship between prior funding and subsequent contributions in reward-based crowd- funding. Journal of Business Venturing, 35(2), 105934. https://doi.org/10.1016/j.jbusvent.2019.04. 002

[15] Chemla, G., & Tinn, K. (2020). Learning Through Crowdfunding. Management Science, 66(5), 1783– 1801. https://doi.org/10.1287/mnsc.2018.3278

[16] Cicchiello, A. F., Kazemikhasragh, A., & Monferrà, S. (2020). Gender differences in new venture financ- ing: Evidence from equity crowdfunding in Latin America._International Journal of Emerging Mar- kets, 17(5), 1175–1197. https://doi.org/10.1108/IJOEM-03-2020-0302

[17] Clauss, T., Niemand, T., Kraus, S., Schnetzer, P., & Brem, A. (2020). Increasing crowdfunding success through social media: The importance of reach and utilisation in reward-based crowdfunding. International Jour- nal of Innovation Management, 24(03), 2050026. https://doi.org/10.1142/S1363919620500267

[18] Rethinking Crowdfunding Platform Design: Mechanisms to Deter Misconduct and Improve Efficiency. Management Science, 66(11), 4980–4997, https://doi.org/10.1287/mnsc.2019.3482

[19] Coakley, J., Lazos, A., & Liñares-Zegarra, J. M. (2022). Seasoned equity crowdfunded offerings. Journal of Corporate Finance, 77, 101880. https://doi.org/10.1016/j.jcorpfin.2020.101880

[20] Croux, C., Jagtiani, J., Korivi, T., & Vulanovic, M. (2020). Important factors determining Fintech loan default: Evidence from a lendingclub consumer platform. Journal of Economic Behavior & Organi- zation, 173, 270–296. https://doi.org/10.1016/j.jebo.2020.03.016

[21] Cuccurullo, C., Aria, M., & Sarto, F. (2016). Foundations and trends in performance management. A twenty-five years bibliometric analysis in business and public administration domains. Scientomet- rics, 108(2), 595–611. https://doi.org/10.1007/s11192-016-1948-8

[22] Cumming, D. J., Martinez-Salgueiro, A., Reardon, R. S., & Sewaid, A. (2021b). COVID-19 bust, policy response, and rebound: Equity crowdfunding and P2P versus banks.The Journal of Technology Transfer, 1–22. https://doi.org/10.1007/s10961-021-09899-6

[23] Cumming, D. J., Vanacker, T., & Zahra, S. A. (2021a). Equity crowdfunding and governance: Toward an integrative model and research agenda. Academy_of Management Perspectives, 35(1), 69–95. https:// doi.org/10.5465/amp.2017.0208

[24] De Crescenzo, V., Ribeiro-Soriano, D. E., & Covin, J. G. (2020). Exploring the viability of equity crowd- funding as a fundraising instrument: A configurational analysis of contingency factors that lead to crowdfunding success and failure. Journal of Business Research, 115, 348–356. https://doi.org/10.1016/j.jbusres.2019.09.051

[25] Defazio, D., Franzoni, C., & Rossi-Lamastra, C. (2021). How Pro-social Framing Affects the Success of Crowdfunding Projects: The Role of Emphasis and Information Crowdedness. Journal of Business Ethics, 171(2), 357–378. https://doi.org/10.1007/s10551-020-04428-1

APPENDIX

```
pragma solidity ^0.8.9;
contract CrowdFunding {
    struct Campaign {
        address owner;
        string title;
        string description;
        uint256 target;
        uint256 deadline;
        uint256 amountCollected;
        string image;
        address[] donators;
        uint256[] donations;
    }
    mapping(uint256 => Campaign) public campaigns;
    uint256 public numberOfCampaigns = 0;


function createCampaign(address _owner, string memory _title, string memory _description, uint256 _target, uint256 _deadline, string memory _image) public returns (uint256) {
        Campaign storage campaign = campaigns[numberOfCampaigns];
        require(campaign.deadline < block.timestamp, "The deadline should be a date in the future.");
        campaign.owner = _owner;
        campaign.title = _title;
        campaign.description = _description;
```

```
  campaign.target = _target;
        campaign.deadline = _deadline;
        campaign.amountCollected = 0;
        campaign.image = _image;
        numberOfCampaigns++;
        return numberOfCampaigns - 1;
    }

    function donateToCampaign(uint256 _id) public payable {
        uint256 amount = msg.value;
        Campaign storage campaign = campaigns[_id];
        campaign.donators.push(msg.sender);
        campaign.donations.push(amount);
        (bool sent,) = payable(campaign.owner).call{value: amount}("");
        if(sent) {
            campaign.amountCollected = campaign.amountCollected + amount;
        }
    }

    function getDonators(uint256 _id) view public returns (address[] memory, uint256[] memory) {
        return (campaigns[_id].donators, campaigns[_id].donations);
    }

    function getCampaigns() public view returns (Campaign[] memory) {
        Campaign[] memory allCampaigns = new Campaign[](numberOfCampaigns);
```

```
for(uint i = 0; i < numberOfCampaigns; i++) {
            Campaign storage item = campaigns[i];


            allCampaigns[i] = item;
        }
        return allCampaigns;
    }
}
```

PLAGARISM CERTIFICATE

ORIGINALITY REPORT

9%	8%	3%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.ijraset.com Internet Source	6%
2	open-innovation-projects.org Internet Source	<1%
3	Alexandra Mora-Cruz, Pedro R. Palos-Sanchez. "Crowdfunding platforms: a systematic literature review and a bibliometric analysis", International Entrepreneurship and Management Journal, 2023 Publication	<1%
4	Ahmed G. Gad, Diana T. Mosa, Laith Abualigah, Amr A. Abohany. "Emerging Trends in Blockchain Technology and Applications: A Review and Outlook", Journal of King Saud University - Computer and Information Sciences, 2022 Publication	<1%
5	Megha Jaiwani, Santosh Gopalkrishnan, Vinita Kale, Anish Chatterjee, Ritesh Khatwani, Nihal Kasam, Pradip Kumar Mitra. "The Blockchain	<1%