DigiRaise:-A Crowdfunding Platform

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

Bachelor of Technology

in

Computer Science & Engineering / Information Technology

Submitted by

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

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CANDIDATE's DECLARATION

I hereby declare that the work presented in this report entitled **'DigiRaise:-A crowdfunding platform'** in partial fulfillment 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. Kushal Kanwar** (Assistant Professor (S.G.), 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.

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NOMENCLATURE

Abbreviations	Meaning	Page no.
DAPP	Decentralised Application	1
DeFi	Decentralised Finance	12
NFT’s	Non Fungible Tokens	12
DAO	Decentralised Autonomous Organization	12
IoT	Information of Technology	12
CFP’s	Crowdfunding Platforms	15
EVM	Ethereum Virtual Machine	14
IDE	Integrated Development Environment	17
AI	Artificial Intelligence	18
NPM	Node Package Manager	18
API	Application Programming Interface	20
UI/UX	User Interface/User Experience	47

ABSTRACT

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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 timeline for completion at their websites. Therefore, smart contract will play a role of a monitor 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 what 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 the 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

In terms of crowdfunding on the money market scene, blockchain makes it safe and reliable at reasonable fees. In summary, it offers a wider option of the safe funded ideas or projects' pool compared to high-risk ones. The social values are not lost while considering blockchain as a platform that should be secure, decentralized and also provide a secured transaction platform for the developers and investor. In turn, crowdlending emerged as a substitute to conventional lenders, who usually gave money to people's ventures and could be paid by many small contributors. The adaption of blockchain techniques to the crowdfunding have advanced the security, transparency and efficiency. Through decentralization in blockchain, crowdfunding will be possible free of dependencies and thereby, secure and affordable. Blockchain assisted crowdfunding solves those problems, making it appealing for numerous investors and partners due to its immutability.

In terms of doubts about blockchain technology and its interaction with public sectors for developing secure, quick smart-contract based payment systems, none exist. A smart contract to turn these investors into money of the developers, remove the opportunity for fraud and increase profits. Furthermore, blockchain being a distributed assures nobody own smart contract, transparency, and trust. Crowdfunding in the cryptocurrency space is enabled by the increased utilization, as well as enhanced DApps.

Finally, it fits with the general trend toward decentralization and dis-intermediation in financial markets.

As the global financial market continues to expand, the integration of blockchain technology will makecrowdsourcing more sophisticated and secure, providing the flexibility needed for fundraising, futures and investments. In summary, the integration ofblockchain technology into consumer accounts is a significant step forward for the

financial world; Provides greater security, transparency and goodoperation. By leveraging the capabilities of blockchain, crowdfunding platforms can solve existing limitations, attract a broad group of entrepreneursand creators, and support the development of decentralized financial systems. This article dives into the intersection of crowdfunding and blockchaintechnology, exploring its key features, perceived benefits, and potential challenges. Young entrepreneurs' adoption of blockchain-based crowdfundingplatforms.

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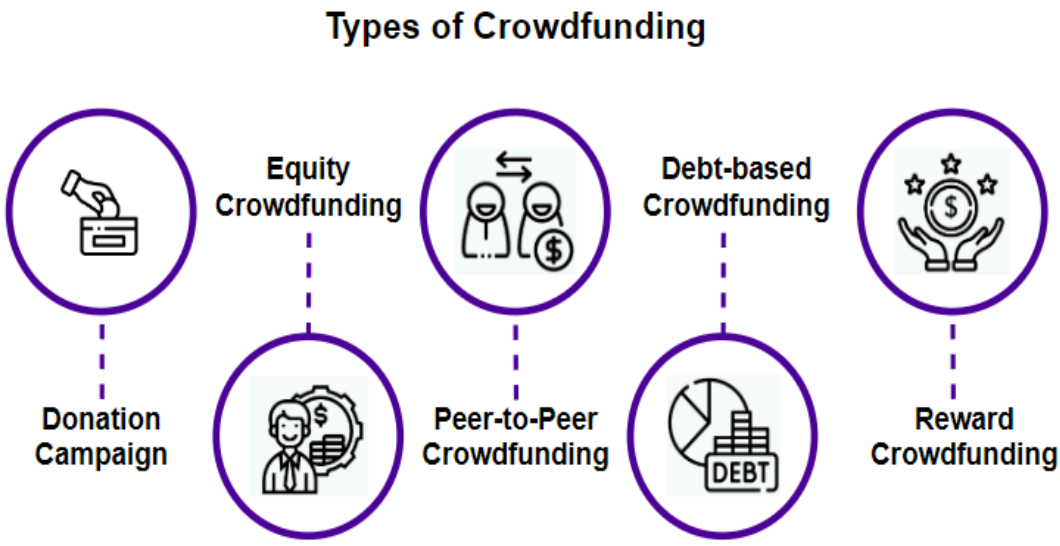

Fig 1.1.1 Types of Crowdfunding

1.2 PROBLEM STATEMENT

The challenges of a project using blockchain technology for crowdfunding are manifold.Additionally, traditional crowdfunding involves limitations including a lack of transparency, high brokerage costs and security problems. Such restrictive rules lower confidence level among investors towards developers who cause a decrease in populace growth that is otherwise a potential source of revenue for conventional lenders. First, entrepreneurs and developers should have a more suitable funding.

Typically, most of these big budgets are restricted to some selected areas or nations hence; the market for new ideas and undertakings. Thirdly there is a need to find a transparent but secure financial platform which will get rid of any intermediaries hence reducing those costs.
These problems can be solved using blockchain technology that is safe, honest and effective for crowdfunding. Crowdfunding platforms utilize blockchain traits and evade intermediaries, lower fees, and improve safety and clarity.

Blockchain technology and social services, among others, have clearly demonstrated how reliable and safe smart contracts are when it comes to money transfer. The revenue from investors goes directly to project developers without any scope for a fraud, which makes the projects more profitable. Besides, smart contracts utilize blockchain and its decentralised nature which ensures that no organisation holds control over them thus creating transparency and public trust.

The approach in this project is an attempt to consider potential benefits that are brought about by blockchain enabled crowdfunding projects as compared to inefficient conventional methodologies that do not solve many problems arising from the prevailing market conditions. The study will also measure various prospects on blockchains for crowdfunding and some obstacles hindering young people to partake in such platforms.

Lastly, it aims at improving the practice of financial handling and providing enough energy that will be used during the future in spending and investing the resources respectively.

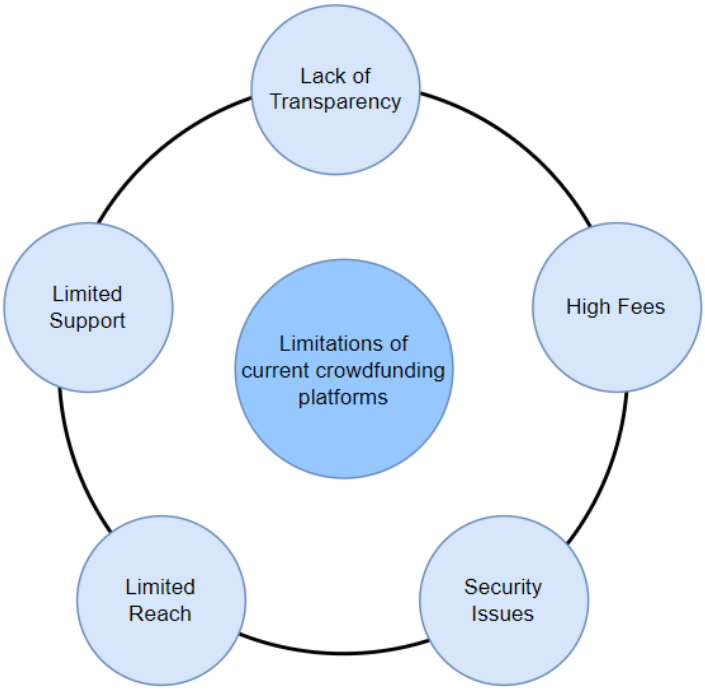

Fig. 1.2.1 Limitations of crowdfunding platforms

1.3 OBJECTIVES

1. Develop a robust, transparent and effective blockchain-network

This project seeks to develop a reliable, honest, and effective crowd funding platform based upon a block chain technology. To achieve its desired objectives, this aim entails developing and putting into practice a system that leverages on the power of blockchain for asset security and operational efficiency.

2. Get rid of the middle person and save on integration's costs.

The second intention is to cut-down middlemen and costly conventional joint venture. It seeks to establish a system without middlemen at much less cost to entrepreneurs and developers than other online investment platforms available today.

3. For easy borrower and developer financing

Thirdly, this goal offers affordable banking facilities that are more convenient for both entrepreneurs and developers. It should facilitate access by anyone, including the private individual or entrepreneur whose sole option of funding has always been the traditional finance institution.

4. Coding smart contracts for use in ensuring transparency and security during crowdfunding projects

To have enhanced efficiency, transparency, and security in the workgroup through smart contracts. Such a platform should be built on smart contracts in order to ensure secure financial transactions without any frauds and gain profit.

5. Look into what is possible with blockchain enabled crowdfunding platforms that can be used to address the issues brought about by conventional models

The last objective is to investigate the applicability of blockchain-based crowdfunding platforms that can address issues associated with typical approaches. This paper aims at finding out if and where the boundaries of crowdfunding are and how can blockchain address them.

6. Investigate the individual advantages and disadvantages incurred by these sites that are meant to promote entrepreneurship among the young people

The sixth objective is to outline the benefits and limitations in using the blockchain-based crowdfunded platforms as a guide for young entrepreneurs in selecting the right platform. The goal is to conduct research to identify the advantages of blockchain-based crowdfunding platforms as well as the problems thatmay prevent young entrepreneurs from using these platforms.

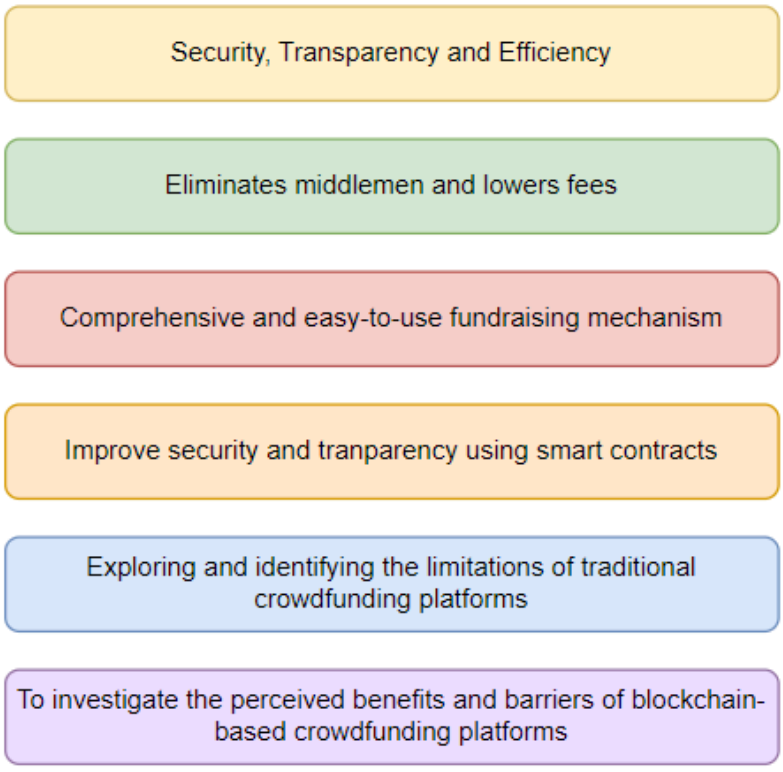

Fig. 1.3.1 Objectives of the project

Overall, the goal of the "Blockchain Crowdfunding" project is to create a safe, transparent and effective way of crowdfunding, eliminatingintermediaries, reducing costs and providing entrepreneurs and developers with a more accessible and easy-to-use fundraising platform. The projectaims to use the potential of blockchain technology to solve the problems faced by the platform crowd and bring about the necessary changes to fundfuture advances and investments.

1.4 SIGNIFICANCE AND MOTIVATION OF PROJECT

The meaning and motivation behind philanthropic projects using blockchain technology are diverse and highlight the transformative potential of this newapproach. Integrating blockchain technology into consumer finance can provide many benefits to developers and investors because it addresses existingrestrictions and promotes better fundraising and security.

SIGNIFICANCE

1. Improved security and transparency: - Blockchain technology provides a secure crowdfunding platform and a transparent environment. Byleveraging blockchain capabilities, crowdfunding platforms will eliminate the possibility of fraudulent transactions and increase overall transparency

2. Efficient Fund Transfer: - The use of smart contracts in blockchain-based crowdfunding platforms ensures efficient and effective transfer of fundsfrom investors to project founders. This not only improves the overall efficiency of the crowdfunding process, but also reduces the time and cost ofsending money normally.

3. Decentralization and elimination of intermediaries: Blockchain technology promotes decentralization and elimination of intermediaries, eliminatingthe need for intermediaries and reducing transaction costs. This is in line with the difference between the decentralization of the financial system andhow much it supports crowdfunding

4. Accessibility: Blockchain-based crowdfunding platforms can provide entrepreneurs and developers with greater and easier access to financingmechanisms. This opens new opportunities for all business people and encourages innovation and entrepreneurship

5. Global reach and participation: Blockchain-based crowdfunding platforms can provide global reach and participation by enabling people fromdifferent regions to participate in fundraising. This can secure investment freedom and allow different types of projects and investors to participate infinancing.

6. Immutable information: Blockchain technology provides immutable information regarding all transactions, providing evidence and irrefutable financialinformation. This feature increases participants' responsibility and trust because all changes are saved permanently and cannot be undone.

7. Enhanced investor protection: Through smart contracts and tokenization, blockchain crowdfunding platforms can provide better protection forinvestors. Smart contracts make business decisions based on defined conditions, reducing the likelihood of fraud and giving investors more confidencein the financing process.

MOTIVATION

1. Eliminate the limitations of traditional crowdfunding: The power of using blockchain technology in crowdfunding is to solve the limitations oftraditional crowdfunding platforms, such as lack of transparency, high intermediary costs, and security issues. This project is intended to be safer, moretransparent and more effective in fundraising

2. Promote innovation and entrepreneurship: The integration of blockchain technology into crowdfunding platforms stems from the desire to encourageinnovation and entrepreneurship. The project aims to create new opportunities for entrepreneurs and creators to realize their ideas and projects by offeringa more efficient and easy-to-use fundraising process.

3. The transformative power of Blockchain: With its transformative character, blockchain technology can find application in the sector of public services. Such advantages of blockchain can mean a better user experience, more investors, and earning new users/money securely.

4. Cost-effectiveness and limited access: Block chain-based crowdfunding intends to lower the cost of traditional funding, and at the same time ease the work of the manager and investors. Blockchain technology helps make donations easily-accessible to anyone thus involving various companies and individuals in fundraising.

5. Trust and accountability: The motivation for using blockchain technology in the crowd is to have trust and accountability in the fundraisingprocess. Blockchain's transparent and immutable data increases participants' trust, ensures funds are used as intended, and provides greateraccountability to employers.

6. New Fundraising: Blockchain technology provides the opportunity to innovate and modernize the fundraising landscape. By leveraging thetransformative power of blockchain, crowdfunding platforms can enable better and safer fundraising, attract more investors, and foster a newculture in fundraising.

1.5 ORGANIZATION OF PROJECT REPORT

The detailed organization of the project can be summarized as follows:

Chapter 1 - Introduction: This chapter works as a project and lays the groundwork to provide the background for crowdfunding based on blockchaintechnology. It includes introducing the project, defining the problem, explaining the objectives, discussing the importance and motivation of the project,and deciding on the organization of the project preview report.

Chapter 2 - Research Literature: This chapter focuses on general research and source information from a variety of reputable sources, including standardbooks, journals, websites, and publications. It provides an overview of relevant documents, shows work done on the same front in the last five years, andidentifies gaps in current blockchain knowledge in crowdfunding.

Chapter 3 - Development Process: This chapter covers the technology process, starting with requirements and analysis, followed by project design andarchitecture. It goes through data preparation and application stages and introduces basic concepts such as codes, algorithms, tools and techniques. Additionally, the main problems identified during development and their management are discussed.

Chapter 4 - Testing: The chapter seven discusses about the stability checks on the platform features as well as test methods, tools, techniques and strategies. It is also easy to paint a complete image of the entire system, the problem experienced, as well as the outcome of the trial.

Chapter 5 - Results and evaluation: Here we focus on presenting and explaining the results obtained from the project. It includes a comprehensivepresentation of the results and their interpretation and comparison with existing solutions, thus providing a platform and benchmark for performance.

Chapter 6 - Conclusions and Future Opportunities: This important chapter presents the project with conclusions, limitations, and contributions to thefield. Finally, future opportunities are identified and potential opportunities for further development and improvement in the field of blockchaincrowdfunding are identified. It provides a preview of the platform and its development.

CHAPTER:-2
LITERATURE REVIEW

2.1 OVERVIEW OF RELEVANT LITERATURE

1.In their work titled **“Crowdfunding using Blockchain”, Aby Varghese et al.[5]** presents a blockchain-based crowdfunding system using smart contracts, developed with Solidity, to revolutionize fundraising campaigns. The system ensures efficiency by automating processes such as campaign creation, and reward distribution on the blockchain. It delves into system architecture, functionality, implementation, and evaluates advantages and limitations. Highlighting blockchain's transformative potential, it aims to create a decentralized, transparent, and inclusive platform for creators and backers in crowdfunding.

2. **Ritvik Gupta et al.[6]** in his publication”**Crowdfunding using Ethereum Blockchain”** explores Ethereum Blockchain's integration in crowdfunding, addressing issues of trust and control in traditional platforms. Emphasizing smart contracts' role, it proposes a secure, transparent model. The introduction outlines blockchain's decentralized nature and crowdfunding's historical reliance on trust. The review underscores contributor control absence in traditional crowdfunding. Implementation details Ethereum's modules for campaign creation, approval, and finalization.The conclusion hails blockchain's potential to resolve crowdfunding challenges. While lacking explicit publication details, it supports blockchain's transformative role, envisioning it as a solution to trust and transparency issues in crowdfunding.

3. In the article authored by **Partha Pratim Roy [7]** titled Web3: **“A Comprehensive Review on Background, Technologies, Applications, Zero-Trust Architectures, Challenges and Future Directions”** the primary focus is 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, 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. The review identifies hurdles impeding Web3 adoption and proposes solutions, emphasizing its pivotal role in the internet's future

4. In the work authored by **Dr. Kumad Saxena et al.[8]** titled **“Ethereum Transaction using Metamask wallet”**this research navigates Ethereum transactions via MetaMask and React JS, emphasizing blockchain's trust, security, and Web 3.0's decentralization. It highlights Solidity's role in creating intuitive interfaces. The study reviews smart contract implementations, privacy-focused transactions, and decentralized lending in Ethereum. The system streamlines transactions using MetaMask wallets, EtherScan.io for data, and integrates humor via memes for user engagement. Balancing entertainment with blockchain principles, it aims to attract a broader audience, offering extensive insights into Ethereum and smart contracts.

5. In the paper authored by **Alexandra Mora Cruz et al.[9]** titled **“Crowdfunding platforms: a systematic literature review and a bibliometric analysis”** they analysed 1,032 articles via Scopus and Web of Science, Mora-Cruz and Palos-Sanchez's study delves into crowdfunding platforms (CFPs) in Latin America. Focusing on Reward, Equity, and Lending categories, their systematic

review highlights 55 key articles, signaling a growing interest in CFP research. These platforms offer alternative financing for entrepreneurs amidst COVID-19 challenges. The study emphasizes the need for tech-centric CFP investigations. It serves as an insightful resource, guiding professionals and researchers exploring diverse crowdfunding avenues.

6. **A Rathore et al.[10]** in his publication **"Decentralized Crowdfunding Platform: A Blockchain-based Approach"** explores decentralized crowdfunding platforms in their 2023 publication. Addressing flaws in current models trust issues, delayed projects, and intermediaries' cuts the authors propose blockchain-based solutions. Smart contracts ensure transparent fund usage, global accessibility, reduced fees, and fraud prevention. Their study outlines the platform's methodology, proposed system, and technologies (Thirdweb, React.js, Solidity). It showcases a functional prototype leveraging Ethereum's blockchain. Future plans include anonymous investments and a decentralized environment for various projects, emphasizing community-driven initiatives, cost-effectiveness, and increased security.

7. In the paper authored by **Hamed Taherdoost [11]** titled **"Smart Contracts in Blockchain Technology: A Critical Review"** assesses smart contracts within blockchain tech from 2012 to 2022. Examining 252 articles, the study focuses on English journal entries, excluding other formats. It explores smart contracts' role in blockchain, their present state, significance, and challenges, emphasizing limitations. The paper discusses blockchain's evolution, focusing on Bitcoin, Ethereum, and smart contract utilization. It addresses the growing popularity of smart contracts and their diverse applications, highlighting challenges like security

vulnerabilities and maintenance complexities. The review identifies gaps and suggests future directions, aiming to benefit scholars and practitioners in the field.

8. In the work authored by **Adrian Petcu et al. [12]** titled **"A Secure and Decentralized Authentication Mechanism Based on Web 3.0 and Ethereum Blockchain Technology"** paper delves into Web3 authentication's significance in decentralizing user authentication. It contrasts OAuth 2.0's centralized approach with Web3's promise of decentralized, secure user authentication using Ethereum blockchain. Exploring authentication's evolution from Web 1.0 to 3.0, the study details Web3's potential applications, technical implementations, and advantages over Web2.0. 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.

9. **Dr. Santosh Kumar Singh[13]** in his work titled **"Smart Contract Using Solidity (Remix - Ethereum IDE)"**explores Solidity programming for smart contracts on Ethereum. Detailing the role of smart contracts in managing Ethereum state, it showcases Solidity's influence, syntax, and applications in creating self-enforcing business mechanisms. The article delineates the syntax, inheritance contracts, and execution steps using Remix IDE. With a focus on blockchain basics, Ethereum Virtual Machine (EVM), and smart contract security, it elucidates the fundamental interplay between Solidity, blockchain technology, and decentralized applications (dApps).

10. **Saniya Zad et al.[14]** in her publication titled **"Crowdfunding using Blockchain Technology"delves** into the novel world of crowdfunding leveraging blockchain technology, presenting a comprehensive exploration of its mechanisms, benefits, and challenges. They highlight crowdfunding's evolution, emphasizing its role as an alternative to traditional financing and its potential for diverse projects.

The authors elucidate motivations, ranging from rapid fundraising to fostering innovation, while addressing key challenges, such as trust and platform selection. Literature surveys and proposed systems underscore the expanding landscape, offering insights into this transformative financing avenue

11**. Ankit Panjwani and Heyu Xiong [15]** in their publication titled **"The Causes and Consequences of Medical Crowdfunding"** delve into the landscape of medical crowdfunding via GoFundMe data, unveiling how Medicaid expansion correlates with reduced health-related campaigns, indicating gaps in insurance coverage as a driver for crowdfunded healthcare. Distinctive disparities emerge: campaigns led by individuals with African-American or Hispanic names face lower success rates and fundraising outcomes. Their study navigates the intricate interplay between insurance, crowdfunding, and societal disparities, revealing crowdfunding's reflection of unmet medical needs and its potential to perpetuate inequalities. It offers a comprehensive empirical view, highlighting the nuanced dynamics of healthcare financing in the United States. This nuanced exploration urges a deeper understanding of crowdfunding's complexities and its role in shaping healthcare access and equity within the social and economic fabric of the nation.

12. In the work authored by **Ahmed G. Gad et al.[16]** titled **"Emerging Trends in Blockchain Technology and Applications: A Review and Outlook" a**nalyzes the trajectory of Blockchain technology since 2013, exploring its impact and outlining future prospects. Investigating the Web of Science Core Collection, the study scrutinizes influential articles, conferences, and reviews. It highlights pivotal findings, such as top influential papers, emerging trends, and funding bodies. Delving into Blockchain's versatile applications, the paper discusses its role in various domains, from IoT to healthcare. Addressing open challenges and future advancements, the review seeks to guide researchers and practitioners in

understanding the current state and prospects of Blockchain technology for future projects and innovations.

2.2 KEY GAPS IN LITERATURE

- Despite the emerging data, some important differences remain in recent studies. These differences point to opportunities for deeper research and advancement, highlighting areas where existing knowledge and information are insufficient or incomplete. These include:

- **Scalability Solutions:** Current literature frequently mentions scalability challenges in crowdfunding blockchain networks, but there is no in-depth research on practical scalability solutions used or planned in instant crowdfunding platforms.

- **Regulatory Frameworks:** Although there is much debate about regulatory issues, there remains a gap in debate about specific strategies or models for implementation as the regulatory process evolves, particularly as it differs from that in many world laws.

- **Ethical and Societal Implications:** There is no significant debate about the ethics of integrating blockchain technology into crowdfunding. Social impacts, including issues of transparency, accountability, and redistribution of power among different stakeholders in ecosystems, are rarely examined in depth in the literature.

- **User Experience and Adoption:** Enhancements to the user experience that are essential for increasing user acceptance of blockchain crowdfunding platforms—like inclusiveness policies and easily navigable interfaces—receive little focus.

- **Diverse Applications and Use Cases:** There is a lack of research on the many use cases and varied applications of blockchain technology outside of financial crowdfunding, despite the fact that some literature concentrates on particular blockchain applications in crowdfunding. More focus is required in areas like tokenization, social impact crowdfunding, and specialised fundraising.

- **Smart Contract Auditing:** Despite smart contracts' crucial role in security, there isn't much thorough research on best practices and systematic approaches for auditing them that are expressly designed for crowdfunding purposes.

- **Cross-Chain Interoperability:** A thorough knowledge and practical application of interoperability concerns and solutions when merging several blockchain networks for crowdfunding purposes are hampered by the absence of detailed investigation of these issues in the literature.

- **Long-Term Sustainability and Governance:** There is little talk of governance structures and long-term viability for blockchain-based crowdfunding. Comprehensive evaluations of the governance frameworks, decision-making processes, and sustainability initiatives employed by these platforms are lacking in the literature.

CHAPTER:-3

SYSTEM DEVELOPMENT

3.1 REQUIREMENT AND ANALYSIS

FUNCTIONAL REQUIREMENTS

- Blockchain.js
- Development Tools
    - Visual Studio Code
    - Remix IDE
- Framework Requirements
    - Dotenv:”version 16.0.0”
    - Next:”12.1.0”
    - Next.js:”version 1.0.3”
    - React:”17.0.2”
    - Solidity:”0.8.23”
- Backend Development:
    - Next.js
    - NPM
    - Vite

NON FUNCTIONAL REQUIREMENTS

SECURITY

1. Transaction security verification: The platform must use blockchain technology to ensure transaction security and tamper protection. This enables secure transaction verification and user authentication using the Ethereum blockchain platform, decentralized applications (DAPPs) and MetaMask

2. Data encryption: All sensitive data, including user data and transaction data, must be encrypted to prevent unauthorized access and ensure data security. Tools such as IPFS can be used to upload and download files securely, ensuring data integrity and confidentiality.

SCALABILITY

1. Effectiveness of events: The system should be designed to handle major events. Leveraging the Ethereum blockchain and Next.js provides a scalable infrastructure to manage multiple transactions while maintaining performance.

2. Smart Contract Optimization: Smart contracts need to be optimized for gas performance and scalability to ensure efficiency and scalability on the Ethereum blockchain. Tools like Hardhat can be used to develop and test smart contracts to ensure efficient and scalable code.

RELIABILITY

1. Consensus Protocol: The platform must implement a reliable consensus protocol to ensure the accuracy and consistency of transactions. Using the Ethereum Virtual Machine and Consensus mechanisms can improve the reliability of the crowdfunding platform.

2. Immutable tokens: Immutable tokens must be issued on the blockchain to prevent counterfeiting and maintain the credibility of the crowdfunding process. Smart contracts made according to the requirements of investors and entrepreneurs can mediate the risks taken by investors and ensure reliability and transparency.

ANALYSIS

The platform should provide an intuitive and user-friendly interface for both project creators and investors, and support interactive campaigns, donation tracking and transparent reporting on project progress to increase user engagement and satisfaction. Integration with appropriate blockchain technology such as Ethereum is essential for security, transparency and smart contract capabilities.

TECHNICAL ANALYSIS

- Blockchain Selection: Evaluation and Rationale for Selecting Ethereum as the Underlying Blockchain.
- Smart Contract Development: Detailed analysis of smart contract architecture, Solid coding standards and best practices.
- Integration agreement: Requirements for external integration or APIs with the blockchain platform.
- The key factors include identifying sponsor,managers, organizer, operator of the platform. We even have to check the viability of blockchain, Smart contracts, and different interface like bandwidth, storage space, computational resources

USE CASE ANALYSIS

- Compare the existing platforms.Evaluate how was their performance,as in if the system was good, or what were the limitations.
- Gatther customer feedback from customers, what they expect, like or don't like.
- Develop a model which includes planning, functionality, user interface

3.2 PROJECT DESIGN AND ARCHITECTURE

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

- **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.

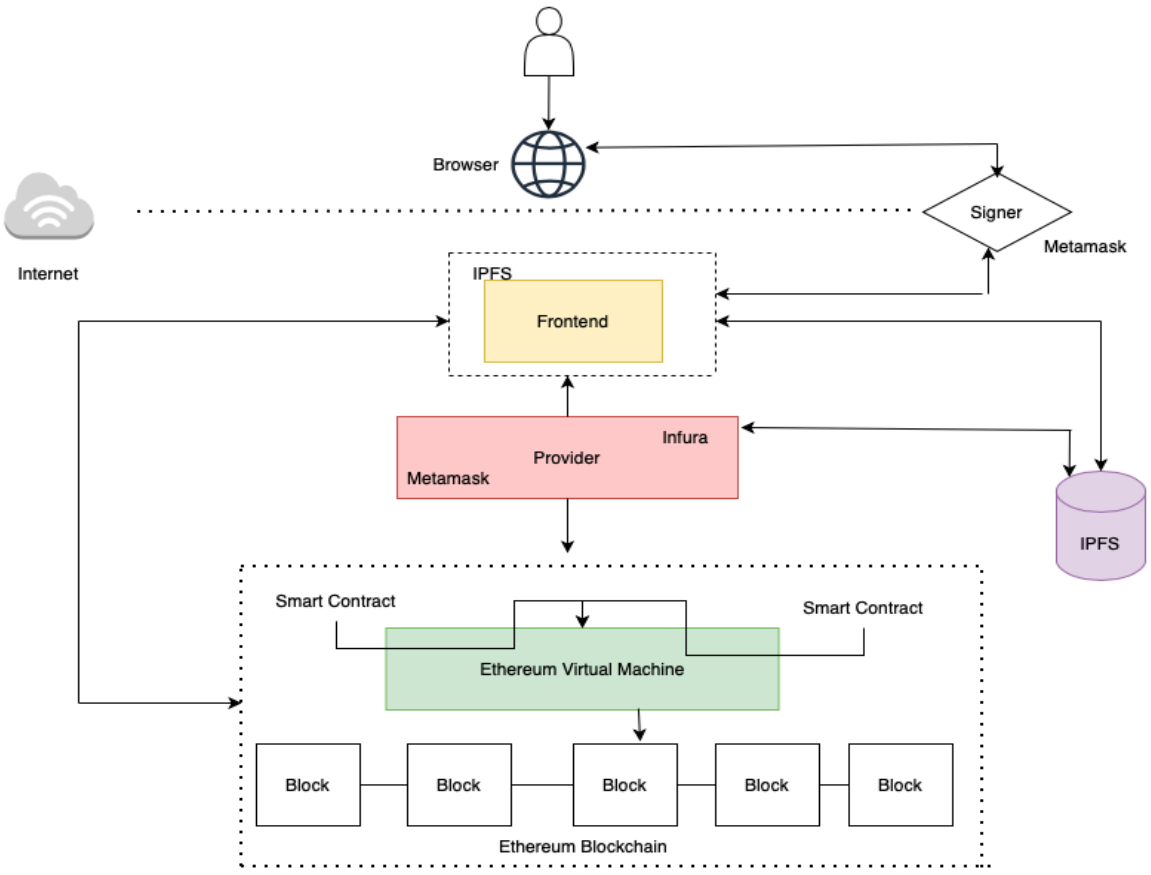

Fig 3.2.1 Architecture of the Project

The flowchart below illustrates that the users first of all log into their MetaMask wallet, which will be their first step for accessing their Ethereum assets securely. Thus, they

develop a link with Web3. though a browser client, JS makes it possible for the users to work with React and Solidity s frameworks. This integration allows users to use the specified verification APIs for verification purposes. In addition, the Ethereum testnet is chiefly used to show the deployment status, thus making the process transparent and accountable throughout the crowdfunding. This systematic flowchart of the step-by-step process of the Ethereum ecosystem shortens the user's interaction, thus the Ethereum ecosystem becomes more secured, efficient, and reliable.

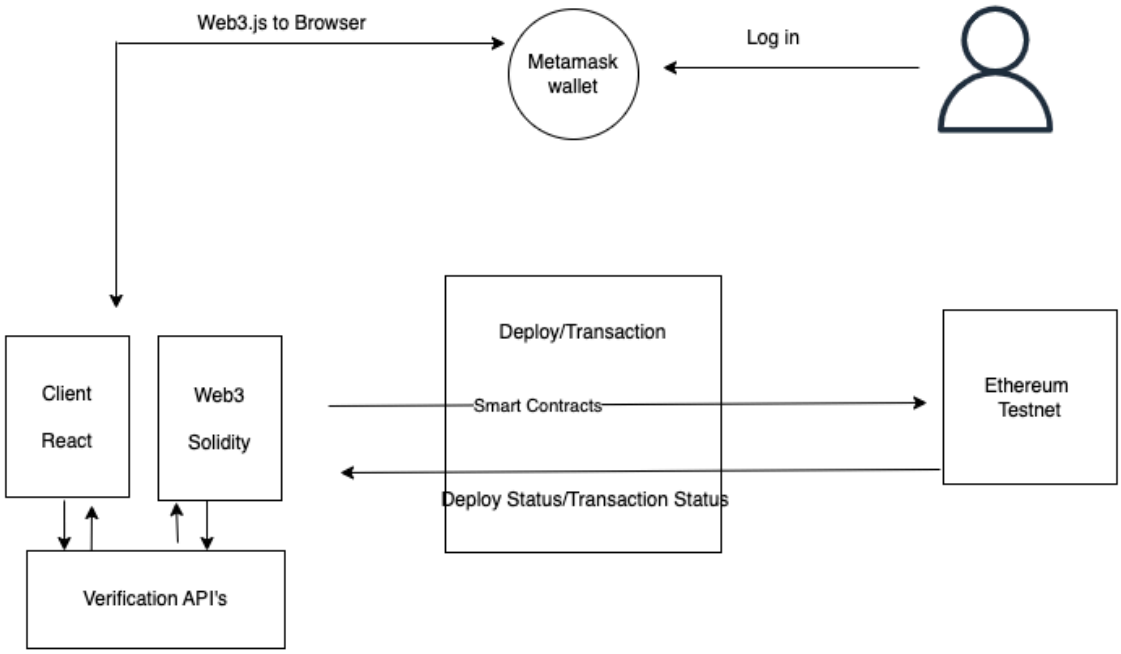

Fig 3.2.2 Architecture of the Project

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 projects 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 Mac network and is for free in order to achieve higher business scale and efficiency.

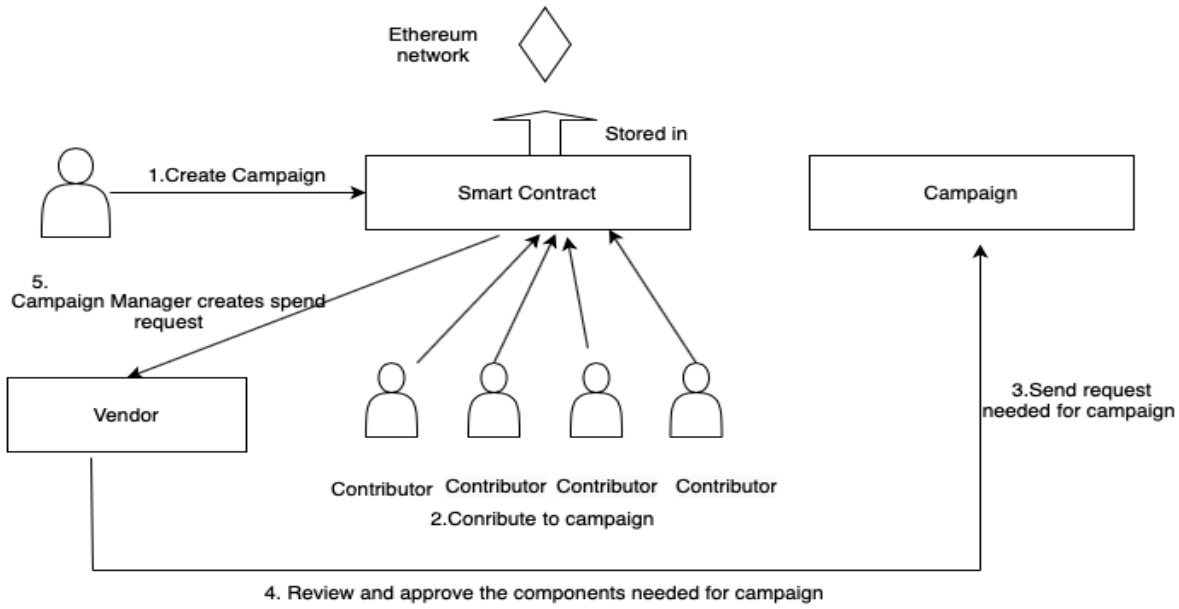

Fig 3.2.2 Workflow of the Project

3.3 DATA PREPARATION

1. Gathering of user data:

Get some general information on users like their authors as well as investors; detailled information on accounts, exported information, investment information etc. The gathering of such data helps in developing user profiles, keeping a check on all sorts of activities carried out by developers and users as well as guaranteeing a secure connection between all parties.

2. Write a project statement:

Write a detailed description of the project, including the project's objectives, description, highlights, and comments. This information is needed to create interactive campaigns, facilitate fundraising, and provide information about achievements. It also helps create a complete and engaging user experience for both project creators and investors

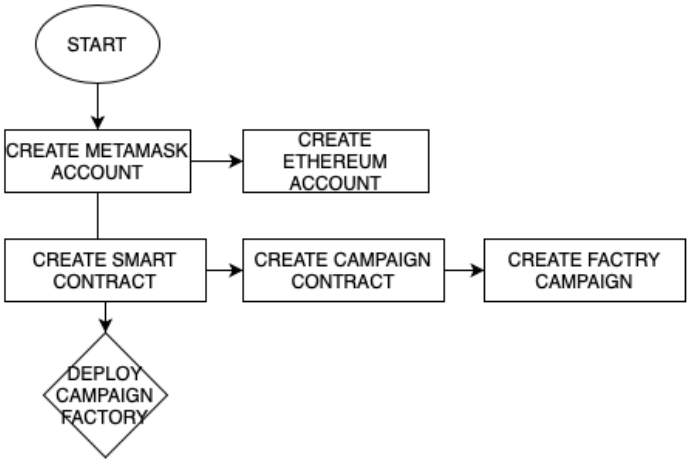

Fig 3.3.1 Data Collection

3. Transaction Records:

Record and track all events related to project financing, cash disbursement and investment activities. This includes tracking cash flows through smart contracts and ensuring transparent reporting on project progress. The use of blockchain technology

ensures the immutability and transparency of transaction documents, providing a secure and verifiable record of all financial transactions.

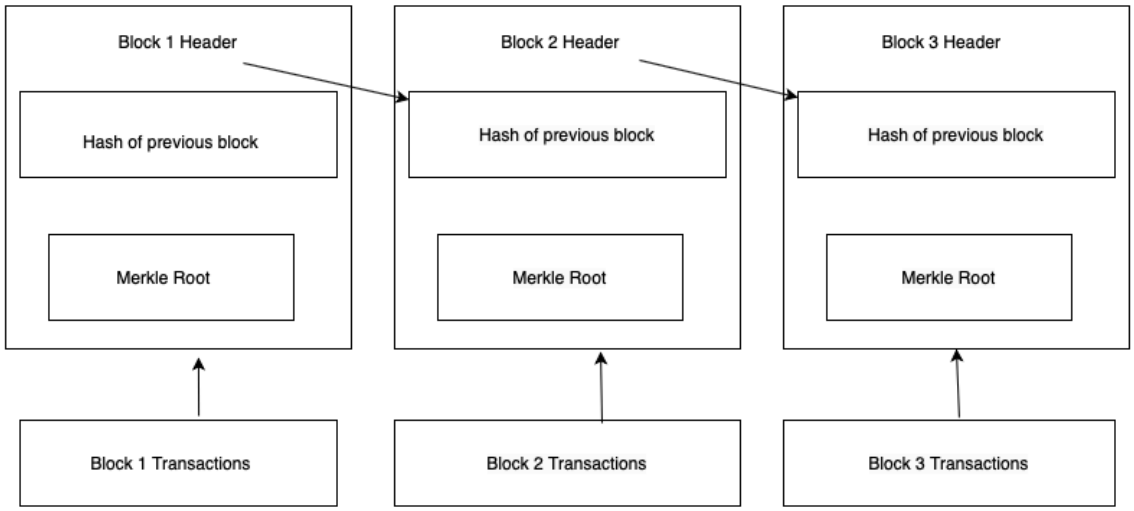

Fig 3.3.2 Blocks of Ethereum Blockchain

The illustration below shows the Transaction Records in Ethereum blockchain. Blockchain block of Ethereum consists of the hash of previous Hunk, nonce, timestamp, and Merkle root, and the hash value of the block. Blocks are connected by the previous hash, giving birth to a chain that is impossible to alter without invalidating the entire chain. In mining perserve was a notable number that was used as a reference which showed distinct hash values that satisfied particular conditions. This timestamp is a procedure used to send blocks at the same time and to show when the block was created. The Merkle root is a hash value that is obtained by hashing all the transactions one by one until a single hash value is obtained. In other words, this string is the contents of the block itself. The corresponding hash is computed from the previous hash, nonce, timestamp, and Merkle root, all of which distinctive and are unique to the block. The current block is given its hash value B, and the previous block is given its hash value AB, while the block before that is given its hash value A. Through the use of hash values, the Ethereum blockchain establishes a safe and unbreakable account of every transaction performed on the network.

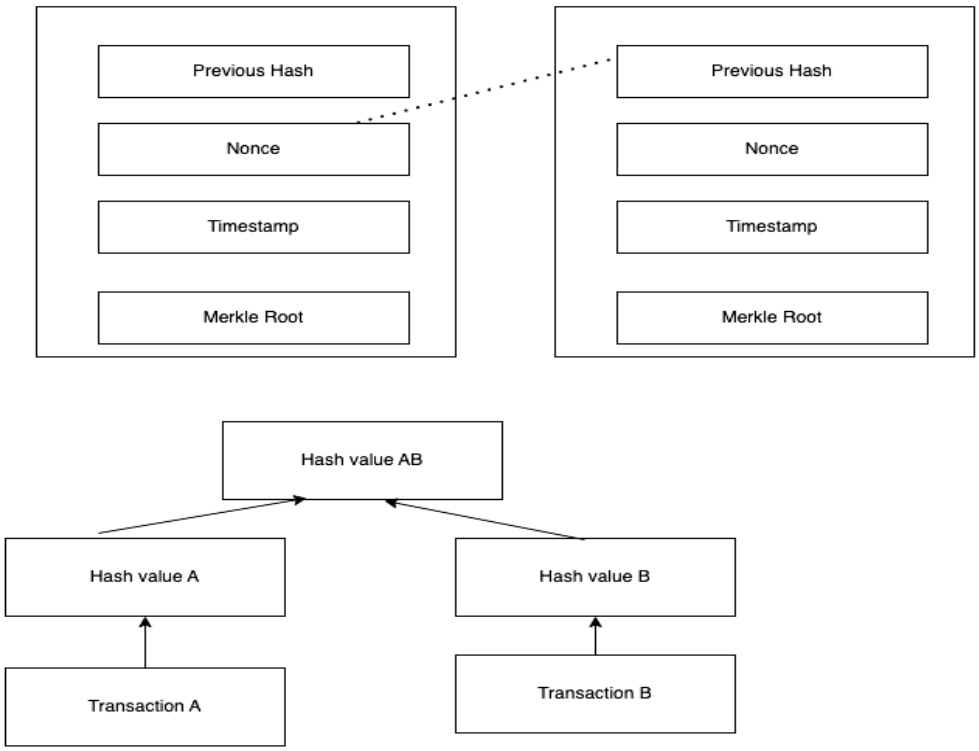

Fig 3.3.3 Transaction records

3.4 IMPLEMENTATION

1. Define the environment - Install Node.js, Infura and Web3.js to create a development environment.

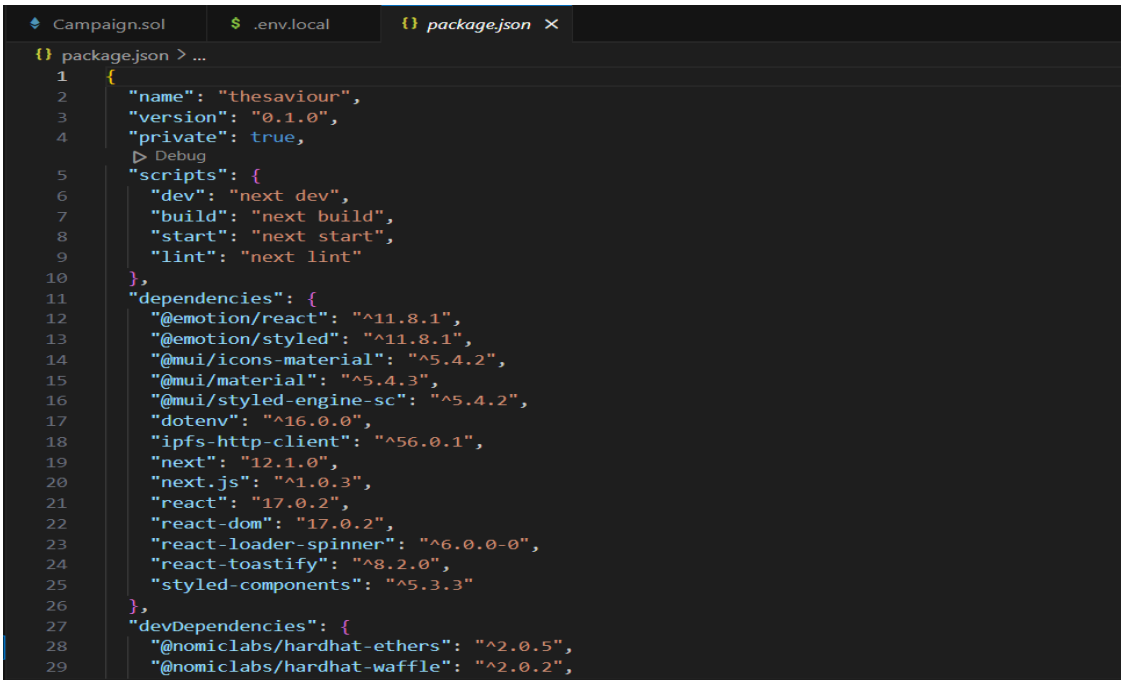

Fig 3.4.1 Dependencies of the project

2. Add the Polygon Mesh to the metamask - Follow the instructions to add the Polygon Mumbai network to your Metamask wallet.. This allows you to communicate with the Polygon network for testing.

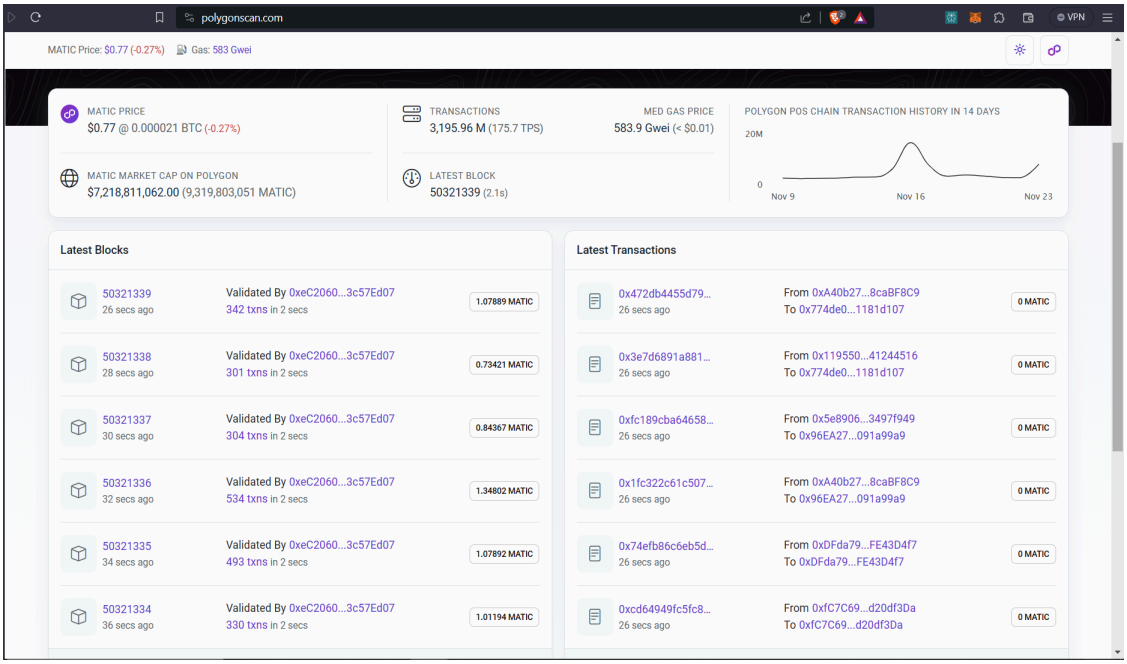

Fig 3.4.2 Adding Polygon Mesh to the metamask

3. Fund your account - Use the Polygon mixer to upload a test mesh for the Mumbai network to your MATIC account. This gives you the test credentials you need to make transactions and test the application.

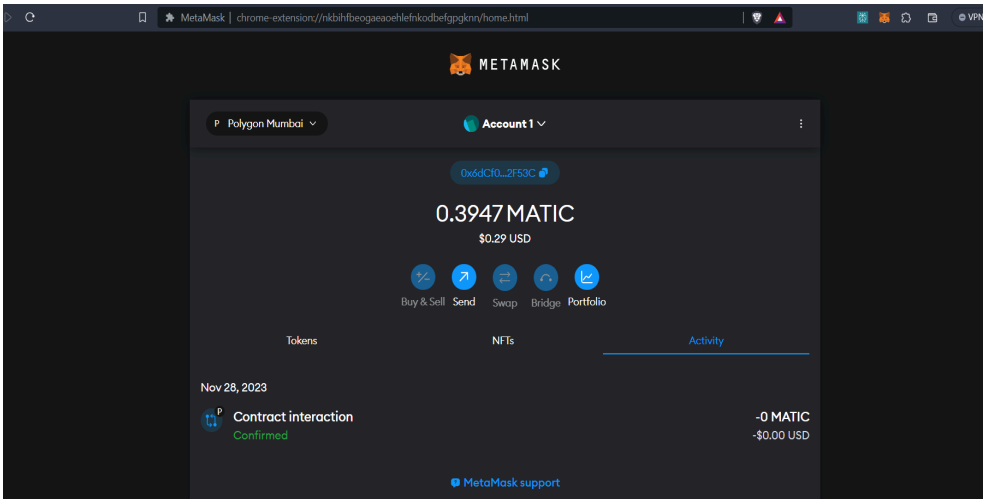

Fig 3.4.3 Metamask wallet

4. Create a project folder - Create a new folder for your project and initialize it with the necessary files and folders. It creates a structured environment for project development and testing.

5. Develop smart contracts - Write and implement smart contracts for your project using Solidity and the Ethereum blockchain. Tools like HardHat can be used for development and testing.

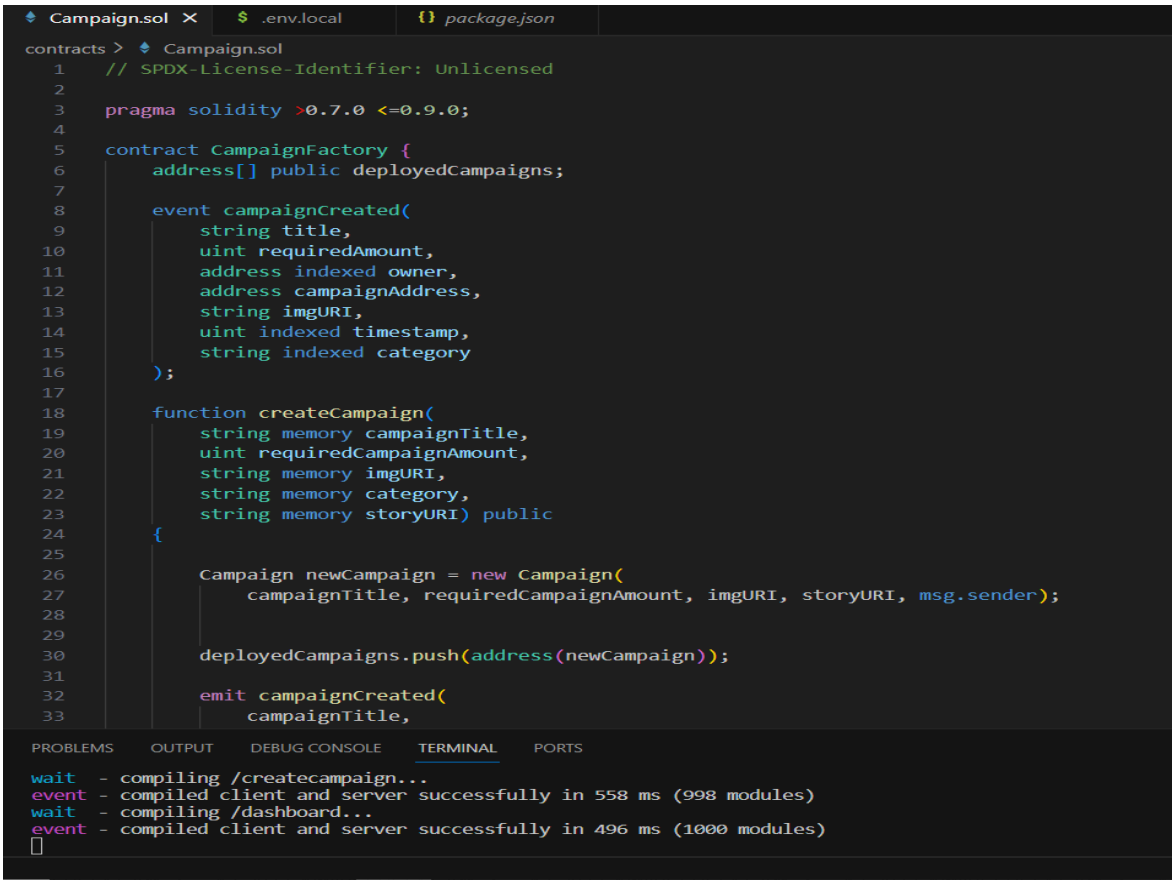

Fig 3.4.4 Development of Smart Contracts

6. Develop the user interface - Create a web application using Web3.js to interact with Polygon Mumbai web smart contracts. You can use React.js or other UI frameworks to create the UI.

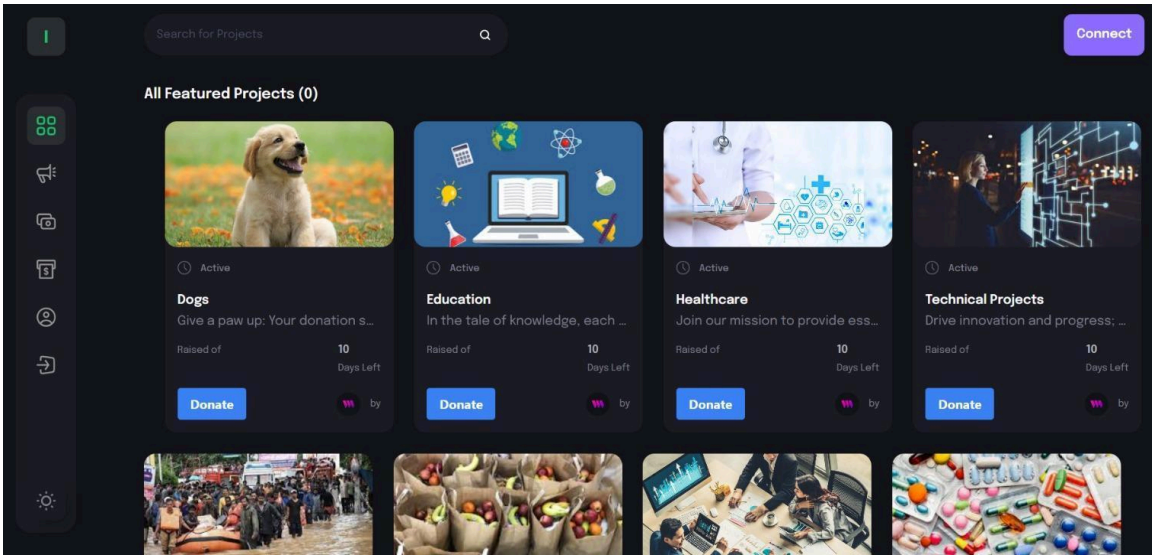

Fig 3.4.5 User Interface for created campaigns

7. Upgrade the User Interface:- Make all the necessary changes to upgrade the user Interface. Develop different pages for Campaign creation and Campaign dashboard.Use React to make these pages more responsive and more efficient in terms of user point of view.

8. Integration of Web3.js with Metamask:- Integrate the frontend with the Metamask wallet which contains Ethereum Matic Tokens which do not have any real time significance.

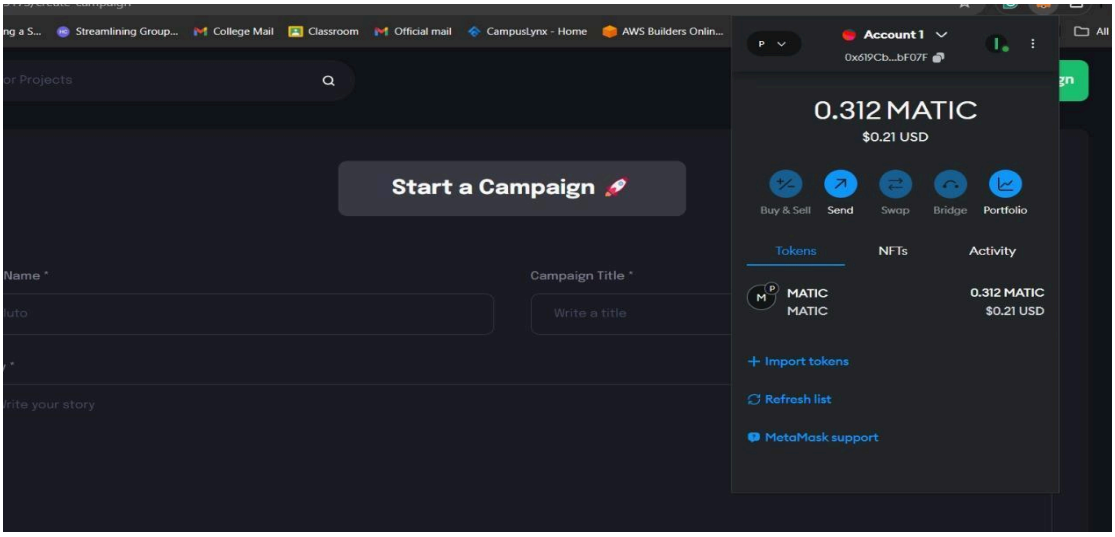

Fig 3.4.6 Integration of Web3.js with Metamask

9. Integration of different Templates:- Integrate all the templates together of create campaign , Campaign dashboard .

10. Test the application - Test the functionality of your smart contracts and web applications using the MATIC testnet and the Polygon Mumbai network. Ensure that transactions work correctly and that the user interface interacts with smart contracts as expected

11. Monitoring and optimization - Continuously monitor application performance and optimize to improve performance and user experience.

3.5 KEY CHALLENGES

Some of the main issues regarding the use of blockchain technology for crowdsourcing are:

1. Compliance: For blockchain based crowdfunding systems, security and funding procedures must not by-pass the laid down rules and regulations. The implementation of these rules should be observed for legal reasons in addition to running the app healthily.

2. Scalability: These are financial difficulties, which blockchain platforms encounter as more firms and people engage in high cost transactions that are lowly regulated.Some of these, and yet others important issues for success in blockchain crowdsourcing.

3. User Acceptance: Benefits associated with collective funding are realized when users understand how blockchain based platform help in raising funds. You should remove the obstacles hindering a widespread adaptation by users through lack of understanding or non-belief in the technology applied.

4. Smart contracts: Solving a number of problems related to scaling and implementing an industrial smart-contract is necessary. It involves challenges related to how they are ensured that the property is secured, inability or failure managements, and overcoming blockchains limitations.

5. Fraud Prevention: Fraud is controlled by monitoring smart contracts for use and consumption of content, which ultimately supports trust in blockchain technology. As a result, fraud is no more than an insignificant element unless always looked after. watch out

6. High fees: Large investors have high costs, which inhibit using a blockchain based crowd funding platform. This would mean that blockchain-based crowdfunding platforms would only be viable if there are low cost bases and more sustainable business models.

7. Transaction Restrictions: Thus, in England, for example, there will be no minilow transactions within the blockchain-based crowdfunding. This implies that these limitation can limit negotiations in other areas, make it hard for customers of equity shareholders. So as to address such business constraints, results from increased knowledge and use of blockchain based crowdfunding platform.

8. Technical complexity: However, for crowdsourced platforms require special skill set and that it is not quite simple.

9. Privacy and Security Issues: However, there are criticisms against block chain technology because of concerns on user, data, corporate privacy, and security. To build trust among users and investors it needs to be kept secret a user profile from prying eyes.

10. Barriers to Adoption: Nevertheless, the adoption of these platforms on a large scale will not succeed without bridging the gaps such as lack of comprehension and belief. It is important for them because it makes more people interested into them thus catching the eyes of different investors and project developers..

CHAPTER:-4

TESTING

4.1 TESTING STRATEGY

1. Unit Testing: -

- Smart Contracts: Test smart contracts deployed on Polygon's network using tools like Truffle or Hardhat. Check the functionality of contract methods such as campaign creation, transfers and reimbursement. -
- Web3.js Features: Unit tests the interaction of a web application with smart contracts using tools like Jest or Mocha. Make sure the app works properly with the blockchain for campaign creation, fund transfer and status updates.

2. Integration testing: -

- Blockchain Integration: Test the integration of web applications with Polygon network and Metamask wallet. Ensure seamless communication between the application, smart contracts and the blockchain. -
- Flow of Events: Test the entire flow of events from campaign creation to release or refund and make sure the process works as expected.

3. Security Test: -

- Smart Contract Security: Perform security audits of smart contracts to identify potential vulnerabilities such as loopback, overflow or unauthorized access.
- Wallet Protection: Ensure that Metamask wallet integration is secure and does not expose users' funds to potential threats.

4. User Acceptance Test (UAT): -

- Crowdfunding Workflow: Engage real users to participate in test campaigns, donate money and validate the entire crowdfunding process. -

- User Experience: Collect feedback on web application user experience, metamask integration and blockchain transactions.

5. Performance test: -

- Blockchain Scalability: Evaluate the performance of the crowdfunding platform under different loads to ensure that a large number of simultaneous transactions can be handled.
- Transaction Rate: Measure the speed of fund transfers and campaign updates on Polygon's network to ensure timely processing.

6. Regression test: -

- Smart Contract Updates: When you update smart contracts, perform regression tests to ensure that new features or bug fixes do not cause unexpected behavior.
- Web App Changes: Check web app functionality after UI updates or blockchain interactions.

4.2 TEST CASES AND OUTCOMES

TEST CASE: VALIDATE CAMPAIGN CREATION CONSTRAINTS

Scenario: Attempt to create a campaign with a deadline set in the past.

Expected Outcome: Expected result is a revert with the message "The deadline should be a date in the future."

TEST CASE: DONATE TO CAMPAIGN

Scenario: Donate to a campaign by sending Ether.

Expected Outcome: Donation transaction succeeds, Ether is transferred to the campaign owner, and the amount collected for the campaign increases.

TEST CASE: RETRIEVE CAMPAIGN DETAILS

Scenario: Retrieve details of a specific campaign by calling getCampaigns() or getDonators().

Expected Outcome: Successful retrieval of campaign information including title, description, target amount, deadline, amount collected, donators, and donations.

TEST CASE: MULTIPLE DONATIONS TO THE SAME CAMPAIGN

Scenario: Multiple users donate varying amounts to the same campaign.

Expected Outcome: Accurate recording of each donation and respective donor addresses in the campaign's donors and donations arrays.

TEST CASE: DONATING ZERO ETHER

Scenario: Attempt to donate zero Ether to a campaign.

Expected Outcome: Expected result is a revert indicating that the donation amount must be greater than zero.

TEST CASE: CAMPAIGN COUNT

Scenario: Retrieve the total number of campaigns after creating multiple campaigns.

Expected Outcome: The total number of campaigns matches the number of campaigns created.

TEST CASE: CAMPAIGN DONATIONS

Scenario: Validate the sum of donations against the total amount collected for a campaign.

Expected Outcome: The sum of donations from individual contributors equals the total amount collected for the campaign.

TEST CASE: RETRIEVE CAMPAIGNS WHEN NONE EXIST

Scenario: Retrieve campaigns when no campaigns have been created.

Expected Outcome: The function returns an empty array, indicating that there are no campaigns available.

TEST CASE: OUT-OF-BOUNDS CAMPAIGN ACCESS

Scenario: Access a campaign ID that doesn't exist.

Expected Outcome: Expected result is an exception or a revert due to attempting to access a non-existent campaign.

TEST CASE: CAMPAIGN IMAGE RETRIEVAL

Scenario: Access the image associated with a campaign.

Expected Outcome: Successful retrieval of the image associated with the campaign as per the contract design.

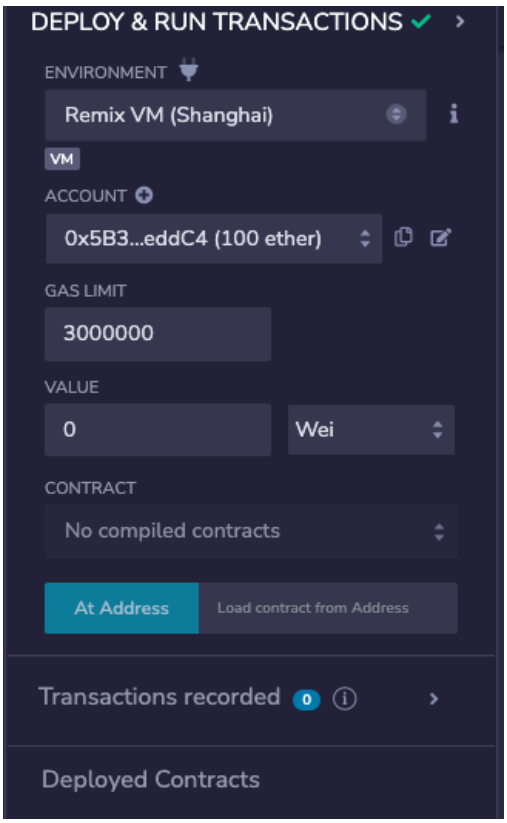

Fig 4.2.1 Deployment of Smart Contracts

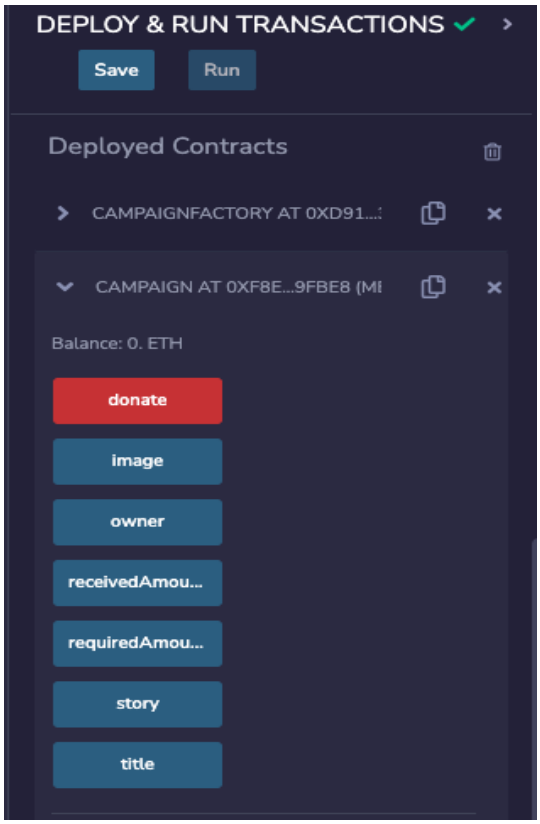

Fig 4.2.2 Deployment of Smart Contracts

CHAPTER:-5

RESULTS AND EVALUATION

5.1 RESULTS

The following snapshot represents the code for the Homepage of our campaign "DigiRaise- A crowdfunding Platform".It represents the User Interface for our project.

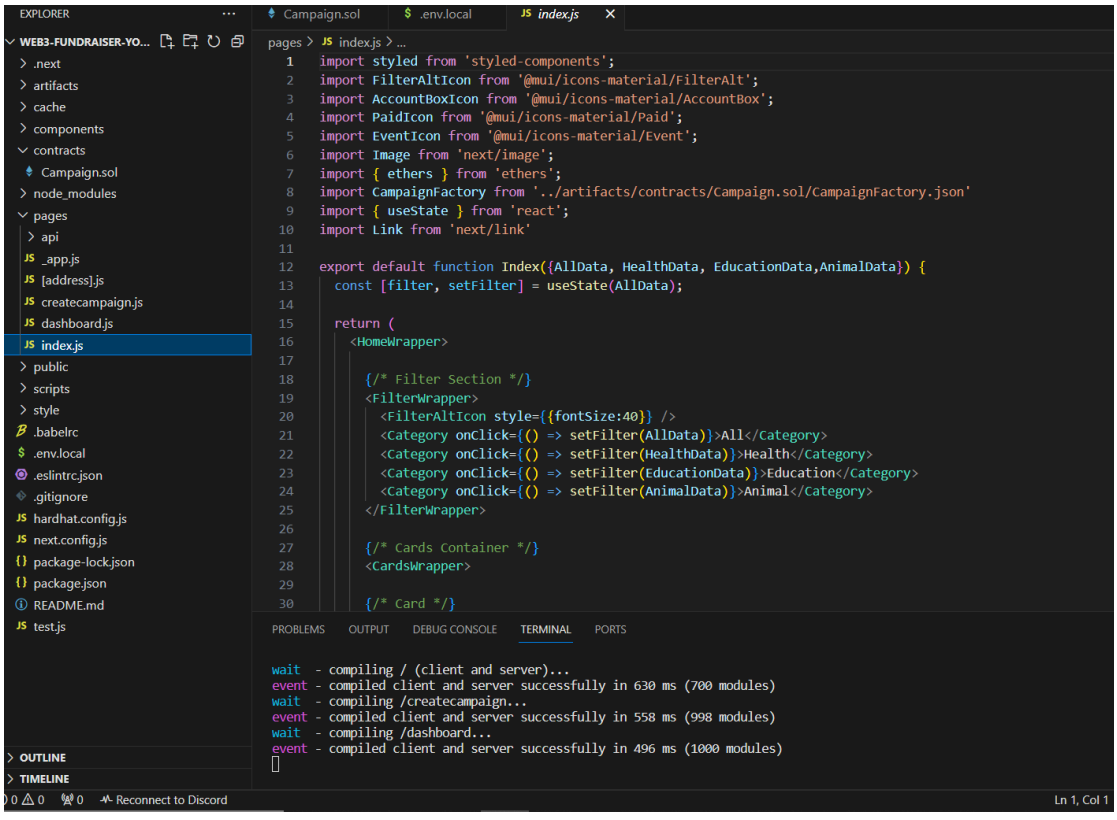

Fig 5.1.1 Home page code snippet

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 the 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 utilize 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.

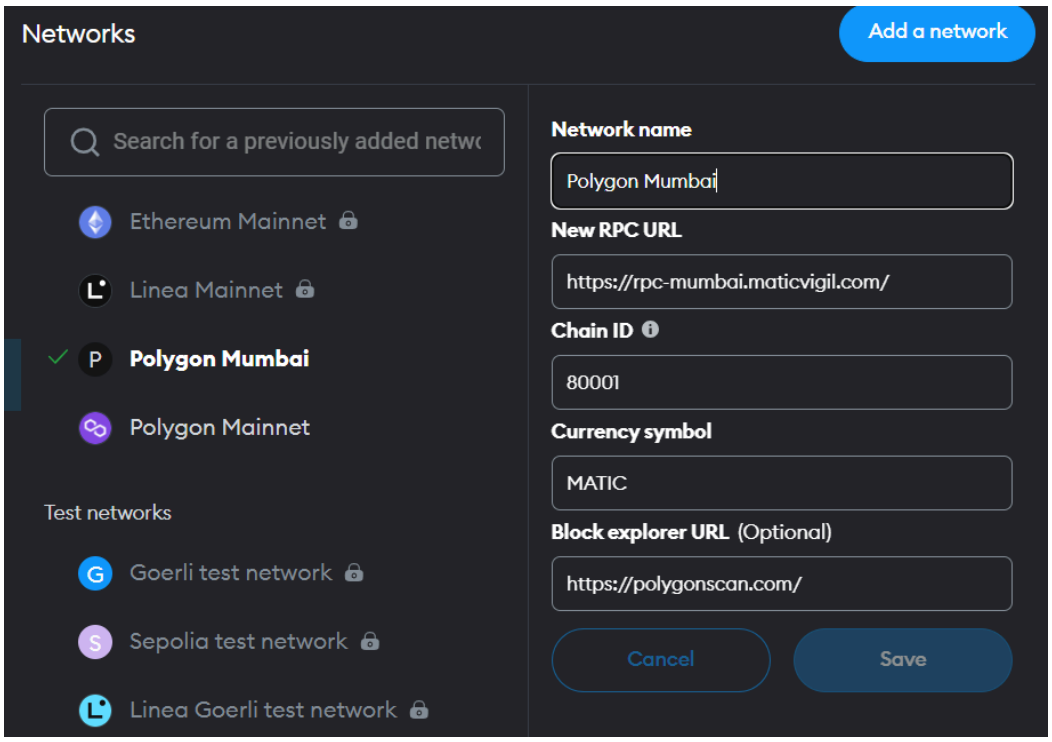

Fig 5.1.2 Polygon Test Net Network

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

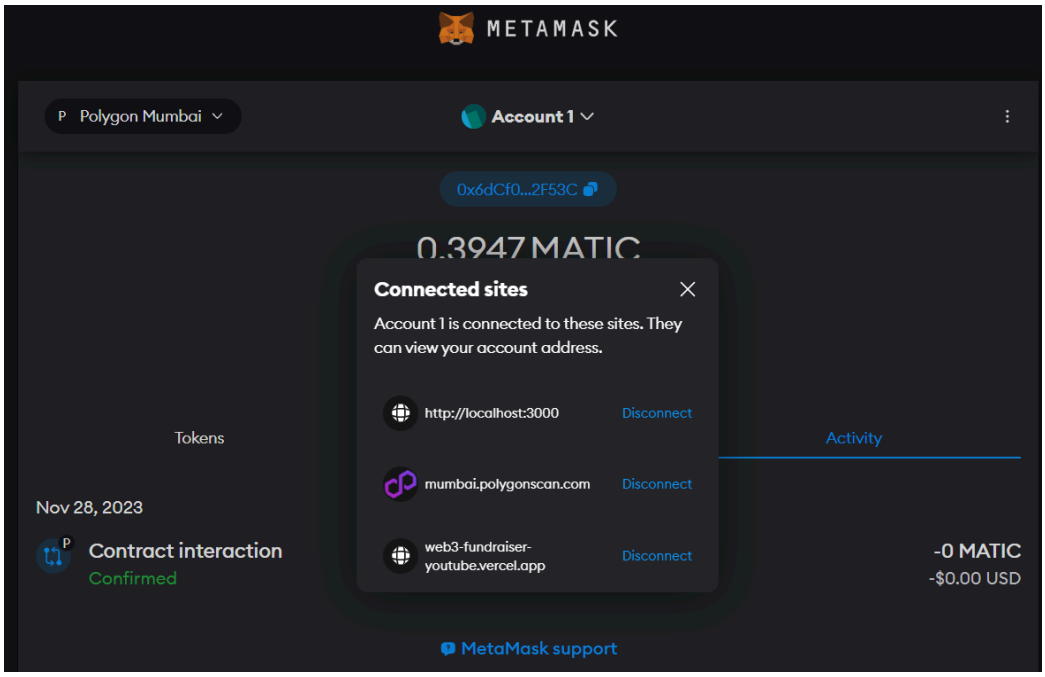

Fig 5.1.3 Connected Sites

The above snapshot is an illustration of the home page on our crowdfunding platform DigiRaise. 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.

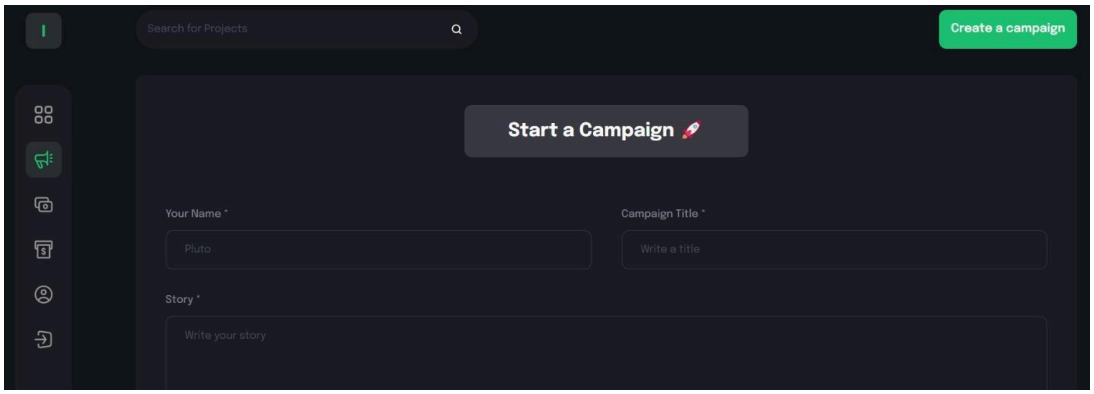

Fig 5.1.4 User Interface

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.

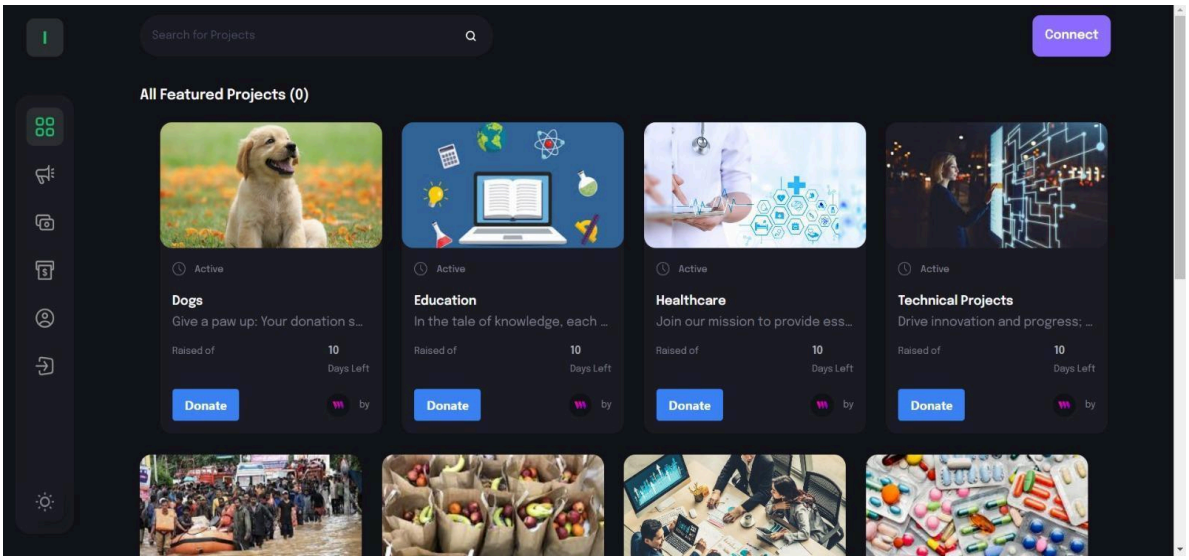

Fig 5.1.5 Dashboard for the campaigns created

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 .

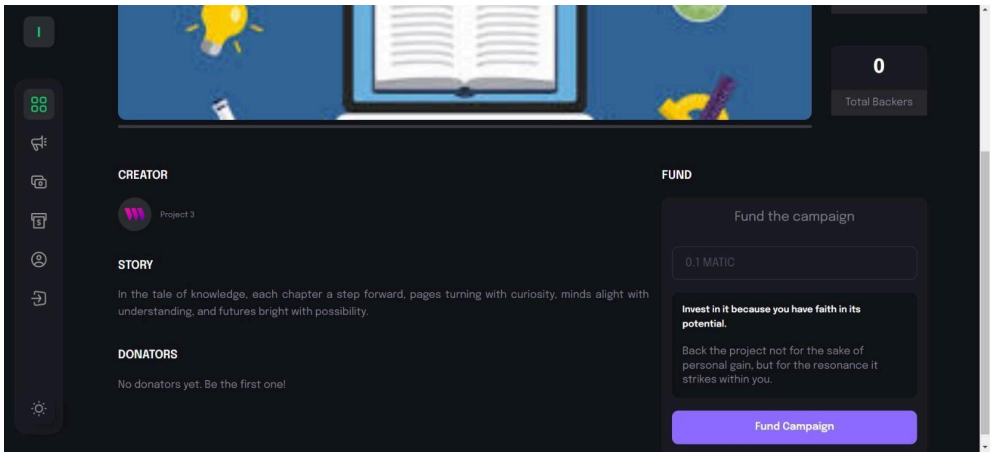

Fig 5.1.6 Campaign Dashboard

5.2 COMPARISON WITH EXISTING SOLUTIONS

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.

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.

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 dual platform for compatibility with two seamless MetaMask wallets and highly mobile. this platform

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

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 decentralized 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, democratizing 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
CONCLUSIONS AND FUTURE SCOPE

6.1 CONCLUSION

Developing a blockchain-based crowdfunding platform using Ethereum and Web3.js offers a promising solution to the challenges of traditional crowdfunding platforms. The platform provides a secure, transparent and decentralized way for individuals to support initiatives and concepts. Using smart contracts, the platform efficiently creates, manages and distributes campaigns, ensuring the integrity of events and users' financial resources. Integration with the Ethereum blockchain through Metamask improves the reliability and accessibility of the platform. Take advantage of Polygon's network of free Mac IDs ; will further improve the scalability and cost-effectiveness of events, setting the stage for a transformative leap in the world of fundraising.

ACHIEVEMENTS

The successful development of the DApp crowdfunding platform has created a functional, secure and reliable solution that stands out in terms of affordability compared to existing crowdfunding platforms. The contributions of the project and the crowdfunding world are as follows:

1. Development of a decentralized crowdfunding platform.
2. Using smart contracts to secure transactions and financial resources of users.
3. Create an open and affordable crowdfunding platform.
4. The platform has the potential to enable individuals to invest in real estate projects through blockchain crowdfunding, democratizing access to real estate investment opportunities.
5. Using blockchain technology, the platform enables seamless cross-border investment, enabling investors from around the world to participate in

crowdfunding projects without geographic restrictions or intermediaries, promoting a globally accessible investment environment.

6. The integration of the blockchain platform increases the security, transparency and trust of crowdfunding. The use of smart contracts and blockchain technology makes the platform more reliable, transparent, reliable, decentralized, cost-effective and convenient, and meets the challenges of centralization.
7. The adoption and adoption of Blockchain in the crowdfunding industry will benefit both creators and investors. The platform and adoption of blockchain technology facilitates decentralization and mediation, leading to more efficient crowdfunding processes and attracting more donors and creators to the platform.

POSSIBLE IMPROVEMENTS

1. Strengthening of security protocols :Improving security through regular security audits, updates and improved user authentication methods will strengthen the platform against potential vulnerabilities and threats.
2. Improving scalability: Optimizing gas prices and finding solutions to improve transaction performance strengthen the scalability of the platform and ensure smooth operation even under heavy load.
3. Improve the user experience :Improving user interfaces, ensuring mobile compatibility and improving the accessibility of the platform will improve the user experience, make it more intuitive and interesting.
4. Community engagement and management:- Implementing features that encourage community participation, exploring Decentralized Autonomous Organization (DAO) decision-making models and promoting community governance will help create a more inclusive and participatory environment.

In conclusion, a blockchain-based crowdfunding platform using Ethereum and Web3.js can revolutionize the crowdfunding industry by providing a secure, transparent and decentralized way to support initiatives and concepts. With the continuous development of blockchain and the introduction of ICO, the platform has the promise of further

improvement and development, which meets the trend of online crowdfunding with blockchain technology.

6.2 FUTURE SCOPE

1. Advanced security measures: -

- Emphasis on security audits: regular security audits and updates to strengthen smart contracts and the platform against potential vulnerabilities
- Implementation of multi-factor authentication: simplify user authentication procedures to increase security requirements.

2. Scalable Optimization:

- Optimizing the price of gas: researching methods of optimizing gas to reduce transaction costs and improve the economy.

3. Better User Experience:-

- User Interface and User Experience (UI/UX) Design: Improving user interfaces to make them smooth and easy to use, attract and repel a larger audience
- Mobile compatibility: improving the usability of the platform by creating mobile versions or special applications.

4 . Community Engagement and Management:-

- Community-centric features: implementation of functions that encourage community participation, such as voting systems for selecting projects or platform update.
- Decentralized governance: research of models of decentralized autonomous organizations in decision-making and community management.

5. Interoperability:-

- Cross-chain compatibility: Connect to other blockchain networks to improve communication and allow users to participate with other cryptocurrencies.

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APPENDIX

CODE SNIPPETS FOR SOLIDITY SMART CONTRACTS

```
pragma solidity ^0.8.9;

contract Ifundify {
    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;
    }
}
```

PLAGIARISM CERTIFICATE

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