

CRYPTO CROWDFUNDING USING BLOCKCHAIN

Sanket Patil^{*1}, Nidhi Patil^{*2}, Pruthviraj Mane^{*3}, Sairaj Shinde^{*4}, Prof. Preeti Patil^{*5}

^{*1,2,3,4}Student, Department of Computer Engineering, Terna Engineering College, Nerul, Navi Mumbai, Maharashtra, India.

^{*5}Assistant Professor, Department of Information Technology, Terna Engineering College, Nerul, Navi Mumbai, Maharashtra, India.

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Abstract

The "Crypto Crowdfunding using Blockchain" project presents a decentralized crowdfunding platform leveraging blockchain technology for transparency, security, and efficient fund management. This innovative platform facilitates seamless interaction between Campaign Creators, Admins, and Users, ensuring a fair and trustworthy ecosystem for fundraising initiatives. Utilizing Next.js for the front-end interface, Solidity for smart contracts, and integrating Metamask for wallet functionality, the project employs a robust technological stack to realize its objectives. The consensus mechanism, inherent to blockchain, enables agreement on the validity of transactions and campaign details across the network without the need for a central authority and this is achieved through proof-of-stake protocols. Campaign Creators initiate campaigns through a user-friendly interface, which undergoes approval by Admins to maintain platform integrity. Users engage securely through their crypto wallets, contributing to approved campaigns, and tracking their impact. The platform's architecture, encompassing smart contracts, PostgreSQL database, and user authentication mechanisms, ensures data integrity and user security. The project's purpose is to revolutionize crowdfunding, fostering a transparent, decentralized environment where individuals can support causes they believe in with confidence. By combining blockchain's decentralized nature with a user-friendly interface and robust security measures, Crypto-Crowdfunding aims to redefine the crowdfunding landscape, empowering both campaigners and contributors alike.

belief in the project, contribute funds in exchange for rewards, equity, or other predefined benefits. Crowdfunding has gained popularity due to its ability to connect creators directly with their audience, fostering innovation and supporting projects that may struggle to secure conventional funding. Crowdfunding, when combined with blockchain technology, has brought about a revolutionary shift in the way funds are gathered for diverse projects and causes. This novel approach stands as a robust alternative to traditional financing methods, establishing a secure and reliable platform for innovators, donors, and consumers. The incorporation of blockchain technology has propelled crowdfunding to unparalleled levels of transparency and efficiency.

The decentralized and transparent features of blockchain have empowered start-ups, novel products, and charitable causes to effectively harness the potential of crowdfunding. The decentralization aspect ensures that decision-making and fund allocation are not under the control of a central authority, fostering inclusivity and democratization in the fundraising process. Moreover, the transparency inherent in blockchain guarantees that each transaction and the use of funds is meticulously recorded on an immutable ledger, instilling confidence among donors that their contributions are dedicated to their intended purposes. Blockchain operates on a distributed ledger, a decentralized database that meticulously chronicles the complete history of digital assets. This unalterable characteristic ensures that once information is recorded, it remains unchanged, serving as a disruptive force in industries such as payments and cybersecurity. The security and integrity offered by blockchain significantly contribute to the overall dependability of crowdfunding platforms, mitigating risks associated with fraud or misappropriation of funds. In summary

I. Introduction

Crowdfunding offers an alternative to traditional funding sources, such as banks or venture capitalists, by democratizing access to capital. Backers, motivated by a shared interest or

the fusion of crowdfunding and blockchain technology has not only expanded the possibilities in fundraising but has also initiated a positive transformation in the realms of financial transparency, security, and trust. As this synergistic relationship continues to evolve, it is poised to redefine how projects receive funding and support across various sectors, promising a bright future for innovation and community-driven initiatives.

This project aims to leverage blockchain technology in the fundraising sector, addressing challenges faced by non-profit organizations. The past events like Covid-19 pandemic and other calamities have underscored the need for efficient fund management, prompting communities to raise funds for relief efforts. However, trust among funders, intermediaries, and recipients remains a challenge. Integrating blockchain can enhance transparency, security, and efficiency in the fundraising process. Blockchain's attributes of decentralization, transparency, and immutability can establish trust among stakeholders. Smart contract technology automates fund disbursement based on predefined conditions, eliminating intermediaries and reducing transaction costs. Inspired by successful applications in industries like telecommunications and healthcare, the project aims to create a reliable, transparent, and secure platform that boosts funders' confidence in supporting causes. This integration could redefine crowdfunding, maximizing funds collected for noble causes through transparency, efficiency, and trustworthiness.

II. Related Work

The concept of blockchain-based crowdfunding has gained significant attention in recent years, with researchers and developers exploring various approaches to address challenges in traditional fundraising methods. Several studies and projects have contributed to the understanding and implementation of blockchain technology in the crowdfunding domain. Here, we review some relevant work in this area:

In "Venturing Crowdfunding using Smart Contracts in Blockchain" by Nikhil Yadav and Sarasvathi V., blockchain and smart contracts are harnessed to revolutionize crowdfunding [1]. Addressing traditional limitations, the platform ensures transparent fund usage, empowering contributors to control their investments. Leveraging Ethereum blockchain and tools like Metamask, security and decentralization are prioritized. Despite challenges, such as technical complexities, the paper heralds a transformative shift

in crowdfunding dynamics, promoting collaboration and innovation in fundraising. This approach enhances transparency, security, and efficiency, reshaping crowdfunding landscapes and encouraging further exploration of blockchain-enabled platforms..

The research paper "Crowdfunding the Insurance of a Cyber-Product Using Blockchain" addresses challenges in cyber-insurance and proposes a framework leveraging blockchain technology [2]. The obstacles include the lack of reliable data for measuring cyber-risks, legal and procedural hurdles for security assessments, moral hazard, adverse selection, transparency issues, risk sharing, and improving security measures. The framework utilizes blockchain's transparency and security features to enhance cyber-insurance by transferring risks to insurers through a sealed-bid auction mechanism within smart contracts. Challenges such as collusion resistance, moral hazard, adverse selection, transparency, risk sharing, and improving security measures are addressed. The system aims to prevent collusion between auditors, customers, and vendors, facilitate risk sharing among insurers with different risk tolerances, enhance the security of the cyber-product, and provide transparency in the insurance process using blockchain technology effectively.

The paper introduces LikeStarter, a decentralized crowdfunding platform developed by researchers at the University of Bologna, Italy, operating as a Decentralized Autonomous Organization (DAO) on the Ethereum blockchain [3]. Unlike traditional platforms, LikeStarter merges social interactions with blockchain technology, enabling users to support projects through post likes, triggering micro-donations in Ether converted into Likoin tokens representing project ownership and profit potential. Ethereum serves as the foundational blockchain, facilitating smart contract and token creation, while smart contracts govern transactions. LikeStarter's architecture is detailed, emphasizing token, crowdfunding, artifact, and voting management via smart contracts. The user-friendly interface facilitates seamless engagement, allowing likes, donations, and participation in crowdfunding campaigns. A practical use case illustrates LikeStarter's efficacy, with an artist crowdfunding a new song through user engagement, highlighting its potential to revolutionize crowdfunding through decentralized social interactions and financial support.

The paper on Education Funding and Scholarship in Blockchain Technology addresses challenges in traditional student project fundraising, highlighting issues like complexity and security

vulnerabilities due to centralized data storage [4]. It advocates for blockchain's decentralized ledger and cryptographic hash functions to enhance transparency and security. Smart contracts are proposed to manage crowdfunding activities transparently and securely. The research emphasizes blockchain's potential to automate processes, ensuring fairness, transparency, and efficiency in scholarship management. By eliminating intermediaries and leveraging blockchain's security features, the proposed platform aims to provide a trustworthy and transparent environment for fundraising, revolutionizing student project funding.

This paper explores the development and utilization of a crowdfunding platform tailored for college students' entrepreneurship, examining its mechanisms, functions, and implications in fostering entrepreneurial ventures among students. The platform serves as a space for students to showcase their innovative ideas, connect with potential investors, and secure funding for their projects. Challenges within the platform include intense competition for attention and funding, the risk of projects failing to meet their funding goals, and concerns regarding intellectual property protection. Despite these challenges, the platform strives to offer a supportive environment for student entrepreneurs to access capital, engage with investors, and realize their innovative concepts[5].

The paper provides a comprehensive examination of blockchain technology, covering public, private, and consortium blockchains, consensus algorithms like PoW and PoS, and challenges such as selfish mining [6]. It clarifies differences between blockchain types regarding consensus, immutability, efficiency, and centralization. It discusses consensus algorithms' attributes and energy-saving benefits, addressing challenges in achieving consensus and transaction anonymity, including selfish mining complexities. Future directions for blockchain, like testing mechanisms and expanding applications beyond finance, are suggested. Various consensus algorithms are proposed, each with pros and cons, to tackle challenges like energy consumption and node identity management. Concerns about centralization in mining pools and the need for testing mechanisms are underscored, along with blockchain's potential in diverse sectors.

The paper examines voting-based crowdfunding implementation using Ethereum blockchain, highlighting its advantages of transparency, security, and decentralization over traditional methods. Smart contracts automate fund transfers via majority voting, ensuring participant accountability.

Ethereum's capability for autonomous smart contract execution fosters trustless interactions. The paper emphasizes blockchain's accessibility and global reach. Challenges include high gas consumption affecting scalability, smart contract vulnerability, regulatory concerns, and user experience improvements. Despite challenges, blockchain holds promise in revolutionizing fundraising by enhancing transparency, security, and efficiency in crowdfunding platforms [7].

The paper introduces BlockCIS, a blockchain-based cyber insurance system aimed at addressing challenges in traditional cyber insurance. These challenges include the absence of standardized risk assessment frameworks and limited data for accurate premium determination. BlockCIS establishes a feedback loop involving customers, insurers, third-party services, and auditors using blockchain. It automates processes, monitors security postures in real-time, and ensures data privacy. Deployment involves placing nodes on customer networks, adjusting premiums based on real-time data, and involving third-party services for specialized monitoring. The role of auditors in dispute resolution and regulatory compliance is considered. Hyperledger Composer is proposed for BlockCIS implementation, with future work suggested to refine incentive structures. BlockCIS offers promise in enhancing cyber insurance through blockchain-enabled continuous security posture monitoring and assessment.

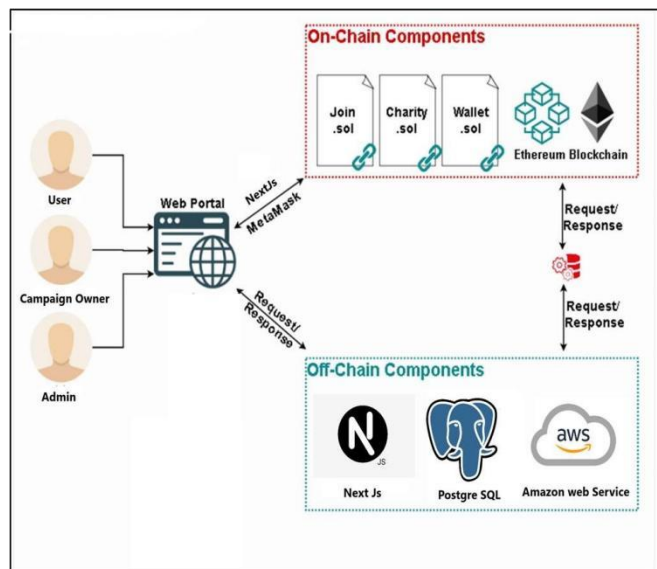
The paper introduces blockchain technology for crowdfunding, highlighting its benefits like transparency and security [9]. It addresses traditional crowdfunding challenges like fraud with features such as immutable ledgers and smart contracts. Using Ethereum smart contracts, the system enhances security and tracks transactions in real-time. Users authenticate via MetaMask and can create, contribute to, and approve campaigns. The system ensures transparency and combats fraud. However, implementing blockchain for crowdfunding poses challenges like user education, regulatory compliance, and scalability issues. Despite these challenges, blockchain-based crowdfunding platforms offer a promising solution, providing assurance to users and encouraging contributions to worthy causes.

This study explores how blockchain technology can improve crowdfunding by addressing issues like high fees, lack of transparency, and fraud. It aims to create a more secure and efficient crowdfunding experience. The research objective is to survey existing blockchain-based crowdfunding platforms and propose improvements. It identifies gaps in current research and highlights the potential of blockchain to enhance security and

trust. The study scope includes examining blockchain's role in creating secure platforms and its expected outcomes in proposing reliable crowdfunding solutions. It reviews related works, showcasing efforts to integrate blockchain into crowdfunding and emphasizes the benefits of transparency and security. Overall, the study aims to leverage blockchain technology to revolutionize crowdfunding for investors and fundraisers alike [10].

The paper explores the integration of blockchain technology into socially conscious crowdfunding platforms to address issues like transparency, trust, and security. It identifies challenges with traditional crowdfunding, such as centralized control and susceptibility to cyberattacks, and proposes a decentralized framework using blockchain to mitigate these issues. Key elements include the use of smart contracts for automated governance, blockchain's transparency and tamper-resistant nature, and the potential benefits of reducing transaction fees and fostering collaboration. The methodology section outlines the research process and identifies risks such as fraudulent fundraisers and contributors, offering strategies to address them. Overall, the paper provides a thorough examination of blockchain's potential to transform crowdfunding by enhancing trust, security, and transparency[11].

III. Proposed Methodology



The proposed methodology for the project is anchored in a visionary approach to crowdfunding, leveraging a strategic blend of advanced technologies and user-centric principles. At its core, the methodology revolves around harnessing the potential of blockchain technology, particularly the Ethereum blockchain, renowned for its robustness and smart contract capabilities. Through meticulous development using Solidity, the project aims to create smart contracts that encode the intricate logic governing crowdfunding campaigns and ensure efficient fund management within the Ethereum network. Complementing this blockchain integration, the utilization of Next.js for front-end development and PostgreSQL for data storage epitomizes the commitment to reliability and versatility. Seamless user authentication via MetaMask integration enhances user experience, while the deployment of responsive customer support and adherence to regulatory standards underscores the project's dedication to transparency and accountability. By embracing cutting-edge technologies and fostering community trust, the proposed methodology seeks to redefine the crowdfunding landscape, ushering in a new era of inclusivity, security, and innovation.

1. Blockchain Integration and Smart Contracts

Deployment: The project's foundation lies in the integration of blockchain technology and deployment of smart contracts. Ethereum blockchain is chosen for its robustness and smart contract capabilities. Smart contracts, developed using Solidity, encode campaign logic and manage funds efficiently on the Ethereum network. To streamline development processes, ensure reliability, and facilitate efficient testing, Hardhat serves as the designated Ethereum development environment.

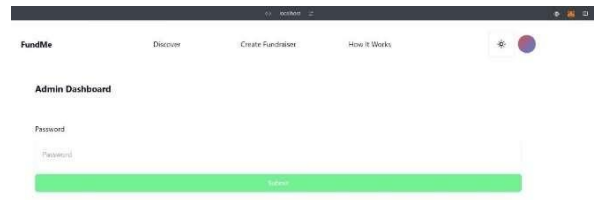
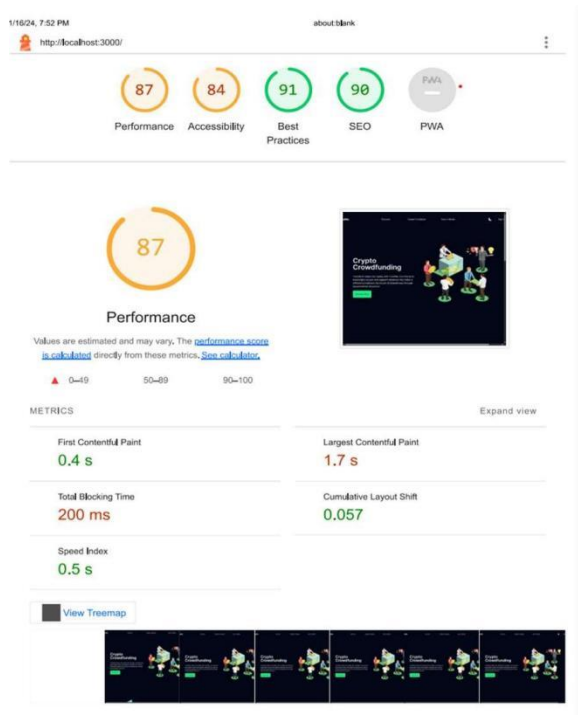
2. User Authentication and Interaction:

User authentication and interaction are paramount for creating a seamless crowdfunding experience. Integration of MetaMask facilitates user authentication and interaction with the Ethereum blockchain. The front-end interface is developed using Next.js, providing campaign creators with a platform to initiate campaigns and provide project details. Web3.js library enables interaction with the Ethereum blockchain from the front-end, enabling seamless integration with MetaMask.

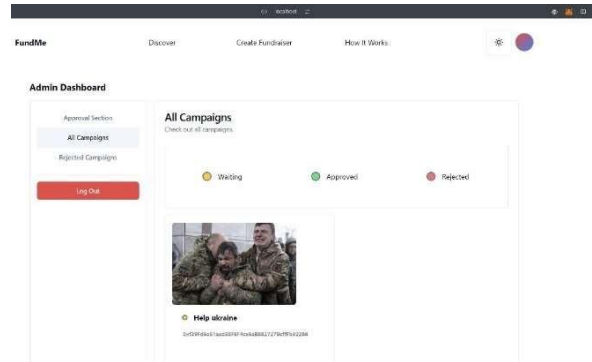
3. Campaign Creation and Management:

Effective campaign creation and management rely on robust database management and backend logic. Campaign data is securely stored in a PostgreSQL database, ensuring persistence and accessibility. Server-side logic, implemented using Node.js with Express.js framework, processes and validates campaign data before storing it in the PostgreSQL database. An admin dashboard, designed using Next.js and PostgreSQL, enables administrators to review, approve, or reject campaigns before publication.

IV. Experimental Analysis



The admin can approve, or reject the campaign created by the user.

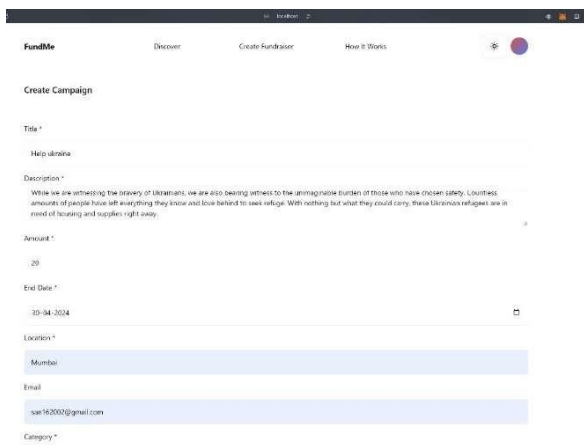


Admin Dashboard

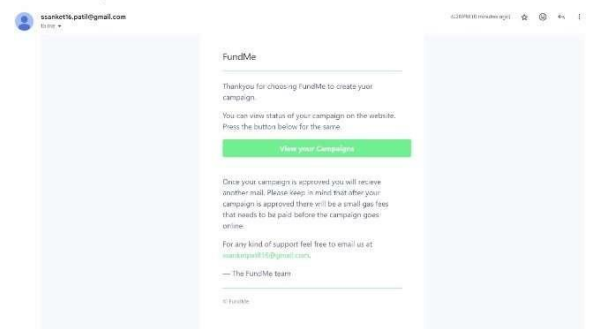
V. Result and Discussions

The user can direct to create fundraiser on the website by adding the details like title, amount location, email, etc. to raise an amount for the cause. The user can add the deadline of the campaign as required

If Admin approves the campaign created by the user then the user will receive an email regarding the status of the created campaign.

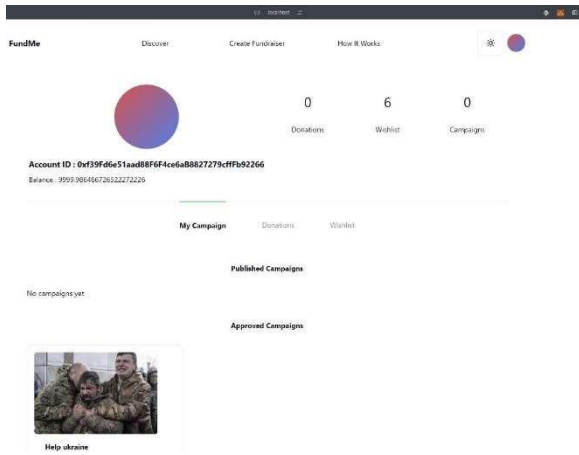


Creation of campaign

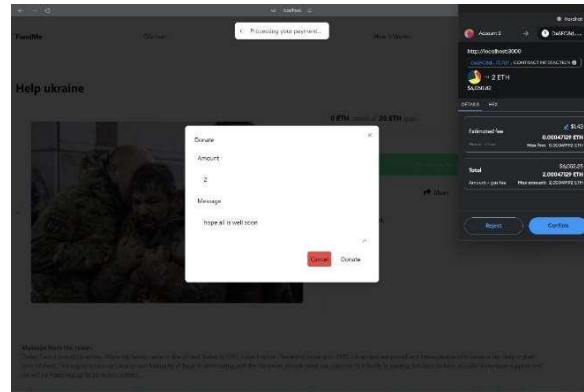


Approval Email

As the campaign gets approved by the admin it will be displayed in the profile of the user.



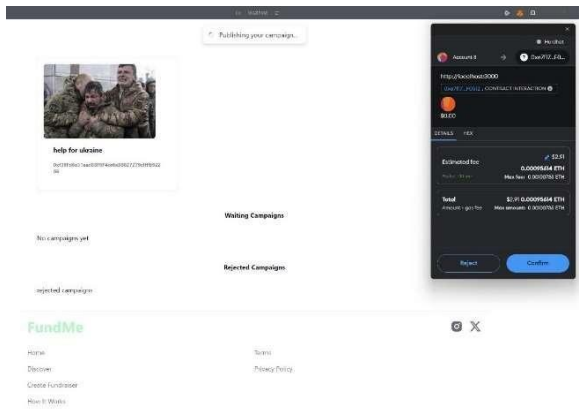
Profile Page



Successful transaction

VI. Conclusion

In conclusion, the Crypto Crowdfunding utilizing blockchain technology offers a robust and secure platform for users to engage in fundraising activities. The integration of Metamask ensures a safe and user-friendly experience, while the admin approval process guarantees the legitimacy of campaigns before they are showcased. The use of smart contracts automates the execution of milestones, enhancing transparency and trust among backers. Security measures, including regular audits, underscore a commitment to safeguarding user data and funds. Legal compliance is a core consideration, ensuring the platform aligns with crowdfunding and financial regulations in relevant jurisdictions. In essence, this blockchain-based crowdfunding aspires to create a transparent, secure, and user-centric environment, promoting legitimate campaigns and fostering trust among users and backers.

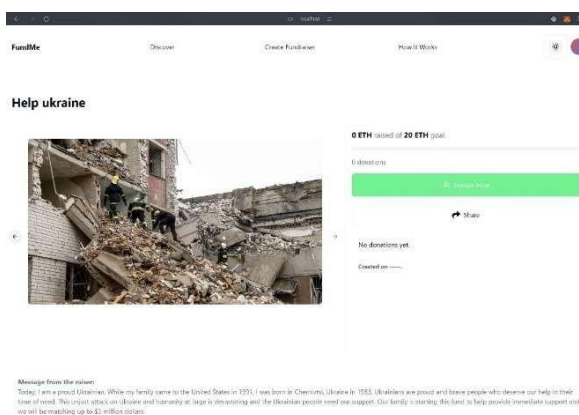


The user can publish the campaign on blockchain.

References

[1] N. Yadav and S. V., "Venturing Crowdfunding using Smart Contracts in Blockchain," 2020 Third International Conference on Smart Systems and Inventive Technology (ICSSIT), Tirunelveli, India, 2020, pp. 192-197, doi: 10.1109/ICSSIT48917.2020.9214295. keywords: {Contracts;Conferences;Companies;Protocols;Computer science;Ethereum;smart contracts;crowdfunding}

[2] S. Nemade, A. Kamble, S. Sopal, P. Bhale and V. Pachghare, "Blockchain-based Crowdfunding for Cyber-Product Insurance," 2022 2nd International Conference on Innovative Sustainable Computational Technologies (CISCT), Dehradun, India, 2022, pp. 1-5, doi: 10.1109/CISCT55310.2022.10046520.



Description of the Campaign

If a person wants to raise an amount for this campaign or a certain campaign on the website they can continue with donate now to contribute.

keywords: {Computers;Law;Distributed ledger;Smart contracts;Insurance;Pricing;Blockchains;Cyber-risks;Blockchain;Crowdfunding;Smart Contract},

[3] M. Zichichi, M. Contu, S. Ferretti and G. D'Angelo, "LikeStarter: a Smart-contract based Social DAO for Crowdfunding," IEEE INFOCOM 2019 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), Paris, France, 2019, pp. 313-318, doi: 10.1109/INFOCOMW.2019.8845133. keywords: {Blockchain;Smart contracts;Social networking (online);Organizations;Cryptography;Standards organizations},

[4] B. Kumar, P Navin , D Dhanush and L Priya "Education Funding and Scholarship in Blockchain Technology," 2019 IEEE 6th International Conference on Industrial Engineering and Applications (ICIEA), Tokyo, Japan, 2019, pp. 567-571, doi: 10.1109/IEA.2019.8714815. keywords: {Support vector machines;Feature extraction;Training;Text mining;Internet;Predictive models;crowdfunding;feature selection;project success rate;prediction;SVM-RFE}

[5] Z. Song, D. Chen and T. Yi, "The research on construction and application of college students entrepreneurship crowdfunding platform," 2016 Chinese Control and Decision Conference (CCDC), Yinchuan, China, 2016, pp. 4483-4486, doi: 10.1109/CCDC.2016.7531792. keywords: {Entrepreneurship;Databases;Decision support systems;Big data;Cloud computing;Computational modeling;Data models;Crowdfunding Model;Entrepreneurship Crowdfunding Platform;College Students Entrepreneurs;Construction and Application of Website}

[6] Zheng, Zibin, et al. "An overview of blockchain technology: Architecture, consensus, and future trends." 2017 IEEE international congress on big data (BigData congress). IEEE, 2017.

[7] Bajad, Siddhesh, et al. "Voting Based CrowdFunding Using Ethereum Blockchain." 2023 IEEE International Conference on Blockchain and Distributed Systems Security (ICBDS). IEEE, 2023.

[8] Lepoint, Tancrede, Gabriela Ciocarlie, and Karim Eldefrawy. "Blockcis—a blockchain-based cyber insurance system." 2018 IEEE International Conference on Cloud Engineering (IC2E). IEEE, 2018.

[9] Vhatkar, H. V., Singh, H. G., Sonavane, A. S., Singh, S., & Pulgam, N. (2023, April 28). Crowdfunding using Blockchain. 2023 11th International Conference on Emerging Trends in Engineering & Technology - Signal and Information Processing (ICETET - SIP). Presented at the 2023 11th International Conference on Emerging Trends in Engineering & Technology - Signal and Information Processing (ICETET - SIP), Nagpur, India. doi:10.1109/icetet-sip58143.2023.10151618

[10] Kumbharkar, P. B., et al. "Fund Crypt: Blockchain based Crowdfunding Platform using SHA-256 & POS Algorithm." 2023 2nd International Conference on Edge Computing and Applications (ICECAA). IEEE, 2023.

[11] Gupta, Shikha, et al. "The Potential of Blockchain Technology in Socially Responsible Crowdfunding Platforms." 2023 Second International Conference on Informatics (ICI). IEEE, 2023.