International Journal of
INTELLIGENT SYSTEMS AND APPLICATIONS IN ENGINEERING
ISSN:2147-6799 www.ijisae.org Original Research Paper

Crowdfunding Platform for Social Activities Using Blockchain

G. Shanmuga Priya[1], K. Siva Ranjani[2], B. Sowmya[3], R. Sugirtha[4]

Submitted: 04/02/2024 **Revised:** 12/03/2024 **Accepted:** 18/03/2024

Abstract: Collecting funds for social activities is a challenging task, requiring the identification of the right places and organizations to meet the need. One of the major areas requiring substantial funding is the eradication of poverty, which is the first Sustainable Development Goal (SDG). Poverty remains a persistent global challenge, impacting millions. While traditional charities and development organizations play a crucial role, innovative solutions are needed to accelerate progress. Crowdfunding emerges as a promising avenue for fundraising. Crowdfunding leverages cutting-edge technology, particularly blockchain, to enhance the efficiency, secure, and transparent fundraising procedure. Blockchain technology a decentralized and distributed ledger system. Unlike traditional crowdfunding, where a centralized platform controls and monitors the fundraising procedure, decentralized blockchain crowdfunding platforms have no single point of control. This significantly reduces the risks of censorship and fraud. While crowdfunding has benefited many over the years, it has also witnessed significant scams. The proposed solution aims to build confidence among contributors to all causes by providing transparency to the crowdfunding process. All campaign, donation, withdrawal, and fund information would be stored on the network, accessible to everyone in a decentralized manner. This approach prevents data being centralized on a single server, ensuring that funds and transactions are visible and maintained at every node on the blockchain. This not only safeguards the funds from falling into the wrong hands but also ensures that they are utilized for the economic development of society.

Keywords: *Poverty, Crowdfunding, Social activities, Blockchain, Decentralised, Fundraising, Ethereum, Campaigns, Smart contracts*

1. Introduction

Crowdfunding is a dynamic and innovative fundraising method that has transformed the traditional landscape of financing. In this contemporary approach, individuals, businesses, or creative campaigns seek financial support from a large number of people, or the "crowd," typically through online platforms. Unlike conventional financing methods, crowdfunding harnesses the collective power of a diverse group of backers, ranging from friends and family to strangers worldwide. This mode of funding enables the entrepreneurs, start-ups and various activities to raise capital for their ventures, community and often offering some rewards [1],[2]. The development of crowdfunding has greatly impacted entrepreneurship and new ideas providing a platform here to flourish and support [3]. Blockchain is a technology that has a widespread technology used to help in various industries. Each block contains a cryptographic hash of the ahead block, creating an order and invulnerable stored transactions [4],[5]. It will ensure data integrity, also remove the need for third party in the transaction. Blockchain technology extend to provide smart contracts and more [6],[7]. It's major ability to facilitate transparency, security, and efficient way of transaction to pave a way for revolution to secure processing. Blockchain technology in crowdfunding brings an advantage that replace the traditional fundraising model [8]. The foremost advantage is the blockchain's immutable nature that make sures that all transactions are secured and visible to all [9],[10]. This transparency instils enhances trust among the contributors as they can check the fund process and reducing the risk of tampering. The integration of smart contracts which automates the flow of crowdfunding campaign [11]. Blockchain provides the global access to get fund from anywhere without any bounds [12]-[14]. The nature of blockchain technology specifically reduces the tampering of data, manipulation and provide a more secure and reliable crowdfunding platform [15]. Fundamentally, the dominance of blockchain in crowdfunding lie in its ability to provide transparent, efficient, and global access to the fundraising approach, ultimately orienting the flow of how secure financial support can be provided by a diverse crowd across the global.

[1]*Assistant Professor (Selection Grade), Department of Computer Science, Sri Krishna College of Technology, Coimbatore – 641030, Tamilnadu, India.*
Email: shanmugapriya.g@skct.edu.in
[2]*Department of Computer Science, Sri Krishna College of Technology, Coimbatore – 641030, Tamilnadu, India.*
Email: 20tucs221@skct.edu.in
[3]*Department of Computer Science, Sri Krishna College of Technology, Coimbatore – 641030, Tamilnadu, India.*
Email: 20tucs227@skct.edu.in
[4]*Department of Computer Science, Sri Krishna College of Technology, Coimbatore – 641030, Tamilnadu, India.*
Email: 20tucs235@skct.edu.in

2. Literature Review

The elements that impact individuals' choices to contribute to medical crowdfunding initiatives. It analyses both determinants (factors impacting donation quantity) and preferences (characteristics donors favour in campaigns) using a large dataset of campaigns from a Chinese platform. Data from 2,656 medical crowdfunding campaigns, which raised a total of 42.4 million EUR, were evaluated for this study. Regression analysis was one of the statistical methods they used to find important correlations between campaign characteristics and donation behaviour [16]. This study clarifies the intricate workings of medical crowdfunding, providing insightful information to legislators and campaign managers: Increasing transparency, storytelling, and

graphics will increase donations. Targeting tactics: You can increase the reach and success of your campaign by concentrating on particular contributor demographics and preferences. Policy considerations: Trust can be fostered and donations encouraged by laws that support accountability and openness. The report admits several shortcomings, including data unique to certain platforms and possible biases. Subsequent studies may examine cross-platform comparisons, delve into incentives beyond economic restrictions, and assess the enduring effects of medical crowdfunding on healthcare accessibility**.**

This work offers the research community fresh insights from the application perspective of crowdsourcing and the technical aspect of utilizing deep learning analysis. We examined the contributions made through crowdsourcing and verified JDS's prediction results on two tasks from different angles [17]. The outcomes of the trial amply illustrated how well our models analysed and forecasted the behavioural events, such as donor retention and donation recurrence. Limited generalizability: Results from certain platforms or campaigns might not apply to larger crowdfunding trends or other situations. Practical insights: Research may provide insightful information, but it can be difficult to turn that information into workable plans for enhancing donor retention or campaign performance. Inadequate methodology explanation Failure to disclose data sources, analytical methods, or potential limits could call into doubt the study's validity. It's possible that elements like campaign characteristics, donor psychology, and external influences on crowdfunding behaviour were disregarded. Poor recommendations or conclusions: The study might offer unclear findings or suggestions to crowdfunding stakeholders that are not. The performance of crowdfunding campaigns for innovative technologies is analysed in relation to campaign creators and operational difficulties [18]. Two categories of complexity are defined: Project complexity: Discusses the technology's level of development, possible hazards, and uniqueness from a technical and scientific standpoint. Operational complexity: Consists of the difficulties in manufacturing, shipping, and getting e new technology adopted by the market. Strategies for risk management and efficient communication can help lessen the negative consequences of complexity: Campaigns that demonstrate credible risk mitigation methods and effectively communicate the technology's benefits and limitations can overcome complexity-related problems. The use of data from a single platform and inherent biases in ad descriptions are just two of the study's drawbacks. Subsequent investigations may examine parallels between different platforms, go more deeply into particular kinds of intricacies, and examine the long-term effects of crowdfunding on the development of successful technologies [19].

3. Existing System

The traditional model of crowdfunding platforms relies on a centralized entity to manage campaigns, connect creators and backers, and process transactions. This often leads to concerns about clarity, sureness and efficient. We are introducing a decentralized and protective system for solving those issues in raising funds through the advanced Blockchain technology. This technology saves all the transactions and it is more secure and transparent. The smart contracts deployed in blockchain automates the crowdfunding process. The front-end of the system allows the creators to begin the campaign and the contributors to contribute the funds and the backend smart contracts manages the workflow. Smart contracts in blockchain enables to begin the campaign, raises funds, reaching the target and rewarding the contributions. The contributors contribute the funds using cryptocurrency wallet and is also collected in the cryptocurrency wallet in the creator's side and the smart contracts keep track of the transactions and updates the process automatically. The funds are withdrawn by the creator if the fund is raised within the specified time else it will be given back to the backers. Based on the contributions of the backers' rewards are awarded to them. All transactions are recorded on the blockchain and publicly accessible, enhancing trust and accountability. Smart contracts automate the fundraising process, minimizing the risk of fraud or errors. Decentralized infrastructure eliminates the need for intermediaries, potentially reducing fees and streamlining operations. Anyone with a cryptocurrency wallet can participate in crowdfunding campaigns, regardless of location or financial status.

•Existing blockchain platforms may not be able to handle high transaction volumes of large-scale crowdfunding campaigns.

•Lack of clear regulatory frameworks for blockchain-based crowdfunding creates uncertainty for creators and investors.

• The technology is still nascent and requires increased awareness and education for widespread adoption.

4. Proposed System

Crowdfunding is process of collecting and raising funds for many purposes so it should be done carefully. To make it simple, smart contracts are used. With respect to the point of the investors and the creators of the campaign, these protocols that automatically carry out execute, control and record the whole transaction history. The suggestion given by this model to approach has two contracts: one handles the transactions for each campaign, while the other records history of the campaigns. The primary players of any crowdfunding platform are the creators, vendors, contributors and the primary actions that takes place during the whole process are smart contracts, sending requests, and withdrawal request. The four parts of the system as creating the campaign, selecting the campaign, contributing towards the campaign and requesting for withdrawal of funds. This model proposes an additional feature to remove the fund if the investor decides to withdrawal for his purposes according to their circumstances. It is shown in fig.1.

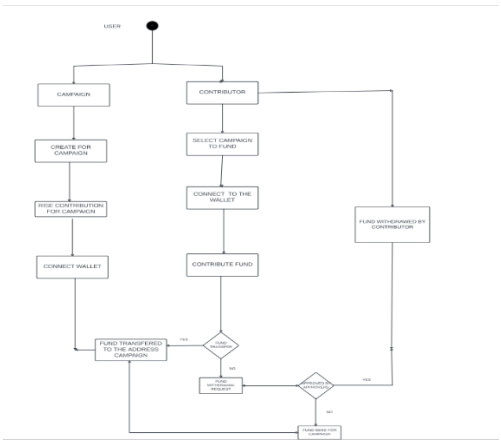

Fig.1. Overall Flow

4.1 Campaign creation

In the first stage, the creators of the campaign create a campaign by addressing each and every detail of the campaign such as name, description, limit to be reached, minimum contribution of the campaign. After creating the campaign, it is visible to all the visitors of the platform. While creating the campaign the creators should create their own wallet for collecting the fund using wallet. MetaMask is the chrome extension. The campaign creation is just a simple process and it is easy for the new users and the beginners. The reason for campaign be anything and anyone can create it. This results in the easy access and as we implement this using the smart contracts. It is displayed in Fig. 2.

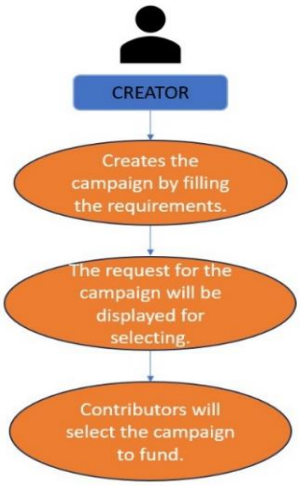

Fig. 2. Campaign Creation

4.2 Selecting campaign

The visitors are able to see the available campaigns in the platform. The visitors who show interest towards contribution by contributing some fund will become the contributor of the campaign. The contributor has choices to which campaign they are in interest from the available campaigns. The contributions done by the contributors are collected in the wallet of the creators. It is shown in Fig. 3.

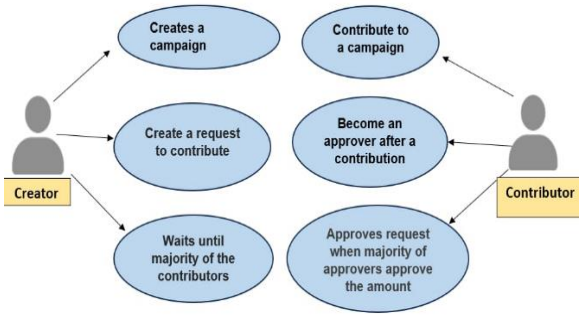

Fig. 3. Selecting Campaign

4.3 Fund raising

While the visitors started contributing towards the campaign, the design makes the contributors who are invested in that particular campaign, only they can accept or reject the request by campaign creators. The campaign which is selected also make sure that the contributor can change the request. So if half of the contributors of that campaign agree for the request, then the fund is sent to the campaign by connecting the wallet. There is also a possibility to reject the withdrawal of the fund by the creator. The contributors will become the approvers when the creators request for the withdrawal of the fund. It is a way of protecting their fund from being stolen by the fraudulent.

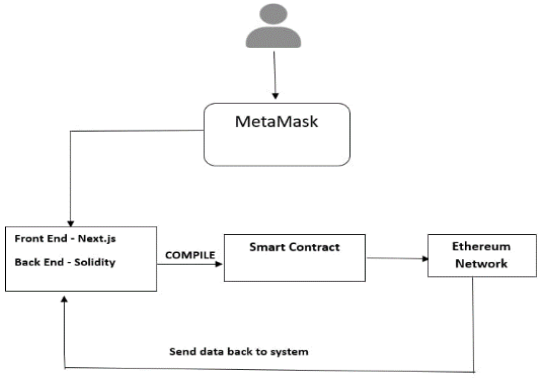

Fig. 4. Fundraising Request

5. Implementation and Analysis

The implementation of the platform, a smart contract is included which is written in solidity MetaMask is a chrome browser extension used to transactions through wallet. It is run and deployed in the Ethereum using solidity. Procedure for building the platform:

Step 1: Construction of smart contract.
Step 2: Connecting the wallet and establishing the transaction.
Step 3: Deployment of the withdrawal request of the fund.

5.1. Construction of smart contract

The solidity is used to create programs that handle all the transactions automatically. The blockchain used here is polygon blockchain to maintain the transfer. The campaign creator first creates the campaign by giving the details of the campaign and an ID to make the authentication simple and easy. The campaign is created into campaign factory and campaign transaction. Then the request is sent to accept the campaign. If half of the contributors agree to the request, then the campaign is accepted. If the contributor wants to join any campaign mentioned in platform, then they can accept the campaign request by contributing minimum amount which creator has set in the campaign. The fund is added to the wallet of that campaign.

Fig. 5. Flow chart of campaign creation.

5.2. Connecting the wallet and establishing the transaction

Connect the blockchain to connect to the MetaMask wallet. The wallet that is integrated here for the transaction of the funds is MetaMask extension. Choose the available campaign to send the request. Review the campaign details, funding and structure. Specify an amount you want to contribute and ensure it meets the minimum requirement. Your wallet will then display the transaction details. Review the details authorize the transaction from your wallet. We can track the contribution status on the wallet.

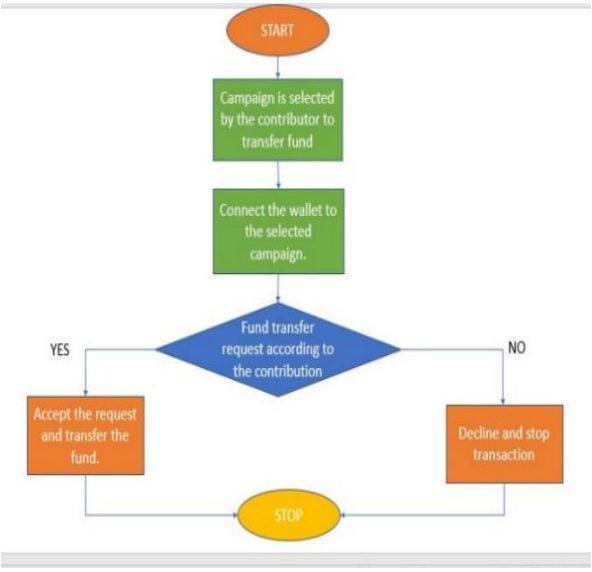

Fig. 6. Transfer of fund through wallet

5.3. Deployment of the withdrawal request of the fund

The creator made a way to get a refund, if the contributor wants to withdraw the funds for some purposes. The contributor can apply a withdrawal request, which must be approved by the majority of investors. If the contributor invested more than minimum contribution then he can become an approver. Contributors can vote on the requests applied by the investor, which may either approved or declined. The funds cannot be withdrawn without the permission of at least 50% of the contributors.

Procedure for withdrawal:

- Select the 'Withdraw Request' button on the campaign page.
- Fill the reason of the withdrawal and the amount to be withdrawn.
- Connect the request to the MetaMask extension.
- The page will able to accessed by the approvers of a campaign and they can agree or reject the request.
- When the request has assent a majority votes, then the amount can be withdrawn.

6. Analysis of Result

The user can create a new campaign by selecting the campaign creation form. The details such as name of the campaign, campaign description and the minimum contribution, as shown in Fig. 7.

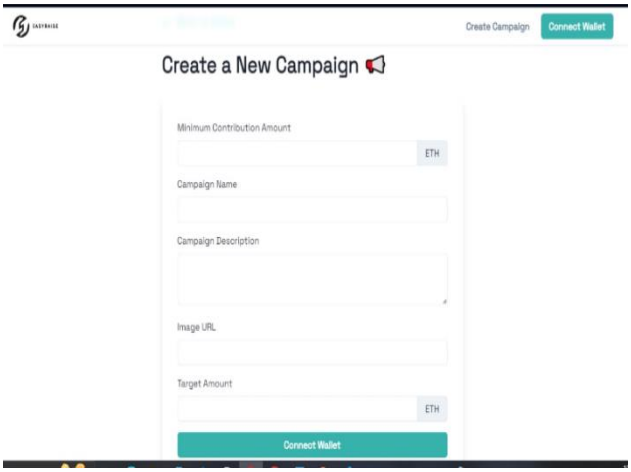

Fig. 7. Campaign creation

In this, the list of campaigns currently are displayed with their name and description to select the desired campaign as shown in Fig. 8.

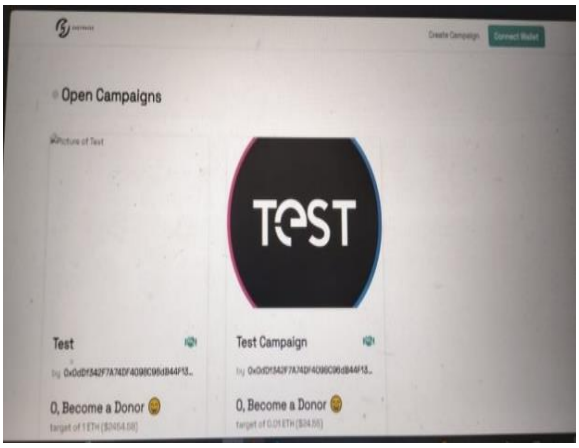

Fig. 8. Available Campaign List

After the campaign is created the request will be sent and displayed in the page to be selected. The description of request and the wallet connection will be made as shown in Fig. 9.

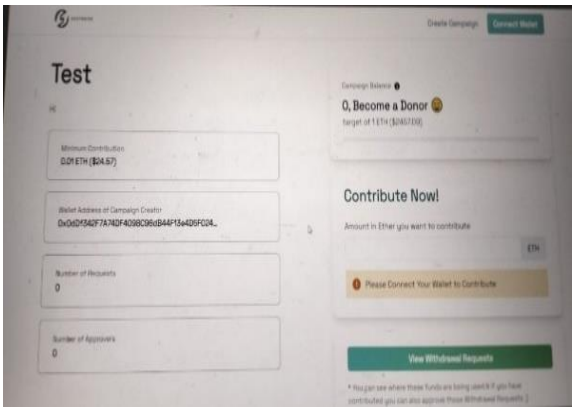

Fig. 9. Request generation

After the form is filled the connection between the wallet from the investor to the campaign is created to transfer process through MetaMask is shown in Fig.10.

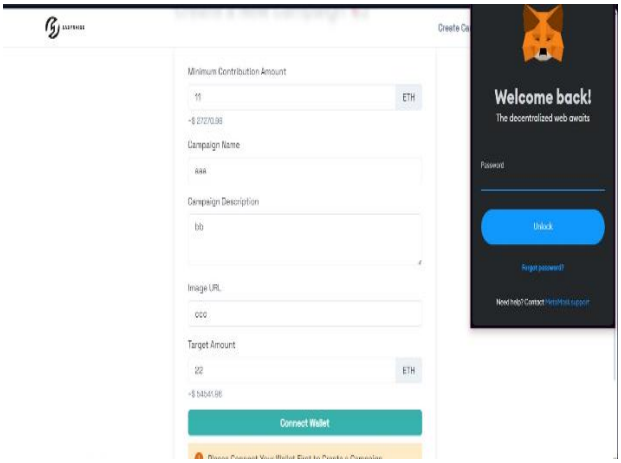

Fig. 10. Connection to the wallet

The graph displays the ratio of the usage of the site advantages to be easy and quick access.

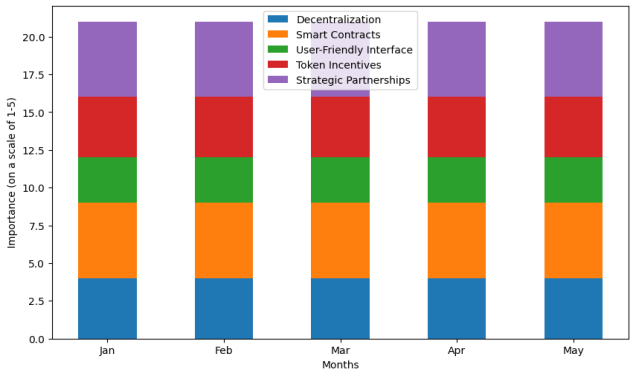

Fig. 11. Importance of Components Over Time

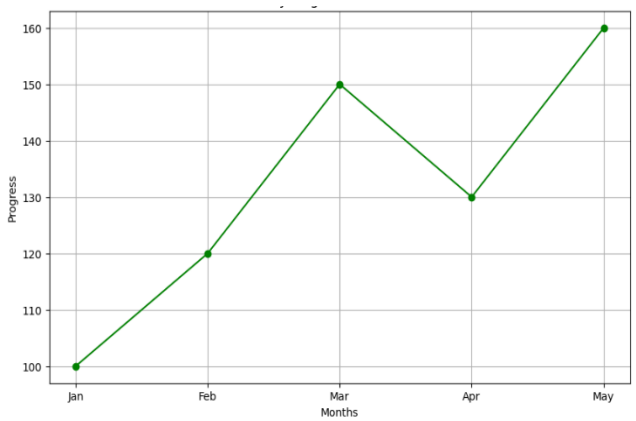

Fig.12. progress of the Initiative

7. Conclusion and Future Work

Eradicating poverty through blockchain-based crowdfunding presents a promising approach to address one of the world's most pressing challenges. By leveraging the transparency, efficiency, and security offered by blockchain technology, the initiative aims to create a decentralized platform that directly connects donors with social activities dedicated to poverty alleviation. The usage of smart contracts, user-friendly interfaces, and strategic partnerships, the initiative seeks to enhance accountability, incentivize participation, foster trust among stakeholders, and ensure alignment with local needs and regulations. The user-friendly interface made easy and understandable use of blockchain technology and use it easily, which was the hindrance in this method. Even though this system is a comprehensive approach for eradicate poverty but also there exists further exploration and improvement. First, we should do the continuous study in the enhancement of the scalability and the interoperability in the network of blockchain to allow the usage of the system by more users effectively. Then, more efforts are needed in addressing and noticing the challenges based on the usage, access where it is limited. And also, this system need collaboration with other organisations, communities and even also with the governmental organisations which ensures the accessibility and the sustainability with long term impact. This includes restructuring the formal partnership process to increase community engagement and engagement while complying with legal requirements. Additionally, ongoing research and evaluation efforts are needed to better assess the effectiveness and impact of interventions. This includes monitoring the progress of funded campaigns, measuring results, and implementing robust monitoring systems to ensure transparency and accountability in the cash flow.

References

[1] Lazzaro, E., & Noonan, D. (2021). The contribution of crowdfunding regulation to cultural entrepreneurship in a supportive ecosystem. Cultural initiatives for sustainable development: Management, participation and entrepreneurship in the cultural and creative sector, 401-424.

[2] M. Mohammed Thaha, M. Preetha, K. Sivakumar, Rajendrakumar Ramadass, “An Investigative Analysis using ‘Prior’ Knowledge of Physical Interaction to Learn State Representation in Robotics”, International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), ISSN: 2321-8169, Vol.11, Issue 3, page No-295-300, March 2023.

[3] Presenza, A., Abbate, T., Cesaroni, F., & Appio, F. P. (2019). Enacting social crowdfunding business ecosystems: The case of the platform Meridonare. Technological Forecasting and Social Change, 143, 190-201.

[4] Sarmah, S. S. (2018). Understanding blockchain technology. Computer Science and Engineering, 8(2), 23-29.

[5] Shekhtman, L., & Waisbard, E. (2021). Engravechain: A blockchain-based tamper-proof distributed log system. Future Internet, 13(6), 143.

[6] M. Mohammed Thaha, M. Preetha, K. Sivakumar, Rajendrakumar Ramadass, “An Aerial Robotics Investigation into the Stability, Coordination, and Movement of Strategies for Directing Swarm and Formation of Autonomous MAVs and Diverse Groups of Driverless Vehicles (UGVs)”, International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), ISSN: 2321-8169, Vol.11, Issue 3, page No-301-304, March 2023

[7] Blossey, G., Eisenhardt, J., & Hahn, G. (2019). Blockchain technology in supply chain management: An application perspective.

[8] Ogwu, K., Hickey, P., Okeke, O. J. P., Haque, A. U., Pimenidis, E., & Kozlovski, E. (2022). An integrated

online/offline social network-based model for crowdfunding support in developing countries: The case of Nigeria. Sustainability, 14(15), 9333.

[9] M. Preetha, K. Elavarasi, A. Mani, E. Pavithra, P. Sudharshna & S. Rakshini "A Survey on Decentralized Crowdsourcing using Blockchain Technology", Further Advances in Internet of Things in Biomedical and Cyber Physical Systems , Vol. 4, Issue 12, Pages 373-382, March 2021. ISSN No. 2455-2143.

[10] Centobelli, P., Cerchione, R., Del Vecchio, P., Oropallo, E., & Secundo, G. (2022). Blockchain technology for bridging trust, traceability and transparency in circular supply chain. Information & Management, 59(7), 103508.

[11] Hellani, H., Sliman, L., Samhat, A. E., & Exposito, E. (2021). On blockchain integration with supply chain: Overview on data transparency. Logistics, 5(3), 46.

[12] Murray-Rust, D., Elsden, C., Nissen, B., Tallyn, E., Pschetz, L., & Speed, C. (2023). Blockchain and beyond: Understanding blockchains through prototypes and public engagement. ACM Transactions on Computer-Human Interaction, 29(5), 1-73.

[13] Dr.M.Preetha, G.Praveenkumar, S.Sabarinathan. "Three-Layer Privacy Preserving Cloud Storage Scheme based on Computational Intelligence in Fog Computing", International Journal for Research in Applied Science & Engineering Technology, Vol.7, Issue III, Pg,No – 1145-1147, March 2019. ISSN 2321-9653.

[14] Montanari, P. (2022). The impact of blockchain and DLT enterprise tokens on business processes. Analysis of applications of different use cases in major industries.

[15] Nguyen, L. T., Hoang, T. G., Do, L. H., Ngo, X. T., Nguyen, P. H., Nguyen, G. D., & Nguyen, G. N. (2021). The role of blockchain technology-based social crowdfunding in advancing social value creation. Technological Forecasting and Social Change, 170, 120898.

[16] Wang, M., Cai, M., Guo, S., Li, M., Tan, X., Ou, C., & Lu, X. (2023). Large-Scale Medical Crowdfunding Data Reveal Determinants and Preferences of Donation Behaviors. IEEE Transactions on Computational Social Systems.

[17] Zhao, H., Jin, B., Liu, Q., Ge, Y., Chen, E., Zhang, X., & Xu, T. (2019). Voice of charity: Prospecting the donation recurrence & donor retention in crowdfunding. IEEE Transactions on Knowledge and Data Engineering, 32(8), 1652-1665.

[18] Appio, F. P., Leone, D., Platania, F., & Schiavone, F. (2023). Evaluating the Impact of Project and Operational Complexities on the Crowdfunding Campaigns of New Technologies: An Empirical Investigation. IEEE Transactions on Engineering Management.

[19] Li, S., & Chen, Y. (2024). Governing decentralized autonomous organizations as digital commons. Journal of Business Venturing Insights, 21, e00450.