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Blockchain Based Fund Raiser & Splitter for Open-source Project

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Abstract: ***The advent of open-source software development has significantly transformed the tech industry, enabling global collaboration and innovation. However, sustainable funding remains a challenge for many open-source projects. In response to this challenge, we present a pioneering research and development endeavour: a Blockchain-Powered Open -Source Project Funding and Splitting Platform. This platform leverages blockchain technology to create a transparent, secure, and decentralized ecosystem where users can upload their open-source projects, donors can contribute funds, and contributions are automatically rewarded to project contributors based on their work.***
This paper outlines the comprehensive research and development journey of our blockchain-powered platform, discussing the architectural design, smart contract implementation, security considerations, and user experience. We also examine the impact of blockchain integration on open-source communities, the challenges encountered, and the potential for future expansion and adoption.

I. INTRODUCTION

In today's digital world, open-source projects are kind of like the engines that power many cool things, from software to science. They're where people from all over work together to create helpful stuff for everyone. But there's a big problem. These projects need money to keep going, and right now, it's tough to make sure everyone who helps gets their fair share of the donations. You see, open-source projects depend on the kindness of folks and companies to fund them. But there's no good system to divide the donations among all the people who make the project awesome. This means some folks might not get the recognition and support they deserve for their hard work, which can make them less excited about continuing to help.
That's where our research comes in. We've got a smart idea that uses Web3 tech, which is like a super-secure and fair way of doing things online. Our plan isn't just about fixing the money problem; it's also about making open-source projects even better. We want to create a platform that makes sure donations are given out fairly and openly, so everyone who helps can get the credit and support they should. In this paper, we'll get into the nitty-gritty details of how our idea works, how to make it happen, and why it could totally change the game for open-source projects. Our aim is to help these projects grow and be fair to everyone involved. We're excited to show how we can make it easier for people to chip in and help out, creating a more awesome open-source community for all.

II. SCOPE

A. Issues with Existing Crowdfunding Platform

Traditional crowdfunding platforms face several challenges, including a lack of transparency in fund management, high transaction costs, limited global accessibility, security concerns, delayed fund disbursements, potential misuse of funds, and administrative overhead. Blockchain-based crowdfunding techniques address these issues by providing transparency through a public ledger, reducing costs by eliminating intermediaries, enabling global accessibility, enhancing security, ensuring faster fund settlements, reducing the risk of fund misuse through smart contracts, and automating administrative processes. Blockchain technology offers a solution to make crowdfunding more efficient, secure, and inclusive.

B. Benefits of Decentralized crowdfunding platform

Decentralized crowdfunding platforms present a host of benefits when compared to traditional methods. These platforms leverage blockchain technology to introduce complete transparency, allowing donors to track their contributions and ensuring accountability in fund allocation.

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By cutting out intermediaries, they significantly reduce transaction fees and administrative costs, ensuring a more substantial portion of the funds directly supports the intended cause. Decentralized platforms are not limited by borders, offering global accessibility and the potential to reach a broader audience for fundraising efforts. Moreover, blockchain's inherent security features reduce the risks of fraud, hacking, and data breaches, providing a tamper-resistant environment. Immediate fund disbursement is a key advantage, crucial for time-sensitive projects or emergencies. Smart contracts on these platforms automate fund allocation, mitigating the risk of funds being misused. Administrative overhead is also minimized through automation, resulting in an overall more efficient and secure crowdfunding experience.

III. LITERATURE SURVEY

The paper [1] presents the development of a straightforward yet impactful system designed for charitable donations and fundraising campaigns. The authors introduced a set of smart contracts that facilitate the seamless transfer of tokens from a donor's wallet to a specified address, as well as the withdrawal of funds from the given address to the donor's wallet. These smart contracts are deployed on Ethereum's Rinkeby test net, showcasing the practical application of blockchain technology in the realm of decentralized fundraising.

However, the paper acknowledges a significant drawback concerning the Ethereum blockchain's high gas fees. With the current implementation, donors, especially those with limited financial resources, might be hesitant to participate due to the associated transaction costs. This challenge prompts a crucial consideration for the sustainability and accessibility of the fundraising platform.

It's important to note that the scope of the presented system is specific, primarily focusing on crowdfunding for fundraisers. While effective for its intended purpose, future iterations or expansions could explore solutions to mitigate gas fees, broadening the application's appeal and usability for a wider audience of potential donors.

The paper [2] introduces an innovative blockchain-based system designed to enhance transparency and traceability in charitable donations. The platform empowers beneficiaries by allowing them to create campaigns, while donors gain a seamless experience in browsing and funding registered campaigns. Notably, the direct flow of donations from the donor's wallet to the beneficiary's designated wallet address is a key feature, recorded on the blockchain for secure and transparent tracking. This mechanism ensures accountability and visibility throughout the donation lifecycle, addressing concerns related to fraud and mismanagement in charitable activities.

The utilization of blockchain technology is central to the system, providing a secure and transparent foundation for donation tracking. The decentralized and immutable nature of blockchain contributes to establishing a trustworthy environment for charitable contributions, fostering trust and accountability between donors and beneficiaries. Emphasizing transparent tracking, the platform registers all transactions on the blockchain, providing an unalterable and auditable record of financial flows. This comprehensive approach not only safeguards against potential misuse of funds but also instills confidence in participants within the donation ecosystem. In conclusion, the paper highlights the technical intricacies of the developed platform and its broader implications, contributing to the evolution of transparent and accountable charitable donation platforms.

The paper [3] explores the integration of blockchain and smart contracts in a project funding platform, emphasizing the systematic methodology employed. The methodology section outlines the seamless integration of blockchain technology, particularly smart contracts, to automate and secure fund distribution. The authors stress the significance of smart contracts as the foundation for managing fund allocation, concentrating on contribution metrics.

The system's methodology initiates with project registration, where creators set a minimum investment threshold. Donors then control fund release, deciding upon project completion or at specific percentage milestones. Unfortunately, the paper lacks explicit details about the specific smart contracts and blockchain chain employed. While the methodology offers a comprehensive overview, a more detailed exposition of smart contracts and the blockchain chain would enhance transparency and contribute to the academic rigor and practical insights for future research and practitioners in the field.

The paper [4] core theme revolves around introducing blockchain into crowdfunding, an emerging concept. The authors prioritize user-friendly design, catering to both experienced contributors and the general public. This commitment reflects a broader goal of making crowdfunding more accessible and inclusive.

The essence lies in the ground-breaking application of blockchain to democratize fundraising for start-ups. This shift to decentralized and transparent funding methods could reshape the start-up landscape. Acknowledging the novelty of blockchain in crowdfunding, the paper lays the groundwork for a valuable contribution, suggesting that additional details on the application's design and functionality could enhance understanding and facilitate future advancements in the field.

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The Paper [5] talks about the cost-effectiveness inherent in integrating blockchain technology into crowdfunding platforms. The authors argue that this innovation significantly reduces the application's development and maintenance costs, fostering a more efficient platform with the potential to spur local economic development. This cost reduction, according to the authors, contributes to a more accessible and sustainable crowdfunding ecosystem, promoting the equitable distribution of wealth and value among the population.

The paper's core contribution lies in highlighting the transformative potential of decentralized crowdfunding platforms utilizing blockchain technology. The authors enrich the discourse on innovative strategies for enhancing economic inclusivity and equitable wealth distribution. However, to enhance the paper's comprehensiveness and broaden its appeal, additional details on the platform's functionalities, technical aspects, and empirical evidence would be valuable for a diverse readership seeking a deeper understanding of the presented concepts.

This paper [6] strives to facilitate effective investor contributions to projects by introducing smart contracts. These contracts empower contributors with control over their invested funds, fostering a collaborative environment where both project creators and investors can efficiently allocate and reserve funding for their endeavours. The implementation of smart contracts ensures a transparent and automated process, enhancing the overall effectiveness of project financing.

Within this framework, beneficiaries gain the ability to initiate campaigns, providing a platform for potential donors to explore a diverse range of projects. This not only broadens the visibility of projects seeking support but also enables contributors to make informed decisions based on their preferences and values. Additionally, organizations can utilize the platform to receive donations, directing funds to support various causes. Moreover, the platform allows for seamless transactions, as organizations can send funds to cooperative stores for token exchange, further contributing to the dynamic and interconnected nature of this innovative funding ecosystem.

The paper [7] introduces a decentralized donation tracking system leveraging blockchain technology, specifically built on the Ethereum Blockchain. The core objective is to establish a transparent, accountable, and direct mechanism for managing donations, ensuring that contributions reach their intended recipients seamlessly. At the heart of this system is a smart contract that facilitates collaboration between Non-Governmental Organizations (NGOs) and government entities. NGOs can input their requirements into the smart contract, and these requirements undergo an approval process by the government. Once approved, transactions can be executed, ensuring that the donation process is both secure and transparent.

By utilizing blockchain, the proposed system not only enhances the accountability of donation processes but also provides an immutable and auditable record of transactions. This approach not only streamlines the communication between NGOs and the government but also establishes a trustful and efficient system for managing and disbursing donations, ultimately contributing to a more effective and accountable donation ecosystem.

The paper [8] focuses on rectifying challenges within traditional donation systems, the authors particularly address the opacity issue, where donors struggle to understand how their contributions are utilized. Their proposed solution involves harnessing blockchain to introduce transparency into the donation process, fostering open participation and encouraging talent donation. This application holds the promise of revolutionizing charitable contributions by providing donors with an unalterable record of their impact.

The paper's core contribution lies at the intersection of blockchain technology and charitable donations. By addressing the transparency challenge, the authors significantly contribute to the ongoing discourse on innovative solutions to enhance the efficacy and trustworthiness of donation platforms. The paper's impact and relevance within academic and practitioner communities could be further strengthened through a more detailed exploration of the proposed blockchain application, complemented by empirical evidence or case studies.

IV. ANALYSIS OF EXISTING SOLUTIONS

Analysing existing blockchain-based crowdfunding projects like Gitcoin, Open Collective, and other similar crowdfunding/project funding platforms assessing their strengths, weaknesses. Here's an analysis:

A. Gitcoin

1) Strengths

a) Transparency: Gitcoin uses blockchain technology to ensure transparency in the allocation of funds and project contributions.

b) Decentralization: Blockchain technology enables trust less transactions without the need for intermediaries.

c) Cryptocurrency Usage: Utilizing cryptocurrencies and tokens provides incentives for contributors and helps attract a global audience.

2) *Weaknesses*

a) *Scalability:* Like many blockchain-based platforms, Gitcoin faces scalability issues, especially during periods of high demand.

b) *Complexity:* Non-technical users may find the platform and cryptocurrency usage complex, limiting accessibility.

B. *Open Collective*

1) *Strengths*

a) *Diverse Funding Sources:* It allows organizations to receive funds from various sources, including individuals, companies, and grants.

b) *Flexibility:* Organizations can use funds for a wide range of expenses, offering flexibility in project management.

2) *Weaknesses*

a) *Lack of Blockchain:* Unlike Gitcoin, Open Collective doesn't use blockchain technology, which may limit transparency and trust in some cases.

b) *Limited Use of Cryptocurrencies:* It primarily deals with fiat currencies, which might not fully leverage the benefits of blockchain technology.

c) *Reliance on Traditional Banking:* Open Collective's financial operations may be subject to the limitations and regulations of the traditional banking system.

V. METHODOLOGY

1) *System Architecture Design:* Begin by designing the architecture of the application, delineating the user interface, blockchain integration, and data fetching components. Consider a modular design to enhance scalability and flexibility.

2) *Platform Requirements Identification:* Enumerate both functional and non-functional requirements, specifying the features needed for user project uploads, fund donation mechanisms, GitHub data retrieval, and blockchain-based fund distribution.

3) *Blockchain Integration and Smart Contracts:* Integrate blockchain technology, utilizing smart contracts to automate and secure the fund distribution process. Develop and deploy smart contracts to handle fund allocation based on contribution metrics.

4) *GitHub Data Retrieval:* Implement a mechanism to fetch project data dynamically from GitHub repositories. Utilize the GitHub API to extract relevant information such as project details, contributors, and commit history. Ensure the seamless integration of GitHub data with the application.

5) *User Registration and Authentication:* Develop a secure user registration and authentication system. Integrate decentralized identity verification using multiple wallets like MetaMask, Brave Wallet, Coinbase Wallet, and Uniswap. Ensure that user authentication aligns with blockchain-based security standards.

6) *Project Management Functionality:* Enable users to upload open-source projects, set funding goals, and manage project details within the application. Integrate features that dynamically fetch and display GitHub project data, providing donors with real-time and accurate information.

7) *Funding Mechanism and Smart Contracts Implementation:* Implement the funding mechanism, allowing donors to contribute funds to open-source projects. Develop and deploy smart contracts toS automate the equitable distribution of donated funds among contributors based on their GitHub contributions.

8) *User Interface Development:* Create an intuitive and user-friendly interface that facilitates easy navigation, project discovery, and donation processes. Ensure that users can seamlessly interact with both the application and blockchain functionalities.

9) *Testing and Quality Assurance:* Conduct thorough testing, including unit testing, integration testing, and user acceptance testing. Address any identified bugs or issues promptly. Perform security audits, particularly in areas involving blockchain transactions and user data.

10) *Deployment and Scaling:* Deploy the application on a staging environment for initial testing and gather user feedback. After refinement, deploy the application to a production environment. Implement strategies for scaling as the user base and project volume grow.

11) *Data Analysis and Optimization:* Continuously analyse application and blockchain data to derive insights into user behaviour, project trends, and funding dynamics. Optimize algorithms and features based on data-driven decision-making to enhance overall user experience.

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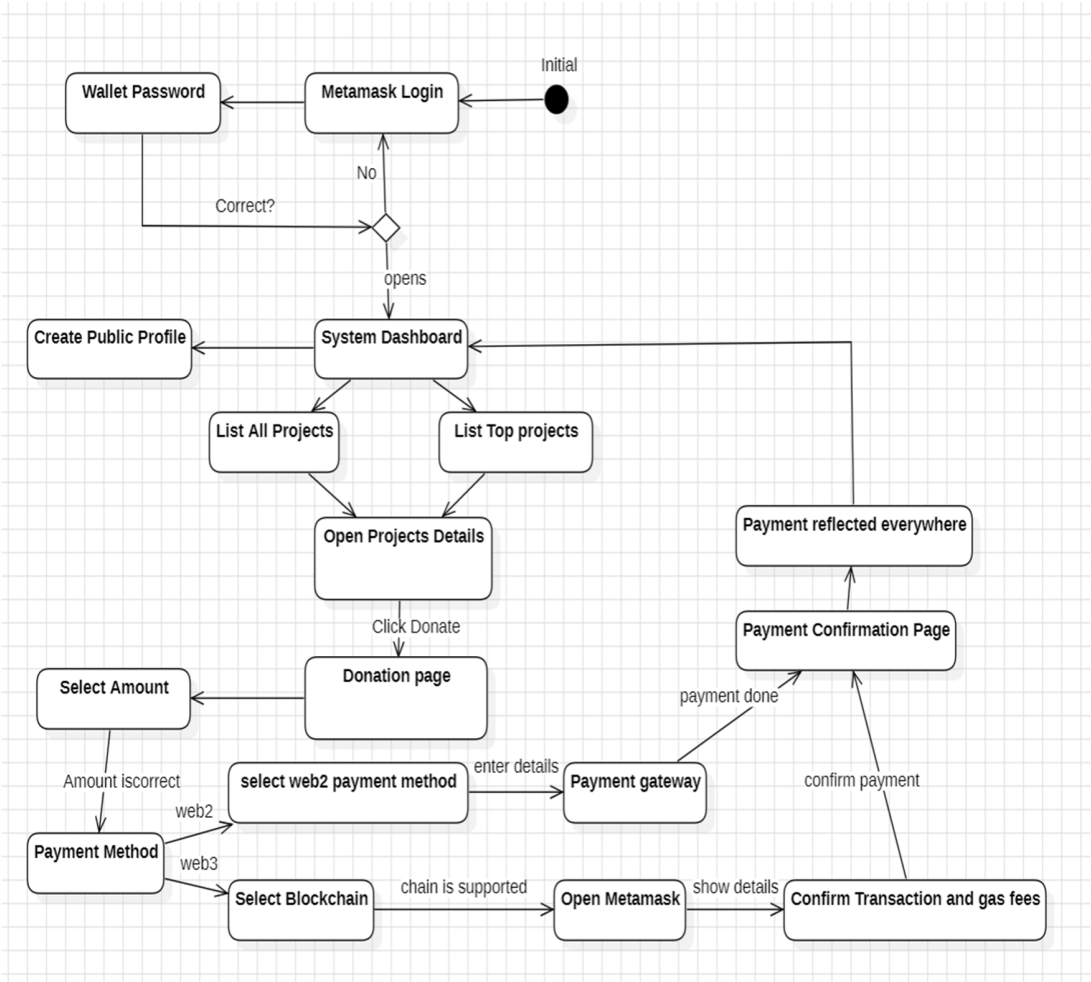
VI. PROPOSED SYSTEM ARCHITECTURE

The proposed system architecture for our open-source project funding platform is meticulously designed to cater to the distinct roles of contributors and donors, ensuring a seamless and secure experience for both user groups. At the core of our architecture lies a modular and decentralized structure that facilitates robust interactions between the application, blockchain technology, and external data sources.

For contributors, the system architecture focuses on providing a user-friendly interface for uploading open-source projects, setting funding goals, and managing project details. The GitHub API integration plays a pivotal role in dynamically fetching project data, such as commit history and contributors, ensuring that the information presented to potential donors is accurate and up-to-date. Contributors' interactions with the platform are authenticated using decentralized identity verification through popular wallets like MetaMask, Brave, Coinbase, and Uniswap, instilling confidence in the security and privacy of their contributions.

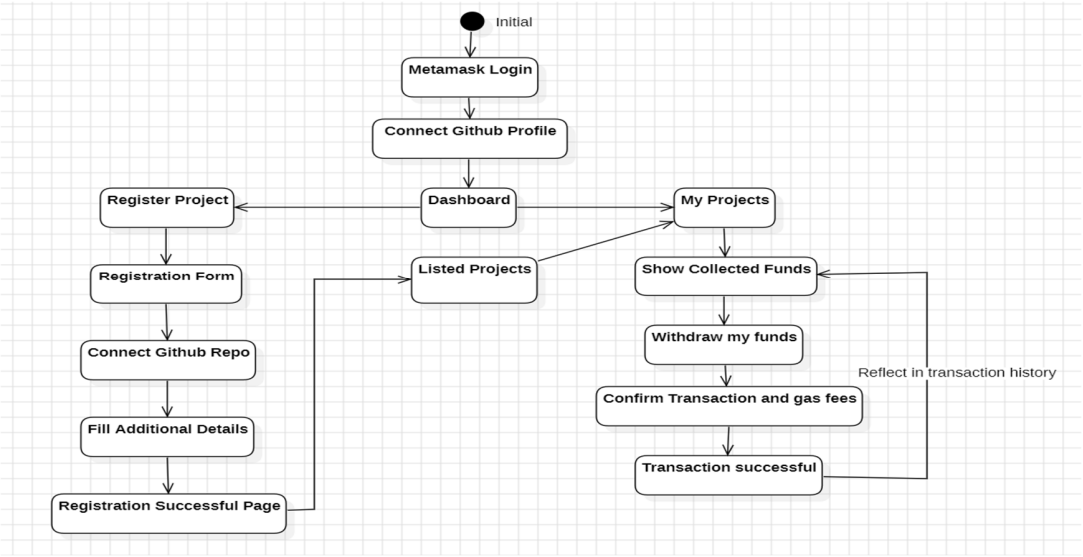
On the other hand, the architecture addresses the unique needs of donors by offering a straightforward mechanism for contributing funds to open-source projects. The blockchain integration, supported by smart contracts, automates and secures the fund distribution process. Donors' interactions with the platform are also authenticated through decentralized identity verification, enhancing the overall transparency and trustworthiness of the system.

The proposed architecture ensures that contributors and donors can seamlessly engage with the platform, leveraging the decentralized nature of blockchain technology to guarantee the security and transparency of transactions. With a modular design that accommodates the varied functionalities required by each user group, our system architecture aims to foster a collaborative and innovative environment where open-source projects can thrive through the support of a global community of contributors and donors



[1] USER ACTIVITY DIAGRAM

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[2] PROJECT OWNER/CONTRIBUTER ACTIVITY DIAGRAM

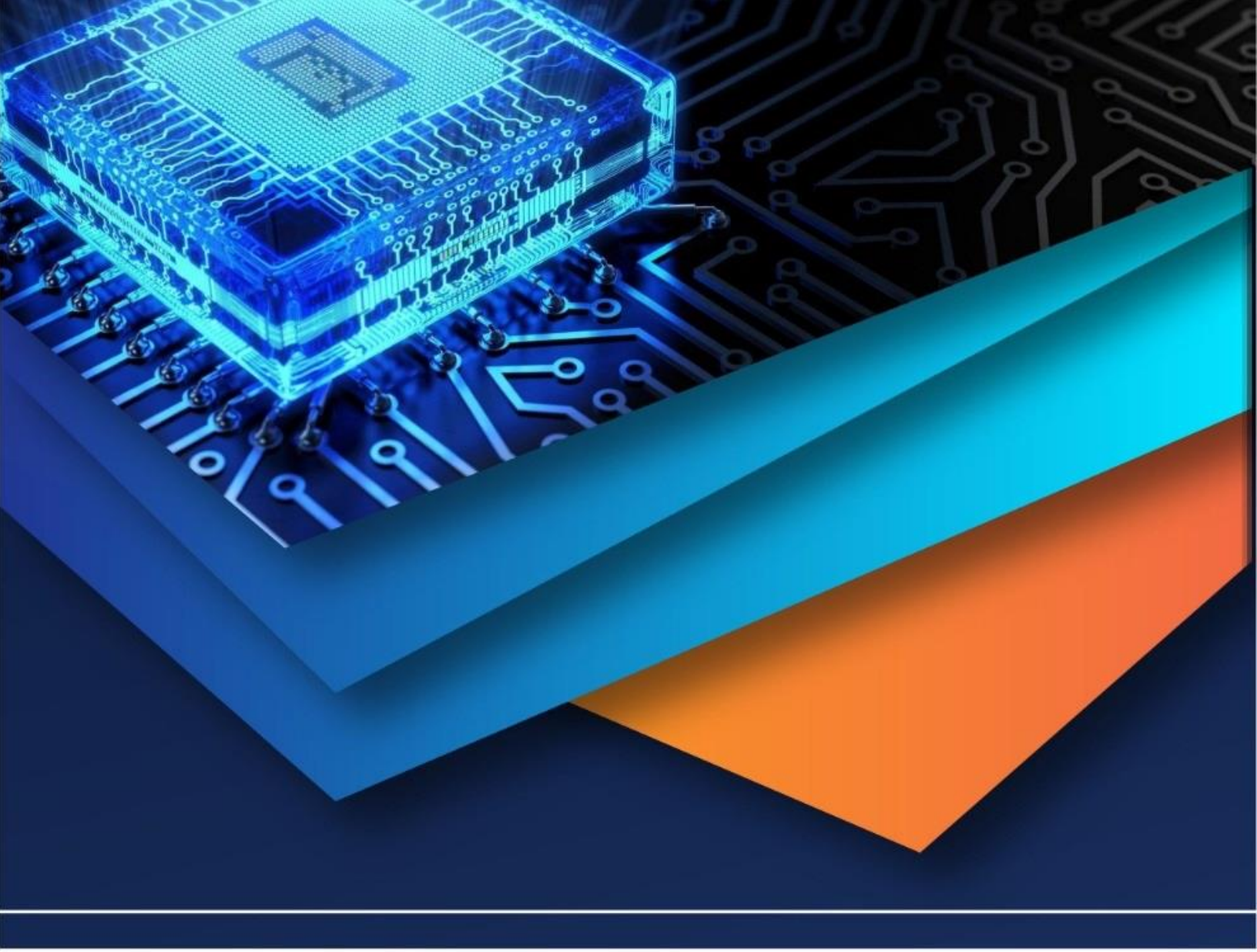
VII. CONCLUSION

In conclusion, our research comprehensively addresses the challenges confronting open-source projects and the urgent need for a dedicated platform ensuring transparent donation distribution among contributors. The absence of such a system poses a persistent threat to project sustainability, hindering growth and innovation. Our proposed Web3-based solution not only tackles donation distribution but also introduces innovative features to enhance the open-source ecosystem. Leveraging Web3 technology, our platform aims to establish a new standard of transparency, ensuring every contributor receives due recognition and support. This approach fosters a collaborative, sustainable, and thriving open-source community. The technical exploration delves into the solution's design and implementation, providing a foundation for its potential impact. We showcase the transformative power of our Web3-based solution, envisioning open-source projects operating more accessibly, efficiently, and equitably. As we pave the way for open-source project evolution, our contribution extends beyond the technical realm to community-building. By mitigating contributor challenges and introducing novel features, our research aims to make a lasting impact on open-source accessibility, efficiency, and equity. Through pioneering work, we anticipate catalysing positive change and inspiring a renewed era of collaboration within the open-source community, contributing to its sustained growth and vibrancy.

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