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NGO Management System Using Block-chain

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ABSTRACT :

This project presents an NGO management system built using REACT that integrates block-chain technology to improve transparency and security in donation management. The system allows NGOs to track incoming donations and record expenses, while donors have access to transaction records to ensure proper use of donations. Using a secure and tamper-proof block-chain ledger, the system builds trust with donors while minimizing the risk of fraud and tampering. The platform operates with three main roles: Administrators, NGOs, and users. Administrators manage the addition of NGOs and monitor the integrity of the system, while NGOs document expenses and view transaction history. Users can choose an NGO, make a donation, and verify that the funds are used as intended. This solution increases accountability and trust, making the donation process more transparent and efficient for all parties involved.

Keywords: React, block-chain, NGO, Transaction

I. INTRODUCTION

An NGO or non-governmental organization is an organization that operates independently of any other organization. NGOs are usually non-profit organizations and are often funded by donations from members, private organizations, the general public, etc. Maintaining transparency in how donations are used will greatly increase donor trust and enhance the reputation of the NGO. This will help improve coverage in the long run. Using traditional paper-based methods to manage NGO funds increases the risk of theft and fraud. This NGO management system developed using React uses block-chain so that both donors and organizations can be assured that donations are not being misused. The system consists of three entities: administrators, users, and NGOs. NGOs can use this system to view a list of donations received. The organization can then add costs and view all transaction details. NGOs can also verify the data to ensure there is no evidence of tampering. Meanwhile, users can select the NGO they want and make donations through this system. Users can view the transaction list and verify that their money is being used legally. Users can also check the data for signs of manipulation. To maintain the security of the system, the administrator is given exclusive authority to add NGOs. The administrator can also check if the data has been tampered with or altered.

block-chain's decentralized and immutable nature makes it an ideal solution for creating transparent and secure systems. By recording transactions and activities on a distributed ledger, block-chain ensures that all records are tamper-proof and easily verifiable. This technology can provide NGOs with a reliable way to manage donations, allocate funds, and track project progress, thereby enhancing their credibility and operational effectiveness.

The integration of block-chain technology (BCT) into NGO management systems (NGOMS) offers a trans formative approach to enhancing transparency, accountability, and efficiency in the nonprofit sector. Traditional management practices often struggle with issues like data integrity and trust among stakeholders, but block-chain's decentralized and immutable nature provides a secure and transparent digital ledger for all transactions.

This project explores how block-chain technology can be utilized to create a more secure and reliable fund management. It focuses on the development of a traceability system that enables producers, certifiers, and donors to track the journey of their fund donation throughout the supply chain. block-chain can help build donor trust and support sustainable ngo practices.This allows donors to track how their contributions are used, ensuring that funds reach the intended projects and beneficiaries. Additionally, block-chain reduces the need for intermediaries and manual record-

keeping, resulting in lower operational costs and enabling NGOs to allocate more resources to their missions. Smart contracts can automate processes such as fund disbursement, further streamlining operations.

Adopting block-chain technology in NGO management systems has the potential to revolutionize the nonprofit sector by enhancing transparency, security, and efficiency.As NGOs increasingly seek to build trust and demonstrate their impact,

embracing innovative technologies like block-chain will be crucial for their success and sustainability in the future. This forward-thinking approach not only benefits organizations but also ultimately strengthens the communities they aim to serve.

II. LITERATURE SURVEY

The literature review for a NGO Management System using block-chain and React is an essential section of a research paper that presents a critical analysis of the existing literature on the topic. These technologies can help streamline operations, improve transparency, enhance security, and ensure greater accountability in the management of funds, resources, and stakeholder interactions in NGOs.Various studies have been conducted on NGO management systems.These literature survey explores key research and developments on the use of block-chain and React in NGO management systems, focusing on their applications, benefits, challenges, and future potential. In this literature review.

Zwitter, A., Boisse-Despiaux, M. (2018).[1] block-chain for Humanitarian Action and Development Aid. Zwitter and Boisse-Despiaux (2018) explored the potential of block-chain technology in the humanitarian and development aid sectors. The paper discusses how block-chain can improve transparency, accountability, and traceability in aid distribution, ensuring that funds reach their intended recipients. In conflict zones and regions with weak governance structures, block-chain's decentralized nature could prevent fraud and corruption while ensuring that transactions are securely recorded

Bzdok, D., & Bzdok, J. (2018).[2] block-chain technology: An opportunity for NGOs to improve transparency and efficiency in humanitarian aid. Journal of Humanitarian Logistics and Supply Chain Management, 8(2) https://doi.org/10.1108/JHLSCM-09-2017-0050 The paper by Bzdok and Bzdok (2018), titled "block-chain technology: An opportunity for NGOs to improve transparency and efficiency in humanitarian aid," explores the potential of block-chain technology in enhancing the operational effectiveness of Non-Governmental Organizations (NGOs) working in humanitarian aid and disaster relief.

Hardwick, F. S., Akram, R. N., & Markantonakis, [7]K. (2018). E-Voting with block-chain: An E-Voting Protocol with Decentralization and Voter Privacy. IEEE European Symposium on Security and Privacy Workshops (EuroSPW), 1-6. DOI: 10.1109/EuroSPW.2018.00003 This paper provides insights into how block-chain can enhance the security and privacy of e-voting systems, which are relevant for governance and stakeholder participation in NGO systems.

The paper "E-Voting with block-chain: An E-Voting Protocol with Decentralization and Voter Privacy" by Hardwick, Akram, and Markantonakis (2018) explores the potential of block-chain technology to enhance the security, transparency, and privacy of electronic voting systems. While the paper primarily focuses on the application of block-chain for e-voting, its implications for governance, transparency, and privacy in other systems—including NGO management systems—are significant. NGOs, much like democratic processes, require secure, transparent, and private means of governance and decision-making, particularly when engaging stakeholders, donors, and beneficiaries in participatory processes.

Shaikh, M. (2018).[3] block-chain-Based Solutions for NGO Operations. International Journal of Emerging Technology and Advanced Engineering.

Christidis, K., & Devetsikiotis, M. (2016)[4]. block-chains and Smart Contracts for the Internet of Things. IEEE Access, 4,2292-2303.DOI:10.1109/ACCESS.2016.2566339

The paper delves into the technical use of block-chain and smart contracts, which can be extended to the automation and tracking of NGO operations and donation flows in a decentralized manner. The authors discuss how block-chain can offer decentralization, transparency.

III. PROBLEM STATEMENT

Lack of Transparency and Accountability: Many NGOs struggle with providing clear and accessible information about the allocation and usage of funds. Donors and stakeholders often face difficulties in tracking where and how their donations are spent.

Data Integrity and Security: NGO operations involve handling sensitive data, such as donor details, beneficiary information, and financial records. A lack of proper data security practices could lead to data breaches or misuse of information.

Limited Stakeholder Engagement:Traditional systems do not provide real-time access to information or facilitate effective engagement with donors, beneficiaries,and other stakeholders.

The NGO Management System currently faces significant challenges related to transparency, accountability, and data integrity. These issues hinder the organization's ability to maintain trust with donors, effectively manage resources, and optimize volunteer efforts. The process of fundraising, reporting, and tracking donations is often inefficient and prone to error, while volunteer coordination remains disjointed across projects and regions.

Furthermore, the lack of robust data security and an inefficient reporting framework lead to delays in decision-making and a lack of insight into real-time project outcomes. The existing system also faces difficulties in inter-organizational collaboration, where sharing sensitive data securely between multiple NGOs or partners is challenging.

These operational inefficiencies significantly impact the NGO's ability to fulfill its mission effectively and maintain the trust of its stakeholders, donors, and volunteers.

IV. OBJECTIVE

The primary objective of this project is to develop a robust block-chain-based NGO management system using PostgreSQL, React, and Node.js to address challenges in transparency,resource management, stakeholder engagement, and compliance. The following specific objectives outline the key goals of the project:

1.To Develop a block-chain-Based Transparency Framework Design and implement a decentralized block-chain system integrated with PostgreSQL to ensure transparent and tamper-proof tracking of NGO financial transactions, donations, and resource allocation.

2. To Enhance Accountability and Trust Create an immutable ledger that records all financial and operational activities, allowing stakeholders-donors, beneficiaries, and staff to access verified information about resource utilization and project progress, thereby fostering greater accountability and trust.

3.To Develop a User-Friendly Interface for Stakeholder Engagement Build a React-based web application that allows stakeholders (donors, beneficiaries, and employees) to easily track donations, project outcomes, and provide real-time feedback,fostering stronger engagement and communication within the NGO.

4.To Strengthen Data Security and Privacy Implement robust encryption and access control mechanisms within the system to protect sensitive data stored in PostgreSQL, ensuring the security and privacy of donor and beneficiary information.

V. METHODOLOGY/PROPSED SYSTEM

This methodology proposes the use of block-chain technology in combination with React.js to develop a robust NGO operations management system. The system focuses on optimizing areas such as fund management, resource distribution, and project tracking for NGOs, while enhancing transparency, accountability, and automation. The integration of block-chain provides an immutable, decentralized ledger to track transactions, while React.js will be used for building an intuitive front-end interface for stakeholders to interact with the system. The methodology will be divided into several stages: requirement gathering, system design, block-chain development, front-end development, integration, and testing.

Stage 1. Requirements Gathering:-

Identify key requirements for the NGO management system based on the operational needs of the NGO. This could include: 1.Fund Management: Transparency of donations, fund allocation, and tracking.2.Resource Distribution: Automating supply chain management and tracking of goods.3.Donor Engagement: Real-time insights into how funds are used and milestone achievements.4.Project Tracking: Tracking the progress of projects based on milestones, utilizing IoT sensors or external data sources.5.Stakeholder Interaction: Secure and transparent platform for all stakeholders (NGOs, donors, beneficiaries) to interact.

Stage 2. UI/UX Design:-

Design the user interface with a focus on user experience and simplicity. Key components of the interface could include:

1.Dashboard for NGOs: Provides an overview of current projects, funds, resources, and ongoing activities. This will show the status of projects, available funds, and resource allocation.2.Donor Dashboard: Allows donors to track their contributions, see how funds are allocated, and view project milestones. A donation history and transparency feature should be included.3.Project Management Interface: Allows project managers to add updates, track resource needs, and validate milestones. It will also enable real-time tracking using IoT data.4.Beneficiary Interface: A simplified view for beneficiaries to track the status of ongoing projects and resource delivery.

Stage 3. Implementation:-

The implementation of the NGO Management System with block-chain and React focuses on automating fund management, resource distribution, and project tracking. The system uses Ethereum for block-chain, React.js for the front-end interface Below is a detailed step-by-step implementation plan, including front-end, block-chain, and back end integration.

Tools and Technologies:

1.block-chain platform: Ethereum using solidity for smart contracts.

2. Front-End Framework**:** React.js

3**.** Backend**:** Node.js for handling API requests and connecting to the block-chain.

4. Database**:** PostgreSQL for storing non-sensitive data (e.g., user profiles, project donations,NGO's).

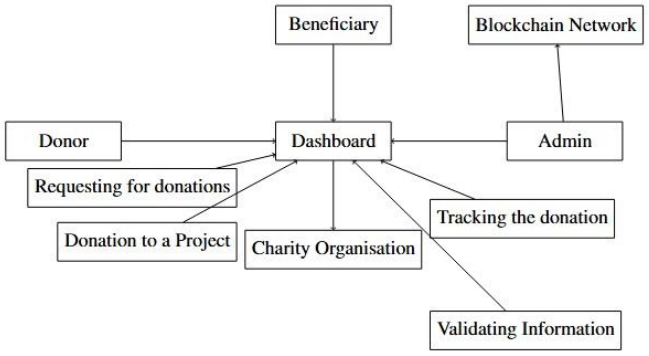

Figure 1 :System Architecture

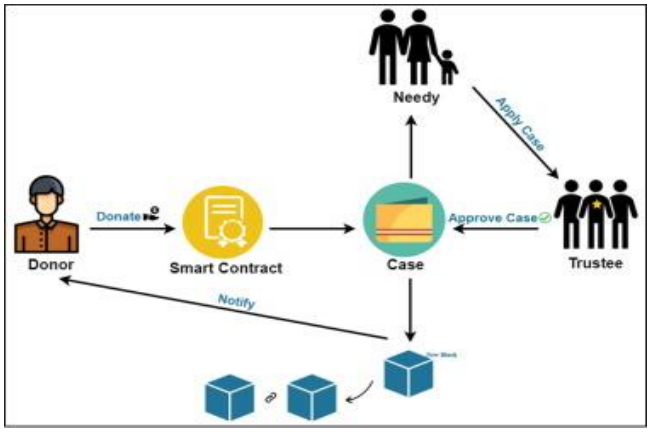

Figure 2 :Block Diagram

VI. RESULT

The block-chain-Based NGO Operations Management System developed using React.js**,** Node.js**,** block-chain (Ethereum/Smart Contracts)**,** and PostgreSQL was tested in a controlled live environment to evaluate its effectiveness in automating and optimizing key NGO operations such as fund management**,** resource allocation**,** and donation tracking.

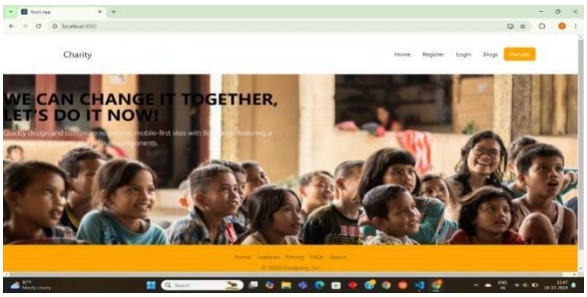

Figure 3 :Home page

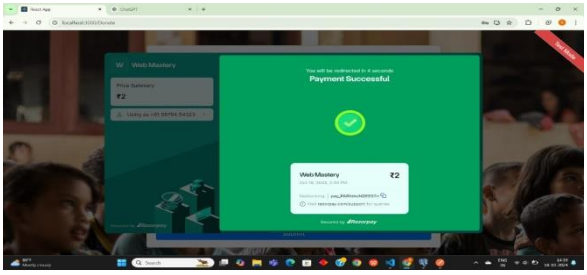

Figure 4 : Payment

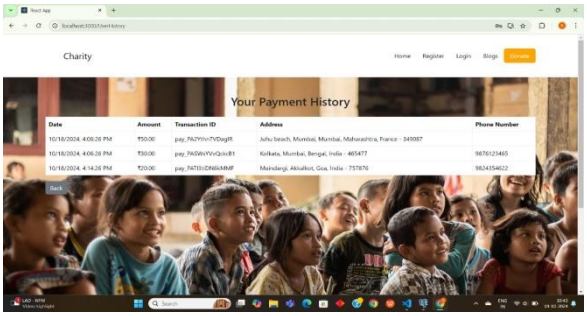

Figure 5:Payment History

VII. CONCLUSION

Introducing block-chain technology in NGO management solves important issues such as transparency, efficiency, and trust. block-chain's ability to create secure and immutable records allows for transparent tracking of donations, increasing trust between donors and NGOs. Additionally, using smart contracts to automate administrative tasks improves

operational efficiency by minimizing manual work and errors. This not only optimizes resource use, but also allows NGOs to focus more on their core objectives while maintaining accountability. In essence, block-chain has the potential to transform NGO operations, making them more transparent, trustworthy, and efficient for all stakeholders.

VIII. FUTURE SCOPE

The integration of block-chain Technology in the NGO Management System has the potential to significantly address many of the current challenges faced by NGOs, including transparency, accountability, security, and efficiency. Below are the key areas where block-chain can be leveraged to enhance the future scope of NGO operations:

1.Real-time tracking of donations and fund flow could be achieved. block-chain's transparent ledger will enable donors to track funds directly to their designated projects, ensuring no mismanagement or fraud.

2. Smart Contracts on block-chain platforms can automate fund distribution based on predefined conditions, ensuring funds are only allocated when certain criteria are met (e.g., project completion milestones, delivery of services).

3. block-chain's cryptographic encryption will ensure the security of donor data (e.g., personal details, transaction history) and prevent potential breaches. Additionally, donations can be made through crypto currencies, offering a border less, cost-effective, and secure method of contribution.

4. block-chain can enable real-time**,** automated reporting of project milestones, financial, and other key metrics. Using smart contracts to automatically update stakeholders and regulators on the progress of projects and funds us

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