NGOCHAIN: Revolutionizing Ngo Operations With Blockchain Technology

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Abstract- *The increasing prominence of blockchain technology has found a pivotal role in addressing security concerns across public and private sectors. Notably, its application in the charitable domain is gaining atraction as a solution to the pervasive issue of transparency in donation transactions. The lack of visibility into how charitable funds are utilized has led to a decline in donor trust. In response to this challenge, this paper advocates for a revolutionary approach – a Blockchain-based Decentralized Donation Tracking System developed on the Ethereum platform. This innovative system aims to restore confidence in charitable contributions by offering complete transparency, accountability, and a direct channel to the intended recipients. By leveraging the inherent features of blockchain, such as immutability and decentralization, this proposed system seeks to eliminate the opacity surrounding donations, empowering donors with real-time insights into the use of their contributions. The integration of blockchain technology in the charity sector holds the promise of reshaping the dynamics of trust and accountability, fostering a more efficient and transparent charitable ecosystem.*

Keywords: *Blockchain, Decentralization, Smart Contract, Cryptocurrency, Ethereum, Traceability, Consensus, Charity*.

I. INTRODUCTION

In the realm of charity and donations, transparency and accountability are paramount for fostering trust and ensuring that funds are effectively utilized for social causes. Unfortunately, existing systems often lack the necessary mechanisms to maintain clear records, leaving donors uncertain about the impact of their contributions. Moreover, the presence of corruption within organizations further exacerbates this lack of trust, causing donors to hesitate in supporting charitable endeavors.

To address these challenges, a proposed system seeks to revolutionize the way social organizations operate by leveraging smart contract-based incentives. By eliminating the need for third-party involvement, this system ensures transparent and verifiable transactions, allowing donors to track their contributions and confirm their impact without intermediaries. This level of transparency not only rebuilds trust among donors but also instills confidence in recipients and other stakeholders involved in the charitable process.

Through this innovative approach, the system not only enhances trust but also improves overall administration efficiency and reduces costs associated with charitable initiatives. By facilitating a seamless flow of donations to their intended recipients, the system ultimately empowers donors, organizations, and vendors to contribute to social causes with renewed assurance and accountability.

Moreover, this system guarantees that donations reach their intended recipients while optimizing overall administration expenses, improving speed, and enhancing efficiency. Through fostering confidence among beneficiaries and other partners in the NGO process, this framework aims to instill trust and bolster support for social causes, ultimately driving positive change within the NGO sector

II. RELATED WORK DONE

In paper [1], the author highlights the advantages of Blockchain technology over traditional systems across diverse domains, emphasizing its ability to eliminate the reliance on third parties for transactions. The paper underscores the applicability of Blockchain in decentralized applications such as supply chain management, banking, currency exchange, and charity, citing key characteristics like decentralization, persistency, anonymity, and auditability. Additionally, the study compares various consensus algorithms based on properties like node identity management, energy saving, and adversary power, providing insights for selecting suitable technologies according to specific system requirements.

In Paper [2], the author explores a blockchain-based trust management system for authentication, proposing decentralized models to enhance security. Traditional online transactions involve a cascade of trust through third parties, creating vulnerabilities. The paper advocates for a blockchain-driven approach, eliminating third-party dependencies and providing an additional layer of trust, particularly beneficial in

decentralized applications like supply chain management and banking. The methodology involves a graph model encoded on the blockchain, ensuring tamper-proof records and heightened security compared to traditional systems like Web PKI and PGP Web of Trust, mitigating potential attacks.

In Paper [3], the author conducts a comprehensive survey on Cryptocurrency mining systems, delving into algorithms and methods employed by different Cryptocurrencies. The necessity of mining is elucidated, serving the purpose of verifying transactions in blockchain technology. The miner's role involves validating the currency used in transactions. The paper outlines benefits and Peercoin, Ethereum, and Blackcoin, detailing the mining algorithms like SHA-256, Scrypt, EtHash, Blake, X11, and CryptoNight utilized in these systems.

In Paper [4], the author advocates for the transformative impact of Blockchain Technology on traceability management, sharing insights from the development of OriginChain. Emphasizing the significance of tracing product origins in supply chains for authenticity verification, the paper introduces OriginChain as a solution. Utilizing a smart contract on the Ethereum blockchain, the system records transactions as state transitions, enhancing traceability across the supply chain. The proposed blockchain-based system is asserted to be more secure than traditional methods, eliminating the need for manual quality checks by storing transactions in a distributed ledger, ensuring transparency and traceability.

In Paper [5], the author addresses the challenge of tracing the origin of each crypto-coin within the Monero blockchain, dispelling the notion that cryptocurrency transactions, especially in systems like Monero, are untraceable. The paper highlights the importance of transparency in transactions between entities and end-users. By enabling traceability, users, such as customers verifying the legitimacy of a purchased product, gain insight into previous transactions, offering applications in areas like metal purchase management, food delivery, and product quality checks. The model proposed by the authors claims successful tracing of transactions in the Monero blockchain, ensuring authenticity and verification of products.

In Paper [6], the author provides an overview of Bitcoin's prominence as a cryptocurrency in the digital exchange landscape. The system is characterized by assigning a unique ID and hash value to each transaction, ensuring their individuality within the blockchain. The paper also highlights the synergy of Blockchain Technology with Ethereum, emphasizing the pivotal role of smart contracts in contemporary cryptocurrency development. Smart contracts, defined sets of rules for transaction participants, eliminate reliance on trusted third parties, fostering trust directly between involved parties.

In Paper [7], the author introduces a system that eliminates the need for a trusted intermediary in money transactions, particularly addressing the limitations of internet commerce reliant on financial institutions. The conventional model, involving trusted third parties, lacks full trust due to non-reversible transactions and potential disputes. In the proposed Blockchain framework, transaction details are organized in sequentially linked 'blocks' using hashing. Each network participant possesses a copy of the blockchain, allowing for decentralized verification of authenticity by cross-referencing information with other nodes and ensuring consensus.

In Paper [8], the author explores the architectural features of blockchains and underscores the significance of design decisions for optimizing system efficiency. The paper emphasizes the need for a thorough examination of blockchain characteristics and configurations during system development to ensure efficiency, security, and trustworthiness. Recognizing that decentralized storage applications may demand varying blockchain traits, the author conducts an extensive study, offering a classification based on factors such as cost efficiency, performance, flexibility, privacy, scope, scalability, and consensus protocol.

In [9], the author emphasizes blockchain security through a privacy mechanism using RSA digital signatures. Confidentiality is ensured by encrypting the message with the sender's private key, followed by encryption with the receiver's public key, preventing unauthorized access and ensuring data integrity and authenticity.

In [10], the author explores transaction security through the Elliptic Curve Digital Signature Algorithm (ECDSA). This algorithm employs the secp256k1 standard, defining a curve critical for transaction signing. The secp256k1 assists in deriving constants crucial for blockchain transaction signatures, requiring the solution of a robust mathematical problem. This cryptographic strength enhances the security of the algorithm, ensuring a resilient foundation for signing and verifying transactions within the blockchain system.

In [11], the author advocates for the adoption of the JSON RPC interface to facilitate client-side connections to an Ethereum node. Serving as a low- level interface, it relies on libraries like web3.js and ethers.js to generate function calls on the client's behalf and deliver corresponding responses. This approach enhances the interaction between the client and the Ethereum node, enabling effective communication and operation within the decentralized network.

In [12], the author outlines a guide for constructing a decentralized application. Emphasizing Solidity language, the author recommends the creation of smart contracts using the

Remix online editor. Additionally, the incorporation of the Truffle.js framework is advised for streamlined management and deployment of the decentralized application, offering a comprehensive approach to the development process.

III. SYSTEM ARCHITECTURE

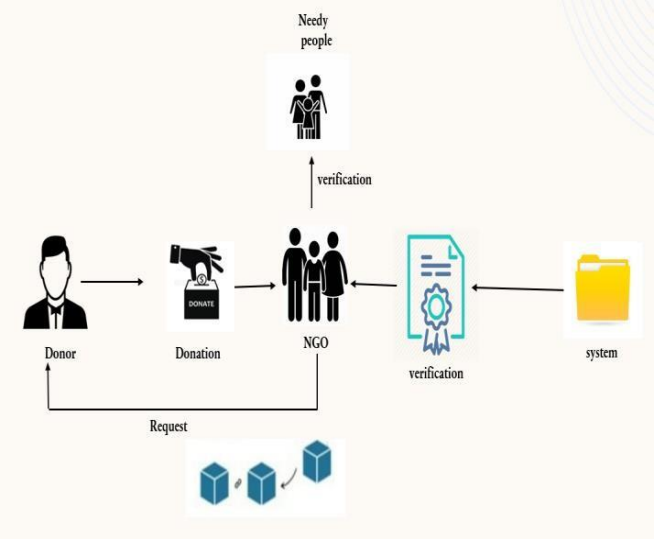

Figure 1. System Architecture

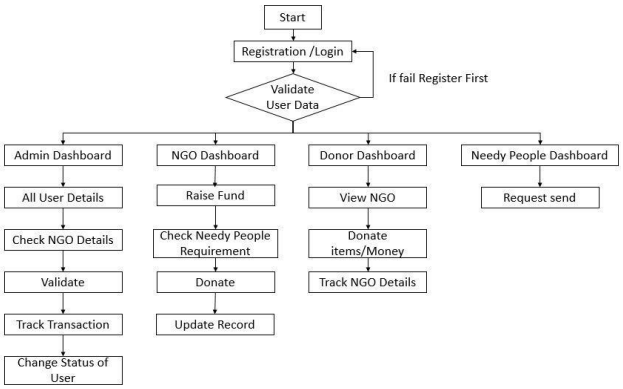

Figure 2. Flow Diagram

The system consists of users that play a major role which is classified as the donor, NGO and the Recipient. NGO will register in the application by providing all the necessary information which is required for the background verification. Once the NGO registers he need to wait for the system admin's approval, So once the system admin approves his credentials the NGO user can login to the application. Recipient has to register to the application by providing all the necessary information and gets the login credentials.

After through verification, NGO will get know whether the requested recipient is genuine or not. NGO will verify and approve recipient requirements that are requested to his organization. Once it is verified NGO will post the requirement. The Donor has to register to the application by providing all the necessary information and gets the login credentials Once the requirement is posted, the donor's will start to contribute. Once the contribution is done he will be tracking the donations by checking the status of the transactions.

IV. PROPOSED SYSTEM

The proposed system is a comprehensive multi- dashboard platform designed to streamline and enhance the management of NGO activities. Users begin by either registering or logging in, followed by a validation of their data. Once validated, users are directed to one of four main dashboards tailored to their roles.

The Admin Dashboard provides administrators with tools to view all user details, check and validate NGO information, track transactions, and modify user statuses, ensuring proper oversight and control. The NGO Dashboard enables NGOs to raise funds, assess the needs of individuals seeking assistance, donate items, and update their records, facilitating efficient resource management and service delivery.

The Donor Dashboard allows donors to view NGO profiles, make donations of items or money, and track the progress and utilization of their contributions, promoting transparency and donor confidence. Lastly, the Needy People Dashboard is designed for individuals in need, enabling them to submit donation requests by providing necessary information such as required items, address, and a description of their situation, ensuring targeted and efficient assistance.

This well-structured system ensures effective management, transparency, and collaboration among all stakeholders, enhancing the overall impact of NGO efforts.

V. RESULT

Figure 3: Home Page

The proposed system is a web application that utilizes blockchain technology. The figure above shows the home

page of the application, named "Seva Sankalp,". The login interface allows users to enter their credentials, with options for admin and beneficiaries to access their respective portals.

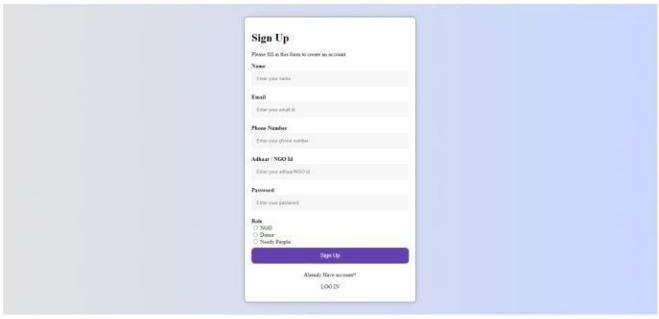

Figure 4: Sign Up Page

The Donar, needy people and NGO has to register to Seva Sankalp System through this application by providing necessary data.

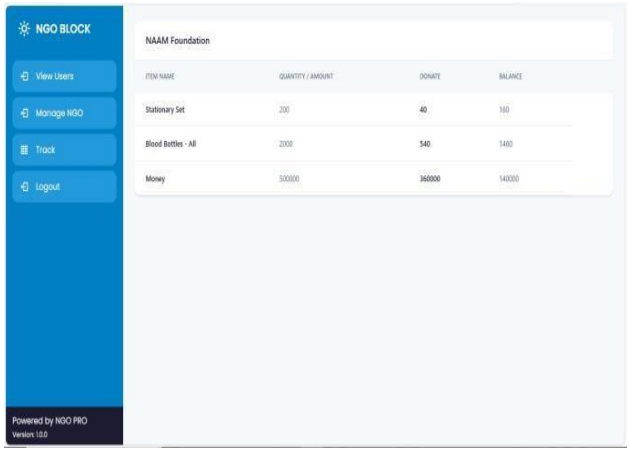

Figure 5: Admin Page (Donated Items)

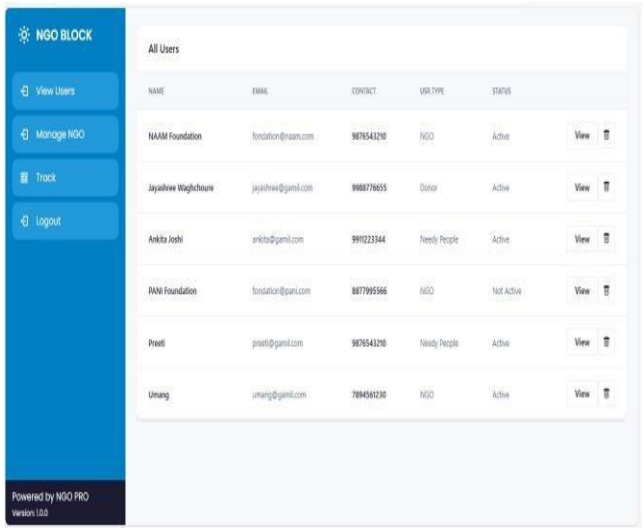

Figure 6: Admin Page (User List)

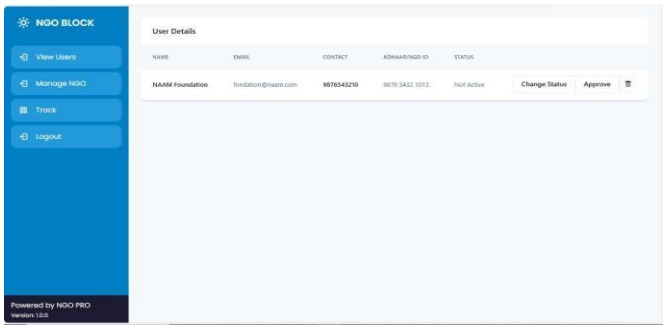

Figure 7: Admin Page (NGO Approval)

This admin pages allows administrators to view users, manage NGOs, and track donations from donors, ensuring efficient oversight and transparent management of all activities on the Seva Sankalp platform.

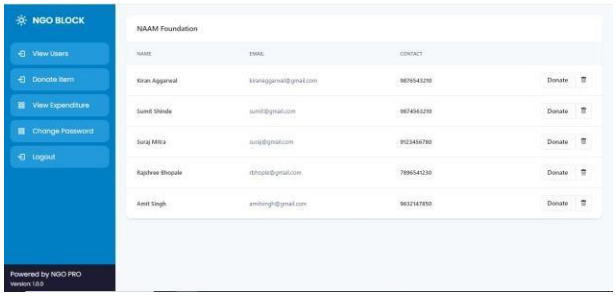

Figure 8: NGO Page

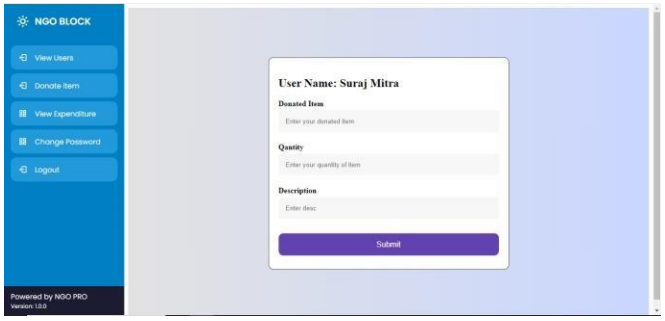

Figure 9: Donar Page

This NGO page allows organizations to view users, donate items to those in need, track total expenditures, and manage account settings, including changing passwords, ensuring effective and transparent operations.

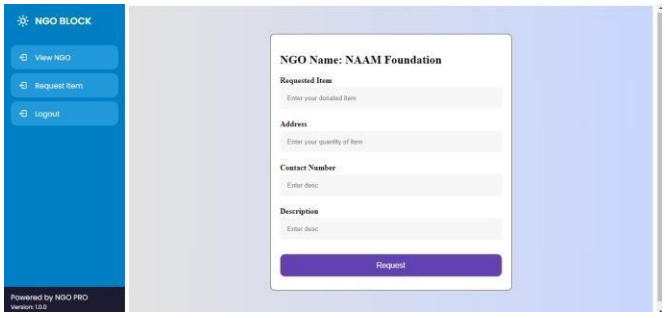

Figure 10: Needy People Page

This page allows those in need to request donations by providing information such as the required item, address, mobile number, and a description, facilitating targeted and efficient assistance.

CONCLUSION

The Decentralized Donation Distribution System based on blockchain technology helps record the transactions of individual(s) making donations and gather information of where the donations are being spent. Smart contracts using blockchain implemented helps in controlling the transfer of tokens or digital currencies between the ends parties involved in the transaction directly without the need to depend on a trusted third party. The system allows donations and receives donations. Each transaction is unique, making it easy to track it through the blockchain. A high level of clarity and social accountability can calm donor minds and encourage them to donate while also strengthening the reputation of giving generously.

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