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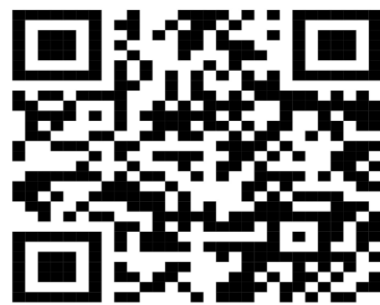
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TITLE: IMPLEMENTATION OF BLOCKCHAIN POWERED CHARITY APPLICATION USING SOLIDITY

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IMPLEMENTATION OF BLOCKCHAIN POWERED CHARITY APPLICATION USING SOLIDITY

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Abstract:

This paper introduces an innovative charity coordination platform built on blockchain technology, specifically on the Ethereum platform. Targeting sectors such as coordination businesses and public government assistance, the platform leverages blockchain's inherent features of transparency and immutability. It incorporates a unique Responsibility Relay System and Evaluation and Reporting Mechanism to ensure data consistency, credibility, and transparency in charitable operations. Additionally, a model for evaluating material donations for social welfare, based on the maximum flow algorithm, is established. Through a four-month observational study, it is observed that the blockchain platform significantly enhances user confidence, improves system cleanliness, and increases the quality of charitable materials, thereby enhancing public welfare. The paper concludes that this blockchain solution serves as a technical means to maximize social welfare, emphasizing its potential impact on improving the efficiency and credibility of charitable activities.

Keywords: *Blockchain technology, Smart contract, data security, data recovery, Charity Application.*

1. INTRODUCTION

The emergence of blockchain technology, stemming from the foundational innovation of Bitcoin, has sparked significant interest and discussion across various industries. Often regarded as a disruptive force in the computing model, blockchain represents a paradigm shift akin to the transitions from mainframes to personal computers and the internet. At its core, blockchain offers a decentralized and tamper-proof ledger system, revolutionizing the way data is stored, verified, and manipulated [1].

Blockchain, strictly defined, is a decentralized cryptographic ledger that combines data blocks chronologically into immutable data structures. This technology ensures counterfeit-proof transactions, facilitates irrevocable data storage, and operates without the need for centralized control [2]. Through the integration of cryptographic techniques and decentralized consensus mechanisms, blockchain enables a distributed computing paradigm that offers transparency, openness, traceability, and irrevocability [3].

The pervasive nature of blockchain technology presents a wide array of potential applications across various sectors, with particular relevance to areas such as public welfare and logistics traceability. In the realm of public welfare, where accountability and transparency are paramount, blockchain technology holds promise for transforming traditional donation management systems [4].

In 2016, the total value of donations collected in China, as reported by the China Charity Federation, amounted to 18.789 million yuan. However, analysis reveals that only a fraction of these donations, approximately 3.08%, constituted monetary contributions, with the majority being physical goods converted into monetary value [5]. This discrepancy underscores the need for greater transparency and accountability within charitable organizations, as donors seek assurance regarding the utilization of their contributions.

The primary objective of this project is to harness blockchain technology to enhance transparency and build trust within charitable organizations. By leveraging blockchain's inherent properties, including transparency, immutability, and decentralized consensus, the project aims to address longstanding challenges associated with opacity and accountability in the sector.

Traditional donation management systems often rely on centralized intermediaries, leading to limited transparency and accountability. Donors are often left uncertain about how their contributions are utilized by charitable organizations,

fostering distrust and hindering further engagement [6]. Moreover, the administrative overhead associated with traditional systems imposes significant costs on charitable operations, diverting resources away from their intended beneficiaries.

To overcome these challenges, the project proposes the implementation of smart contracts on the blockchain. Smart contracts are self-executing agreements that automatically enforce predefined conditions and actions based on predetermined criteria [7]. By integrating smart contracts into the donation management process, the project aims to automate the tracking of donations and the disbursement of funds, thereby streamlining operations and reducing administrative costs.

Blockchain technology serves as an immutable and transparent ledger, ensuring that all transactions, including donations and fund disbursements, are securely recorded and tracked [8]. This transparency allows stakeholders, including donors, beneficiaries, and regulatory authorities, to verify the integrity of financial transactions and ensure compliance with established protocols.

In summary, the introduction of blockchain technology offers a transformative opportunity to enhance transparency, accountability, and trust within the charitable sector. By leveraging blockchain's decentralized infrastructure and smart contract capabilities, the project aims to revolutionize traditional donation management systems, ultimately

maximizing the impact of charitable contributions on societal welfare.

2. LITERATURE SURVEY

Blockchain technology, initially introduced through Bitcoin, has garnered significant attention for its potential applications beyond cryptocurrency. This literature survey delves into various studies exploring the use of blockchain in philanthropy and charitable activities, highlighting its benefits in enhancing transparency, accountability, and efficiency within the sector.

Reiten et al. [1] present a study on "Transparent Philanthropic Microlending," where they propose a novel approach to microlending using blockchain technology. The authors discuss how blockchain can enable transparent and auditable lending processes, addressing concerns related to accountability and trust in philanthropic endeavors.

Miraz and Ali [2] explore "Applications of Blockchain Technology beyond Cryptocurrency," providing a comprehensive overview of the diverse use cases of blockchain technology. They discuss its potential in various sectors, including finance, healthcare, supply chain management, and philanthropy. The authors emphasize the transformative impact of blockchain on enhancing transparency and trust in charitable activities.

In a study titled "Adding value with blockchain: an explorative study in the charity retail sector," Bunduchi et al. [3] investigate the potential value of

blockchain technology in the charity retail sector. Through qualitative research methods, the authors explore how blockchain can improve supply chain transparency, facilitate donations tracking, and enhance donor engagement in charitable retail operations.

Agarwal et al. [4] propose a "Decentralized and financial approach to effective charity" by leveraging blockchain technology. The authors discuss the use of smart contracts and decentralized finance (DeFi) mechanisms to streamline charitable operations, reduce overhead costs, and ensure the efficient allocation of funds to deserving beneficiaries.

Saleh et al. [5] present a "Platform for Tracking Donations of Charitable Foundations based on Blockchain Technology," highlighting the importance of transparency and accountability in charitable foundations. The authors develop a blockchain-based platform for tracking donations, ensuring that funds are utilized for their intended purposes and providing stakeholders with real-time visibility into donation flows.

Aras and Kulkarni [6] conduct a comprehensive survey on "Blockchain and Its Applications," exploring the various domains where blockchain technology can be applied. The authors discuss the underlying principles of blockchain, its key features, and its potential applications in sectors such as finance, healthcare, supply chain management, and philanthropy. They emphasize the role of blockchain in enhancing data integrity, security, and transparency across diverse industries.

Jayasinghe et al. [7] discuss "Philanthropy On The Blockchain," focusing on the use of blockchain technology to revolutionize philanthropic practices. The authors explore how blockchain can facilitate transparent and auditable donation processes, improve donor trust, and enable efficient fund distribution to charitable initiatives.

Overall, the literature survey highlights the growing interest in leveraging blockchain technology to enhance transparency, accountability, and efficiency in philanthropy and charitable activities. From transparent microlending platforms to decentralized donation tracking systems, blockchain offers innovative solutions to address longstanding challenges in the sector. Moving forward, further research and development efforts are needed to fully realize the potential of blockchain in maximizing the impact of charitable contributions on societal welfare.

3. METHODOLOGY

a) Proposed Work:

One of the main objectives of making a charity application using blockchain is to provide transparency between the organizations and donors without any third-party inclusion such that they do not lose hope in online donations.

The proposed system will utilize blockchain technology to create a transparent and immutable ledger of donation transactions. By recording every donation on the blockchain, donors can have confidence that their contributions

are being used as intended and can track their impact in real-time.

The proposed system will be governed by a decentralized network of stakeholders, including donors, charities, and validators. This distributed governance model will ensure that decision-making is transparent, inclusive, and resistant to corruption or manipulation.

The proposed system will be accessible to individual's worldwide, regardless of geographic location or socioeconomic status. Donors will be able to contribute to charitable causes using digital currencies, eliminating barriers such as currency conversion fees or banking restrictions.

b) System Architecture:

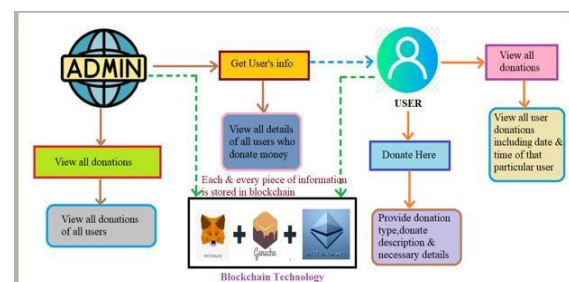


Fig1 Proposed Architecture

The proposed system architecture leverages blockchain technology to facilitate transparent and efficient donation management. At its core, the system consists of a decentralized network of nodes that collectively maintain a distributed ledger containing records of all donations. Smart contracts govern donation transactions, ensuring automated execution of predefined rules and conditions.

Users interact with the system through a user interface, accessing functionalities such as viewing all donations, accessing user-specific donation data, and obtaining user information. The system employs cryptographic techniques to secure data integrity and user privacy.

Upon initiating a donation, users' transactions are broadcasted to the network and validated through a consensus mechanism. The donation details, including the amount, timestamp, and user information, are permanently recorded on the blockchain.

To retrieve donation information, users can query the blockchain for all donations or specify criteria to filter donations based on user or time. This architecture ensures transparency, accountability, and traceability in the donation process, fostering trust and confidence among stakeholders.

c) Modules

To implement this project we used the following modules: user, admin.

These modules' descriptions are given below:

New User Signup

This module facilitates the registration process for new users on the charitable platform. Users, including donors and potential participants, can create accounts by providing essential information such as name, email, and password. Upon submission, this data is used to register users, enabling them to access and engage with the platform's functionalities.

User login

Upon successful registration, users gain access to their accounts by logging in with their registered credentials. This module guarantees secure authentication, allowing users to access the platform's features and functionalities with ease. By verifying user credentials, the system ensures that only authorized individuals can access their accounts, maintaining the privacy and security of user information.

i) Donate here

This module streamlines the donation process for users, allowing them to select a cause, specify the donation amount, and securely complete the transaction. Leveraging blockchain technology, all donation transactions are recorded and verified, ensuring transparency and accountability in the charitable giving process.

ii) View all Donations

This module allows users, including both donors and participants, to access a transparent and comprehensive list of all donations made on the platform. By providing detailed insights into the allocation of contributions, it fosters trust and accountability, enhancing transparency in the charitable ecosystem.

Admin Login

This module caters to administrative users responsible for managing and overseeing the platform. Upon logging in with their credentials, administrators gain access to a suite of administrative functions and data. These functions include user management, donation tracking, and platform maintenance tasks. By providing

specialized access to administrative features, this module ensures efficient platform governance and facilitates effective decision-making by administrators.

i) Get User's Information

Within the admin panel, this module enables administrators to access and retrieve information pertaining to registered users. This may include user profiles, donation history, and other pertinent data, facilitating efficient management and oversight of user activity on the platform.

ii) View all Donations

This module within the admin panel offers administrators a comprehensive list of all donations made on the platform, akin to the user's view. Admins utilize this feature to uphold transparency and accountability in charitable activities, ensuring efficient oversight and management of donation transactions.

d) Blockchain Integration

This module utilizes blockchain as an immutable ledger. It allows all participants, including donors, to access and view recorded donation transactions and fund utilization. Donors can trace their contributions in real-time, ensuring complete transparency in how their donations are utilized.

When users make donations through this module, blockchain's decentralization reduces the need for intermediaries. Donors can see exactly where their

contributions are directed, enhancing the transparency and accountability of fund allocation.

These modules provide donors with real-time visibility into their contributions. Donors can access detailed transaction information on the blockchain, boosting their trust and confidence in the charity platform.

Within this module, donors and other participants can track the complete journey of funds from the point of donation to the ultimate beneficiary. This transparency is enabled by the blockchain, ensuring that the path of funds is visible to all involved parties.

GANACHE-

Ganache, a development tool for Ethereum, structures data into blocks, similar to how the Ethereum blockchain operates. Each block contains a collection of transactions, a reference to the previous block (except for the initial "genesis block"), and a timestamp indicating when the block was created.

When developers interact with smart contracts in their development environment, Ganache records these interactions as transactions within the blocks. This means that any actions taken during development, such as deploying smart contracts or executing functions, are securely documented within the blocks.

Ganache's functionality extends to enabling developers to retrieve specific information from the stored blocks. This access allows developers to review and analyze the details of transactions, account

balances, and other data within the blocks, facilitating testing and development processes.

METAMASK-

Metamask is a browser extension and mobile wallet connecting users to Ethereum, allowing account management and DApp interaction.

Ethereum's cryptocurrency, ETH, undergoes continuous price changes due to market forces, including demand, speculation, utility, network activity, and global events, alongside investor sentiment and technical factors.

4. EXPERIMENTAL RESULTS

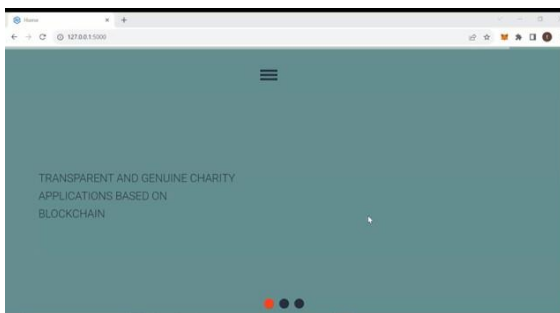


Fig 2 home screen

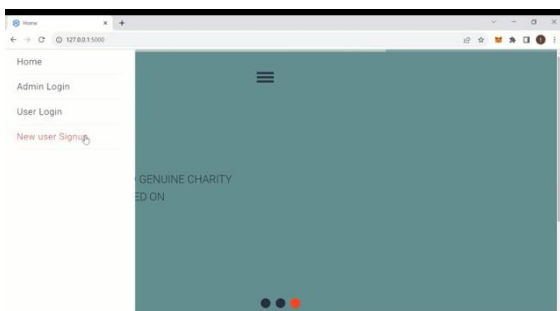


Fig 3 click on new user signup

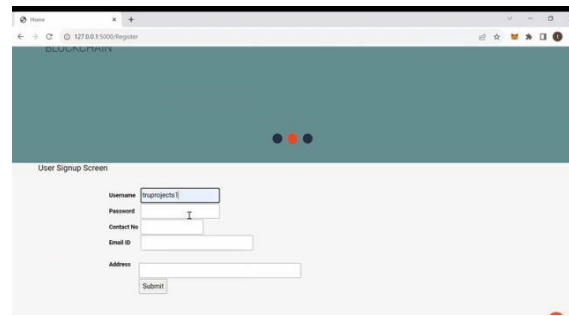


Fig 4 user sign up screen

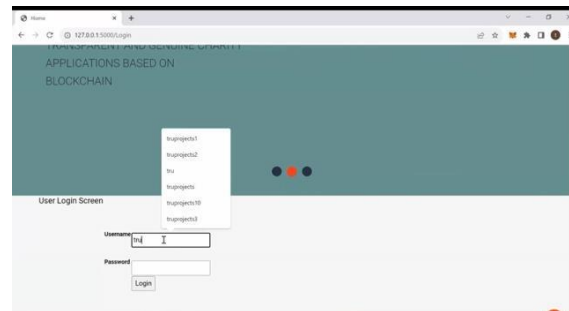


Fig 5 user login screen

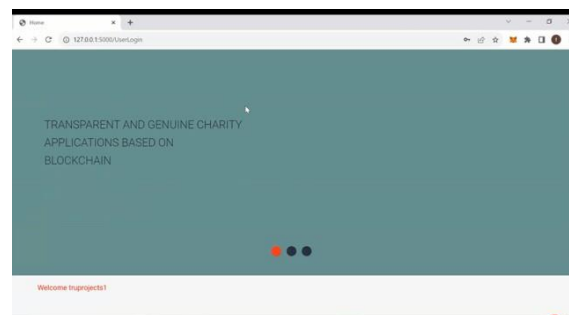


Fig 6 main page

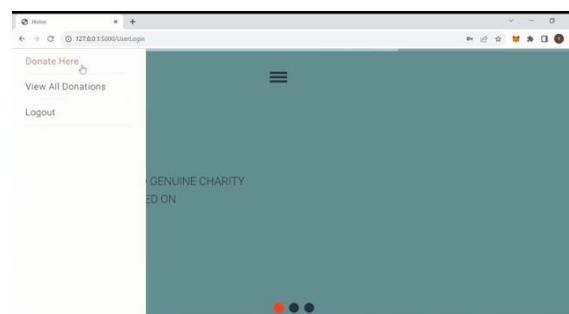


Fig 7 click on donate here

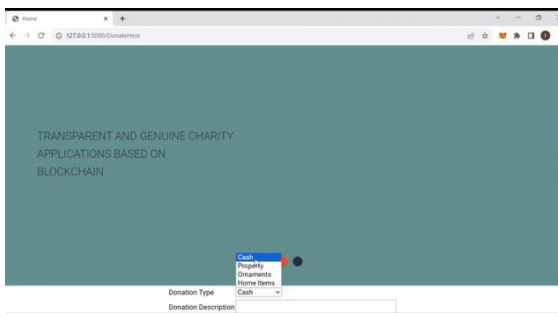


Fig 8 donate here page

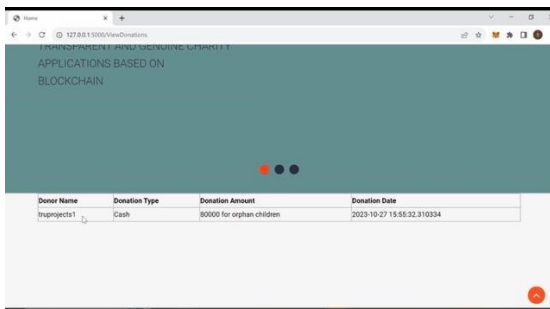


Fig 9 view all donation page

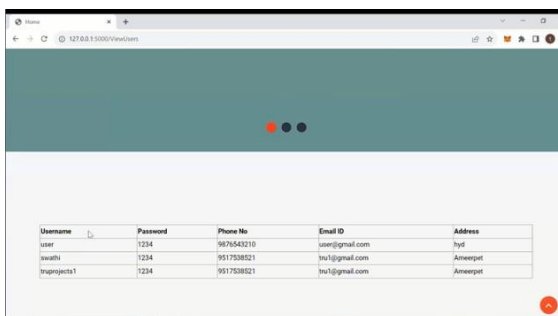


Fig 10 donation details page

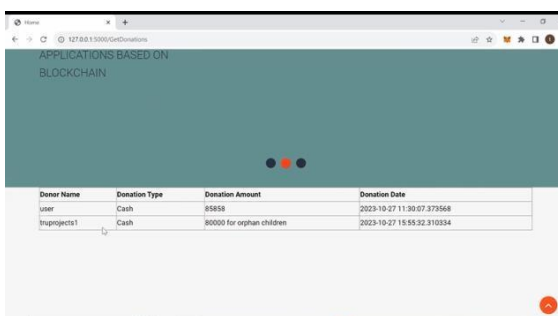


Fig 11 out put page

5. CONCLUSION

In conclusion, the utilization of blockchain technology represents a significant step forward in enhancing transparency, efficiency, and trust within the charity sector. By securely recording all transactions on a public ledger, stakeholders can access a transparent and accountable view of charitable operations. Eliminating intermediaries streamlines the donation process, ensuring aid reaches charitable organizations promptly and cost-effectively. Moreover, blockchain's tamper-proof nature reduces fraudulent activities, rebuilding donor confidence and trust in the sector. This adoption of blockchain technology heralds a transformative shift in the charity sector, offering increased accountability, efficiency, and confidence among donors and beneficiaries alike. As highlighted, blockchain holds immense potential for revolutionizing charitable activities, with its long-term benefits promising sustained improvements in transparency and operational effectiveness. Moving forward, widespread adoption of blockchain technology stands to usher in a new era of trust and efficiency in charitable endeavors, ultimately benefiting both donors and beneficiaries.

6. FUTURE SCOPE

In envisioning the future scope of the proposed project, several enhancements can propel its impact and effectiveness within the charitable sector. Firstly, leveraging blockchain technology to foster greater collaboration and partnership among charitable organizations, government agencies, businesses, and stakeholders can amplify the project's

reach and efficacy. By creating a unified platform for transparent and accountable charitable activities, stakeholders can pool resources, share insights, and coordinate efforts more efficiently.

Secondly, integrating the proposed system with existing donation platforms, financial systems, and regulatory frameworks will be instrumental in fostering adoption and ensuring interoperability. Seamless integration with established platforms and systems will streamline processes, enhance data exchange capabilities, and facilitate compliance with regulatory requirements. This integration will not only broaden the project's scope but also enhance its relevance and utility within the broader ecosystem of charitable initiatives.

Overall, the future scope of the project lies in its ability to catalyze collaboration, innovation, and efficiency within the charitable sector while aligning with existing infrastructures and regulatory frameworks to maximize impact and sustainability.

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