Blockchain Supported Charity System to Track the Utilization of Funds

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Abstract

NGOs face a difficult fundraising situation, due to their lack of transparency. With each passing day, it grew increasingly difficult to determine if donations were being delivered to the right address or if they were misused to commit fraud. As a result, donors lose their trust in these NGOs. This study proposed a solution to the problem by utilizing Blockchain technology, a decentralized system that offers security, transparency, and lower financing costs by removing the need for third parties between donors and NGOs. In the blockchain, all donations can be recorded, allowing donors to see where and how their money is being used. Polygon-Mumbai Blockchain was used to achieve the proposed solution. Smart contracts are used to make all payments, allowing donors to know exactly when and how their money will be received. For ease of use of the proposed system, a website was developed for users. Our objective is to support the growth of philanthropy and enhance public trust in NGOs by implementing a blockchain-based charity system.

Keywords. Polygon, Smart contract, Blockchain, Charity, Fundraising, Transparency.

1. INTRODUCTION

Charity is an essential component of a democratic society. Every year, numerous situations occur in this world that result in painful loss. People are growing increasingly eager to contribute to society[1]. Many individuals have recently been interested in donation activities. In order to collect donations from people all over the world, charities work to reach as many people as they can. Satoshi Nakamoto introduced the concept of decentralized blockchain[2]. Blockchain is a technology that can be used to store data that needs to be tamperproof as the data written to the blocks cannot be changed without changing the data in the following ones. Data that is public, transparent, and permanent can be stored on the blockchain. A blockchain-based decentralized solution [3] is being provided in this paper that works as a charity platform for donors to donate money in crypto currency. Blockchain has the potential to have a significant influence on the charity sector, allowing for the safe and transparent allocation and management of donations. Donors can donate money in cryptocurrency to non-government organizations who need the donation taking advantage of the high security and transparency characteristics of blockchain.

2. LITERATURE SURVEY

Considering recent development of Blockchain in various fields, many researchers are focusing on use of blockchains in various domains. Table 1 shows few of them studied during proposed work.

Table1. Literature review of related papers

Title, Author(s), Year of Publication	Purpose of study	Research type/aspect
"Blockchain-Based One-Off Address System to Guarantee Transparency and Privacy for a Sustainable Donation Environment" *Jaekyu Lee, Aria Seo, Yeichang Kim, and Junho Jeong (2018)*	The current system for charity has numerous issues like transparency with donors and privacy. To try to solve the problem of transparency, this paper proposes a donation mechanism based on smart contracts on the blockchain and to preserve privacy, the authors suggest a one-time address system using the same smart contract concept. Here, donations are sent through the donor account address created once to ensure anonymity. [4]	Case study/learner experiences
"Managing charity 4.0 with Blockchain: a case study at the time of Covid-19" *Rangone, A., Busolli, L. (2021)*	This paper goes in depth about the current status of blockchain and how this technology can be used in the charity sector. The paper then studies the idea of Charity wall, a system that uses the combination of a social network for NGOs and an automated audit system. Not only transactions but all documents are traced in this system. It discusses how Charity wall helps restore relationships with small and medium-sized donors, lower operating costs, refine the whole supply chain, and speed up contribution procedures in the interests of the eventual recipients. [5]	Survey/institutional and administrative factors
"Research on Charity System Based on Blockchain" *Baokun Hu1, He Li(2020)*	This paper investigates the intersection of blockchain technology and philanthropy and presents a blockchain-based charity model. Donors complete donations and use funds with the help of smart contracts. All transactions are recorded on blocks to ensure fund traceability and boost transparency. A DApp that the paper developed claims to have validated certain fundamental components and realizes the next step to create a complete blockchain-based charity system. [6]	Case Study/learning environment; learner perceptions
"Platform for Tracking Donations of Charitable Foundations based on Blockchain Technology" *Hadi Saleh, Sergey*	Donors are suspicious of how their money is handled. Blockchain technology is now being used in a variety of industries. Incorporating blockchain technology helps make money giving and receiving a	Causal comparative/ learners' outcomes

Avdoshin, Azamat Dzhonov (2019)	transparent process. It is necessary to build a single platform for monitoring donations that would track all information regarding gifts, transactions, and donors. The aim of the paper is to explain the development of a blockchain based system for tracking donations. Based on blockchain technology, the system provides transparent accounting of operations for donors, charitable foundations, and recipients. A charity platform should provide a way to show complete transparency which allows donors to monitor or track where and how the charity funds were used.[7]	
"Investigating the Charity Funding System using Blockchain Technology" *Ajendra Saxena; Dileep Kumar; Bhanu Pratap Singh; Bhairu Lal Jatt; J. Sathish Kumar (2022)*	In this article, the author suggests a blockchain-based solution for the online philanthropy system. Any donor's contributions may be tracked and kept up to date using the blockchain technology. The system turns actual money into digital tokens, and all transactions on the platforms are carried out using tokens. These tokens are given out by donors, and other algorithms are used to distribute them when they are given to receivers. Based on execution time and execution cost, the comparability of proposed algorithms is assessed and examined[8].	Case study/learner experiences
"Charity Donation System Based On Blockchain Technology – 2022" *Prof. Dhanashri Patil; Abhishek Kadam; Gargi Shetye; Tanmay Budage; Ashutosh Sonar (2022)*	For transparency in this study, the authors created a blockchain-based contribution mechanism. This procedure makes donations transparent. By encrypting the contribution from a specific donor to a specific NGO, it protects the privacy of the system's users [9].	Causal comparative/ learners' outcomes
"Developing a Reliable Service System of Charity Donation During the Covid-19 Outbreak" *Hanyang Wu; Xianchen Zh (2020)*	This paper investigates how charity service providers may employ blockchain technology as a quick and secure solution during the COVID-19 pandemic, which led to a spike in information asymmetry and the demand for contributions. The researchers were able to ensure the veracity and quality of information during the pandemic because to this application of blockchain technology. They explain the design and implementation of the service system [10].	Case study/learner experiences; design and implementation

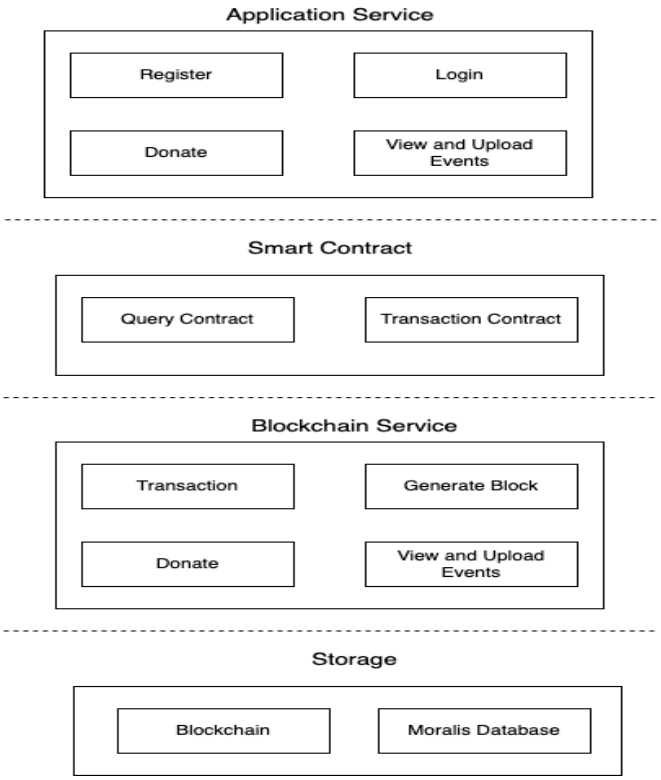

Figure 1. Architecture Diagram

3. PROPOSED SYSTEMS AND SOLUTIONS

Currently majority of web-based software is centralize. In this project, a decentralized process for charity funding is developed with two basic categories: NGOs and contributors (DONORs). By using Polygon-Mumbai Test Chain, every transaction information is stored on a blockchain network. This system uses the Meta Mask Browser Extension as cryptocurrency wallet. Smart contracts were developed using Solidity. Dapps were used to verify the project formation, and fund transfer processes.

4. FUNCTIONALITIES

4.1 Functionalities for NGO as a user.

- Connect to meta mask wallet and login into the NGO dashboard
- Click on create campaign to host a new event for which the NGO wants to raise funds and fill in the name, description and the amount to be raised in crypto (MATIC)
- View all donations received by donors on poly scan for all events
- View all events created by other NGOs

4.2 Functionalities for Donor as a user

- Connect to meta mask wallet and login into the donor dashboard
- View all active events to make donations

- Make donations to an event of their choice in crypto (MATIC)
- View all donations received by donors on poly scan for all events

4.3.1 WORKFLOW

The proposed system's entire workflow pattern is depicted in Figure 2. The following are some key details to note:

- There are two dashboards available (DONOR & NGO). If a user links their Meta Mask wallet to the Donor Dashboard for the first time, they will be logged in as a DONOR and will not be able to connect the same wallet to the NGO Dashboard. The same is true if an NGO account is created through the NGO Dashboard and subsequently can't log in from Donor Dashboard.
- If the user is an NGO, the user can request funding by submitting a proposal (NGO Campaign/Event).
- If the user is a DONOR, the user can donate crypto (MATIC in this case) to the newly created NGO Proposal. On Polyscan, the user can examine all of the donations that NGOs have received.
- The account balance and prior transactions are visible to both the NGO and the DONOR.

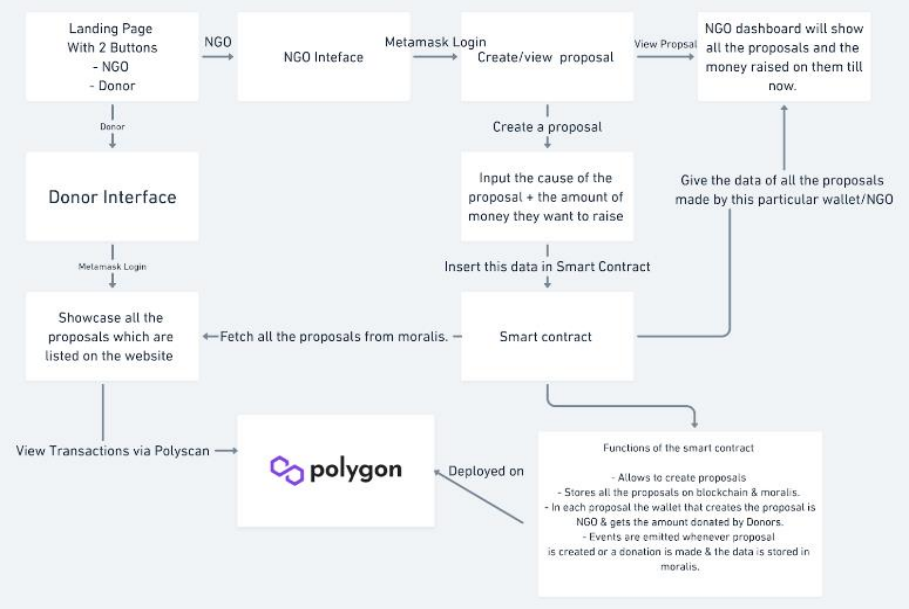

Figure 2. Workflow Flowchart

4.3.2 USERS Involved

- **NGO:** These are NGOs or charities in need of assistance.
- **Donors:** These are the entities that will review the needs stated by various NGOs, and will choose whether to donate to the NGO's cause or not.

The proposed website's landing page includes a detailed description of the system's purpose. Two dashboards are available, into which users may log in and link their crypto wallets for future usage.

To create a Charity Event, a user must first link their Meta Mask wallet to the NGO dashboard, following which a campaign can be created by filling out a form. The NGO would fill in the event's title, the amount of money intended to raise, and a description of the event. The Meta Mask wallet extension requests the user to sign/approve this transaction; if approved, the Event created will be permanently recorded on the Blockchain.
After creating an NGO Event, the NGO Dashboard will display the details of the events that the NGO organized as well as the total funds received thus far by that campaign.
Donors who have successfully integrated Meta Mask wallets can donate money. The donor is given two buttons: one to verify all the donations in detail and the other to donate to the charity as shown in Figure 3. If the donor clicks on the donate button, then a donation amount and a message to be sent can be entered into the campaign of their choice. Assets will be sent immediately to the NGOs wallet address after approval.

All donations are made using smart contracts, allowing donors to track the flow of their benefactions. Polyscan is a block explorer and a search engine for the Polygon network, allowing users to look up, confirm, and authenticate transactions. Figure 3 shows a list of an NGO's incoming and outgoing transactions, which may be viewed by any Donor who has previously clicked on the "View Donations" button.

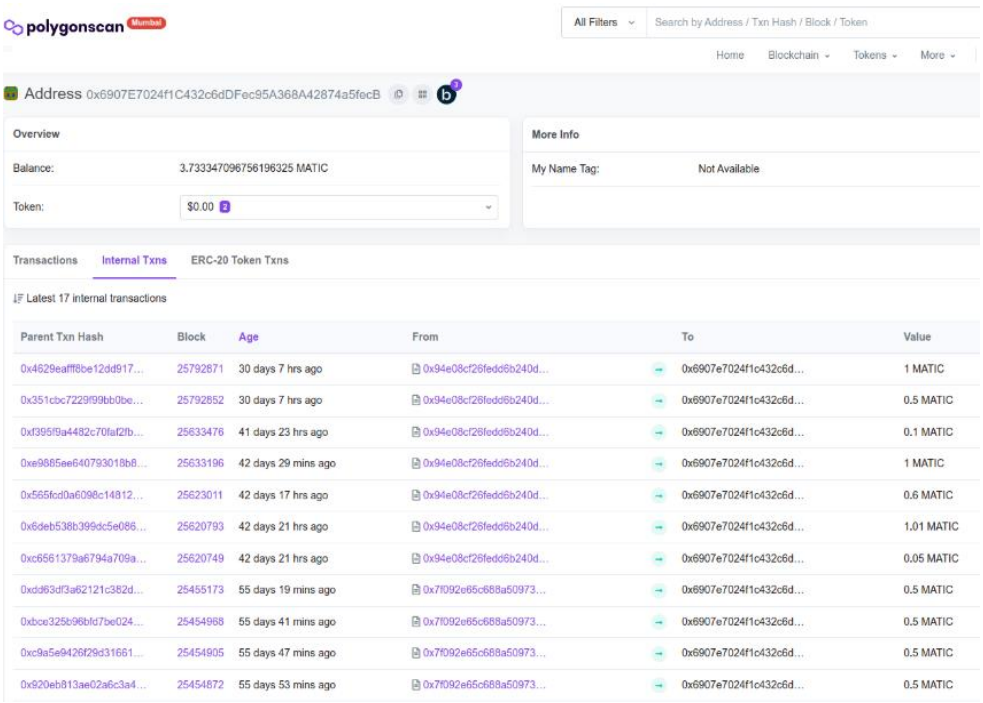

Figure 3. Polyscan results displaying all incoming and outgoing transactions to an NGO

5 RESULTS

The basis of our approach for charity, tracking its utilization, is blockchain. In the blockchain, all donations are recorded. Once recorded, they cannot be tampered with, allowing donors to see where and how their money is being spent allowing for the safe and transparent allocation and management of donations. blockchain technology does not require any third-party involvement. Because blockchain renders data open/transparent in ways that have not previously existed in financial institutions, many say that it might be utilised as the set of standards for transparency. Most consumer goods and service

companies are currently using this technology to safeguard their customers' data. In our case, the donor will be able to see the flow of his donation from the start point, to where it heads, and how successfully it goes into the charity's wallets without any tampering. The ultimate see-through option for all the donations ranks this platform's superiority against other online working camps.

6 CONCLUSION AND FUTURE SCOPE

Inadequate transparency, data security, concerns about individual trust are few issues with India's charity system that has to be resolved soon[11]. This study proposed a ground-breaking method to change the Charity framework by utilizing blockchain technology. The entire procedure will be more transparent as a result of this application. Users can donate to an NGO, and donors can view the donations that have been made, thus making them more transparent & secure.

Decentralized autonomous organization, or DAO, is a group of people that agree to follow certain norms to accomplish a common objective. Every DAO has a built-in treasury to keep its crypto assets, which members may only access with the group's approval, and group decisions are decided collaboratively over a specified period. Charity DAO's members will all have access to a single treasury. As a result, all funds/donations received by all NGOs will be deposited in the shared treasury. An NGO would have to create a "withdrawal proposal," which would have a voting period. If the proposal obtains more than 51% of the vote, the desired funds will be sent into the NGO's personal wallet from the common treasury. This feature increases security and is a better method to verify the authenticity of the NGOs.

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