

Blockchain based Transparent Donating System

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Abstract

Blockchain is a promising technology that is quickly gaining traction in the realm of security that is regulated by both governmental and commercial organizations. Donors are unable to know whether their donations are being used effectively due to a complete lack of transparency in donation-related transactions, which has prompted many to stop believing in charities. The immutability, traceability, and reliability properties of blockchain technology make it a viable solution for enhancing efficiency and transparency for charity. This research work is based on the Ethereum Blockchain, the decentralized donation tracking system that will permit transparent accountability, openness, and direct communication with the intended targets. The blockchain network would be made up of well-known, reliable, and esteemed companies.

Keywords: Blockchain, Traceability, Smart Contract, Ethereum, Decentralized

1. Introduction

In a modern democracy, charity is essential. Every year, many situations occur around the world that result in devastating losses, whether they are connected to luck or life, and do serious harm. Several individuals have participated in philanthropic activities in the past and are looking for assurance and safety in the donation processes.

Charity makes every attempt to reach out to as many people as possible to get funds from all around the world. The donations are given to the poor and structured fundraising is not done regularly or with traceability. Even if donations were provided via a direct deposit or the Internet, most contributors have no idea how their money was used. In the sphere of charity and donations, current methods lack openness. When it comes to transactions involving donations to various organizations, there is no effective record-keeping, and the presence of some unscrupulous internal stakeholders has caused people to lose faith in this social purpose.

Fake charities attempt to profit from the kindness and generosity for those in need. Fraudsters will defraud people by posing as a legitimate charity. In addition to costing money, these fake games also steal money from respectable charitable organizations. Improving the visibility of donated data is an important method for increasing the validity of formal contributions and digital fundraising. The consistent advancement of blockchain technology has made it increasingly appealing to a wide range of applications, including money transfers, machine intelligence, internet of things-based applications, government entities, and economic sectors, among others, for the prevention of obscure attacks and cybercrimes. Thus, the growth of generosity is encouraged through a blockchain-based donation platform.

2. Literature Survey

To create, validate, and send transactions to other nodes in the network, users can utilize the blockchain to construct a decentralized transaction ledger. The level of security needed for financial activities is increased by various cryptographic hash algorithms used by some cryptocurrencies.

A decentralized system was illustrated since a database or other centralized entity is not included and it is not run by a third party. In the blockchain system, everything is recorded as a transaction. Users of the system fall into three categories: contributors, non-governmental organizations, and governmental entities. These individuals can be uniquely identified on the network as account holders on the blockchain platform thanks to their 160-bit account addresses. They can use their 256-bit private key to sign documents, execute transactions, and gain access to their accounts. [1][9]

A system was offered in which contributors can choose from a list of causes and donate any amount to any one of them. All wallet addresses and the transaction hash will be included

in the final receipt that the donor receives for their donation. These all take place decentralized and are tracked on the Blockchain ledger. Before being recorded in the ledger, each transaction is reviewed. A transaction is verified by a node, which then corrects the problem through a mining process. The transaction is then recorded on the blockchain and a block number is given. The Ethash proof-of-work algorithm, which is built into Ethereum, finds a nonce input. The time taken to find a nonce is determined by the threshold. In addition, the author listed many assaults and defenses for authentication systems. [2][7]

The Proof of Work technique was used to validate transactions. It offers security, which helps deter fraud and promotes confidence. Once all transactions within the block of data have been confirmed, it is then uploaded to the blockchain. It requires only a small amount of time and effort to inform the whole network that a new block has been mined, after validating the transactions in the block to be included and ordering them chronologically. [3][10]

The InterPlanetary File System (IPFS) was supported by a distributed peer-to-peer architecture in [4]. Since the IPFS functions similarly as a blockchain, blockchain technology uses it as the storage system. Each block in the blockchain is given a hash value by the cryptographic hash function. This value serves as an index for saving data. The files or blocks are retrieved using this special hash value. A decentralized, everlasting web is what IPFS aims to build. Blockchain cannot function without a consensus protocol. Agreeing on a set value of data is required for distributed and peer-to-peer activities or platforms. All participants are informed whenever a new transaction is added to the network. They can either approve it and include it in the chain or they can reject it. Most people must agree to the transaction to be consensus.

The platform was connected to the systems of charitable foundations using the REST API. The REST API is used to track every donation and movement of funds. Every bit of application data is kept in a centralized database that is separate from the blockchain. On the blockchain, the master data is kept up to date. Smart contracts generate each entry in the decentralized store. REST queries are used to send and receive data from the blockchain and centralized storage. [5][8]

The suggested approach in [6] used DApp (Decentralized Application), a web application that is blockchain-enabled and runs across a peer-to-peer network rather than a single server. Both a front end and a back end are included, and it operates independently on

each node. Typically, the front-end interface is developed using the same tools as other apps. The only notable difference is that a smart contract is used to link the app to a blockchain network.

3. Methodology

A. Charity System Model

Figure 1 depicts the proposed charity system model. Donors, recipients, nonprofits, and cooperative retailers are the four different types of participants. The platform provides the information needed for charitable groups to develop projects and ask for assistance. On the site, donors discover charitable endeavors and make donations to the causes they care about. Beneficiaries upload their information to the network to receive assistance; they can obtain and use tokens at cooperative shops. The charity platform will get the store transactions that have already occurred. For the beneficiaries to receive tokens, the cooperative stores provide them with services or goods. Charity organizations can convert the tokens into actual money. Due to the complete recording of the money movement on the blockchain, it is now possible to follow transactions and stop the misuse of money.

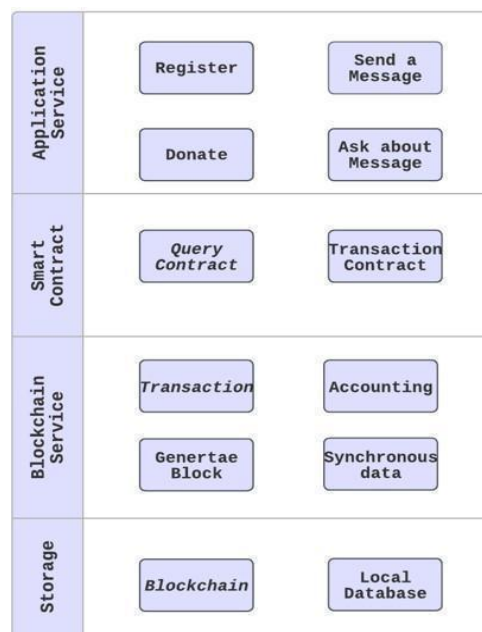


Figure 1. Proposed Model

B. Proposed Model

The platform's functionalities are made available to users directly through the application service layer, which includes several apps such as account registration, posting charity information, donating money, and sending messages of inquiry. Various scripts and smart contracts are included in the layer of smart contracts. It includes query techniques, transaction procedures, and other information. The charity platform's distributed accounting features, including block packaging, transaction consensus, block broadcasting, and data synchronization to a local database, are implemented by the blockchain service layer. Data, including blockchain storage and local storage, is kept in the storage layer.

C. Platform Usage Process

The charity platform is only partially operational, as shown in Figure 2.

1. **Donor:** The donor browses the charity projects after successfully logging in, then chooses one to donate to. The donor account's balance will be verified by the system. Users will deposit if the balance is insufficient. Only when there is enough money in the account, a donation can be made.
2. **Requirements of People:** Assistance is required to fill out rescue forms, uploaded by nonprofit organizations for evaluation, and that have been authorized will be placed on the philanthropic platform. The beneficiary can use the tokens to make purchases from cooperative businesses after checking their account balance to assess how the effort is performing.
3. **Charity Organization:** The group can use platform donations to aid others and apply funds to the cooperative stores for token exchange.

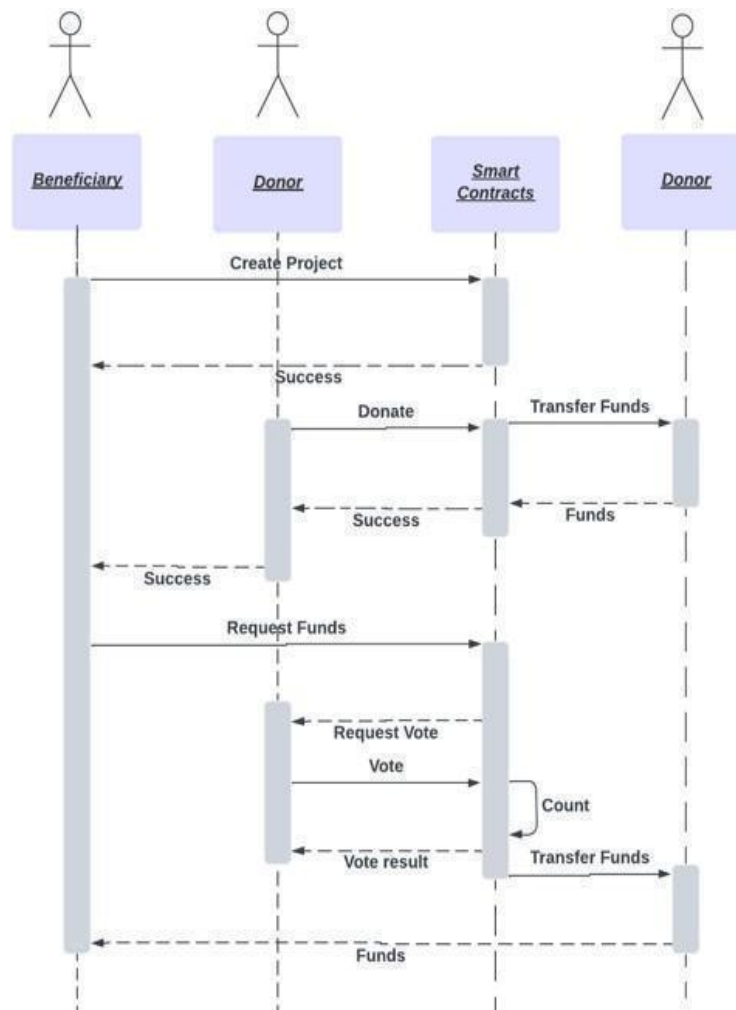


Figure 2. DApp Diagram

D. DApp Model

To illustrate some key features of the charity platform and to test the system, a DApp has been created for charity fundraising that is rooted in Ethereum. This system was examined using the MetaMask Browser Extension, and smart contracts were developed using Solidity.

1. The beneficiary launches a volunteer initiative in the DApp.
2. The beneficiary seeks financial assistance from the self-initiated charitable project.
3. Funder makes charitable contributions to the causes he selects.
4. Contributors can cast a vote on the financing request for the charitable project in which they have already taken part.

- When the beneficiary's profile has been approved, the money is automatically sent.

Donors browse the browser's list of philanthropic initiatives before selecting the one they want to support. The money will be deposited into the DApp administrator's account. When they need money, the recipient initiates a capital expenditure request via a smart contract.

E. Building Smart Contracts

Value streams relying on contractual agreements are known as smart contracts. Smart contracts, which differ from actual contracts in that they are pre-programmed code recorded on the blockchain, are entirely digital. As the blockchain advances, smart contracts can react to the decentralization and ability to run on every network node. Without the consultation of executives, smart contract transactions will be stored on the blockchain. The smart contract will automatically execute when certain criteria are satisfied. For charity platforms, money transfer mechanisms can be defined using smart contracts.

The layout of the smart contracts used in the DApp was created to fulfill the requirements outlined in the previous section. The ProjectList Contract, which also provides a view of all projects listed on the blockchain, allows users to launch charitable projects. The Project contract, which manages charity projects and funding, is used to describe and store certain charitable projects.

4. Result

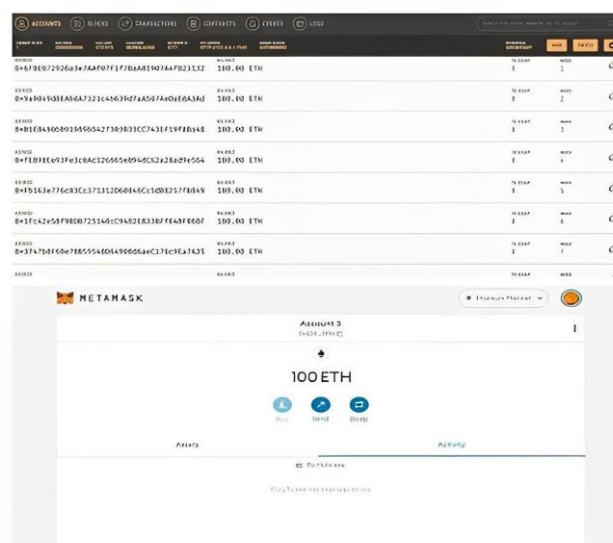


Figure 3. Ganache to MetaMask

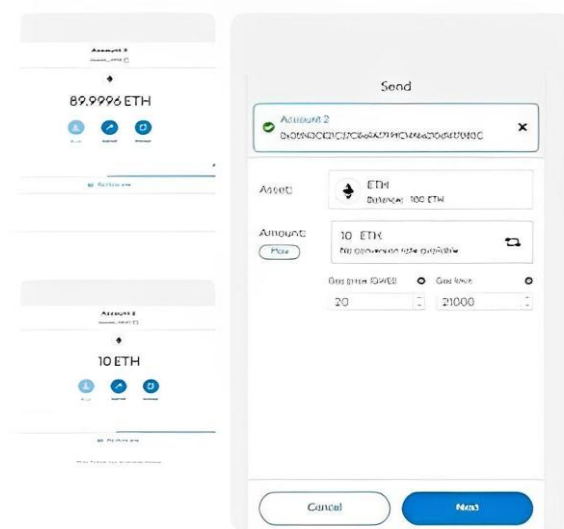


Figure 4. Transaction Page

Figure 3 depicts the Ganache to MetaMask. The private key information is copied from ganache, then the Account button in the MetaMask upper-right is selected. The new account is created with 100 ETH when Import Account is selected.

Figure 4 depicts the transaction between two accounts in MetaMask. When the Send option is selected, it leads to the transaction page where the amount to be sent is entered and changes in total. Ether is reflected after the transaction in both the accounts.

5. Conclusion

The idea of a new charity platform model has resulted from the fusion of donation with blockchain technology. In this approach, users complete the donation and then utilize smart contracts to manage the funds. All transactions are tracked on the blockchain to establish financial traceability and improve charitable transparency. The lack of openness in philanthropic activities may be technically remedied with the aid of this blockchain-based charity system, increasing public trust in charitable institutions. Through the development of a DApp, certain fundamental elements have been implemented and proven. The future work is to build a full-fledged blockchain-based charity system.

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