

# CharityChain - A Charity App Built on Blockchain

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## ABSTRACT

Donors are suspicious of how their funds are being spent. Charities are subject to the same risks. Embezzlement, for example, is a sort of commercial fraud. and financial mismanagement by executives Blockchain technology has recently become popular. Technology has been used in a variety of fields. The Using blockchain technology, you can speed up the process. Making the process of giving and receiving money more transparent It's true. a single platform for tracking donations is required that will keep track of all gifts, transactions, and other information as well as contributors The goal of this article is to provide an overview of the construction of a blockchain-based tracking infrastructure donation. The goal of this article is to provide an overview of the construction of a blockchain-based tracking infrastructure donation. The system, which is based on blockchain technology, gives contributors, charity foundations, and recipients with transparent accounting of operations. On a philanthropic platform, a transparent contribution channel should be offered, allowing public users and donors to see and monitor where, when, and to whom charitable gifts were distributed.

**Keywords :** Smart Contract, Ethereum, Blockchain, Transactions, Ledger

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## I. INTRODUCTION

Philanthropy has been more open and transparent as Internet technology has advanced, providing individuals with additional information access routes. There have been several flaws discovered in the philanthropic process. The "Guo Meimei Incident" and the "Hu Manli Incident" were well known on the Internet. According to media accounts, in the aftermath of the " 5.12 Wenchuan Earthquake," some people sold relief goods and tents for money, demonstrating the perplexing everyday handling of humanitarian funding and commodities. Between 2009 and 2012, these factors resulted in a decrease in

donor willingness and a decrease in contributions [1]. Simultaneously, internet crowdfunding has emerged as a new avenue for the general public to contribute to public good causes. The crowdfunding platform has created a database for the project, and effective project monitoring is an important aspect of the public welfare crowdfunding platform's risk automated management system [2]. Improving the openness of charitable data is a key strategy to boost conventional contribution and online crowdfunding reputation. A traceability system may be developed using Internet technology to boost the technical transparency of charity [3]. This study proposes a new model of donation based on blockchain technology for this aim.

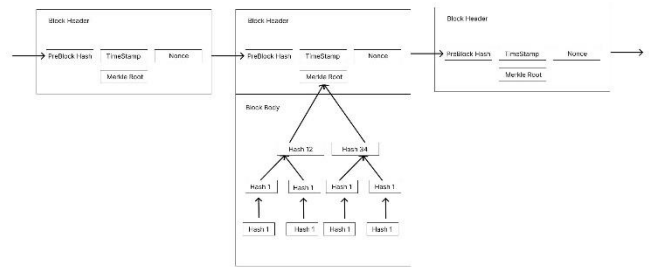
## II. LITERATURE REVIEW

### A. Blockchain Technology

Blockchain, which is the foundation of Bitcoin [4], is a decentralised, non-tamperable, anonymous, and traceable technology with enormous potential for revolutionising established businesses [5]. A distributed database system with numerous independent nodes is known as a blockchain. The database is kept up to date by nodes all around the network. All transaction information may be recorded on the blockchain, which has an efficient and transparent method and extremely secure data [6].

A blockchain is made up of a sequence of blocks, each of which has a block header and a block body. The block header includes metadata, whereas the block body contains transaction data. The header [7] contains the preceding block's hash value (PrevBlockHash), timestamp (Timestamp), random number (Nonce), and Merkle Root. In the structure of a Merkle Tree, the block body holds numerous transactions from the preceding block. The hash value of the transaction information is stored in the Merkle Tree's leaf node, while the hash value of all the leaf nodes below it is stored in the non-leaf node. The blockchain system is based on a peer-to-peer network and does not require credit endorsement from a centralised body. Following the transaction, a consensus process allows each node to compete for accounting rights. The winning node will bundle all transactions that happened within a specified time frame. The block will be broadcast to the whole network and will be verified by all nodes. The block will be added to the chain when the majority of nodes have properly authenticated. One transaction is open and transparent from start to finish, and there is no way for nodes to fool each other. Anonymous transactions are possible thanks to asymmetric encryption, and transaction traceability is ensured thanks to the chain structure.

### B. Blockchain Structure



### C. Research of charity platform

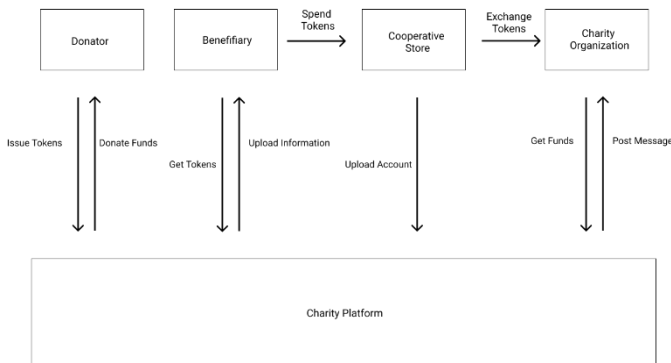
Liu Na [8] researched the Chinese charity monitoring system and proposed that charity be supervised in legislation, administration, industry, and society in order to strengthen the legitimacy of charitable organisations. Bi Ruixiang [9] came to the conclusion that Chinese charitable organisations' financial information disclosure is generally low. Yu YuXi [10] proposed that charitable groups' influence be limited by enhancing the liability system and government oversight. To complete the management and publicising of charity donations, Wang Jian [11] and Xu Yuchao [12] built the charity donation information management system using ASP.NET technology. Yang Qilin [13] realized the core business system LAMP architecture harmonised the administration of charitable foundation data and the delivery of charity information, making it easier to handle charity funds. The application of blockchain technology to tackle challenges in social emergency aid was advocated by Jia Hongwei and Deng Xiuquan [14]. Wang Jia and Chen Haifeng [15] have looked at how blockchain technology is being used in China's charity and validated the benefits of the technology. Li Qi, Li Wei [16], and others presented the charity platform application paradigm and built the charity application platform based on the Bubi blockchain. Simultaneously, Rizal Mohd Nor [17] suggested that disaster relief money be managed via blockchain technology, with the complete infrastructure built on Ethereum. Danushka Jayasinghe et al. [18] developed a Bitcoin charity platform based on blockchain for

online and offline bitcoin transactions, which provides a secure and simple means to give to remote locations without access to the Internet using the GSM network. We presented a new model of charity system based on blockchain technology based on these research.

### III. THE DEVELOPMENT OF SYSTEM

#### A. Modes of charity system

The recommended charity system mode is depicted in Figure 2. The four roles are donors, recipients, benevolent organisations, and cooperative stores [19]. Philanthropic organisations can use the website to get information on how to get help and launch charitable projects.



Donors use the site to learn about charity initiatives and then give to the recipients or charity organisations. Beneficiaries can acquire and spend tokens at cooperative stores after uploading their details to the website for assistance. The charity platform will be updated with the transactions that took place in the stores. To collect tokens, the cooperative stores provide services or items to the beneficiaries. Charity groups can trade the tokens for actual money. The whole flow of cash has been recorded on the blockchain, allowing transactions to be monitored and funds to be protected against misuse.

#### B. Platform usage process

##### 1. Donor

After successfully checking in, the contributor frequents the charity initiatives and selects one to support.

The system will check the balance of the donor account. If the balance is insufficient, the user will be prompted to deposit. The gift may only be completed if the value is sufficient.

##### 2. Needy people

People in need should fill out the rescue form, which will be forwarded to the non profit organization for review, with accepted projects being included to the charity platform. The beneficiary may check the balance of their account to see how far the project has progressed, and then spend the tokens to buy services or things at cooperative businesses.

##### 3. Admin

Admin can approve project created by benefactor to check if created project is genuine one.

#### C. Development

To evaluate our system and illustrate some fundamental capabilities of the charity platform, we created a charity fundraising Dapp based on Ethereum. Our solution was tested using the MetaMask Browser Extension, and smart contracts were created using Solidity. We tested the Dapp for the functions of launching a project, contributing, authorising funds, and transferring cash.

##### Dapp Model

The Dapp's timing diagram is presented in which following features have been achieved:

1. In the DApp, the beneficiary starts a charitable initiative.
2. The beneficiary asks for money from a charitable initiative that he started.
3. The donor makes a donation to the charitable initiatives of his choice.
4. Donors can vote on a funding request for a charity initiative in which they have already participated.

5. The monies are automatically sent to the beneficiary's account when the request for cash is authorised.

A smart contract is used by a beneficiary to start a charitable initiative, which is subsequently implemented on the blockchain. Donors explore the charity projects on their browser and choose a cause to donate to. The cash will be deposited to the account of the Dapp administrator. When the beneficiary requires cash, the smart contract initiates a capital expenditure request. If the majority of project participants vote in favour of the request, the project's contribution monies are moved from the Dapp administrator account to the beneficiary account.

### Build Smart Contract

Smart contracts are value streams that have precise terms and conditions attached to them. Smart contracts, unlike traditional contracts, are entirely digital, consisting of pre-programmed code kept on the blockchain [20]. Smart contracts adapt well to the decentralisation of the blockchain, which may function in any network node, as the blockchain expands. Without the need for administrators, smart contract transactions will be recorded on the blockchain. The smart contract will be executed automatically whenever the requirements are satisfied. The transaction logic for a charity platform may be defined using smart contracts.

We implemented smart contracts in the Dapp to satisfy the functions stated in the previous section; the structure of smart contracts is depicted in Figure 6. The ProjectList Contract allows users to launch a charitable project while simultaneously providing a glimpse of all projects on the blockchain. The Project contract is used to describe and store a specific charity project, as well as to offer an interface for managing the charity project and its funding. The token expenditure structure is developed individually.

```

Charity Project
uint projectId;
string projectName;
address payable creatorAddress;
string projectDescription;
uint amountRequire;
bool isCompleted;
uint amountGot;
bool isApproved;

```

```

Donor
string donorName;
address donorAddress;
string donorEmail;
uint participatedCount;
address[] participatedProjects;

```

```

Benefactor
string benefactorName
address benefactorAddress
string benefactorEmail

```

## IV. CONCLUSION

We investigated a new charity platform that combines blockchain technology with altruism. A blockchain-based approach was presented. Users finish the gift and use the monies using smart contracts in this system. To ensure financial traceability, all transactions are recorded on the blockchain, which makes charities more transparent. It's possible that a lack of openness in charitable efforts is to blame. With this blockchain charity system, a technological problem has been overcome, and the public's faith in the system has grown. benevolent organisations A Dapp we have has realised and verified certain fundamental components. developed. The next step for us is to create a whole charity system based on blockchain in the future.

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