

# Fairfund - A Decentralized Charity Platform Using Blockchain

Akash Raj<sup>1</sup>, Rishikesh Raj<sup>2</sup>, Swapnil Sharma<sup>3</sup>, Om V Desai<sup>4</sup>, Sana K S<sup>5</sup>

<sup>1</sup>Assistant Professor, CSE, Acharya Institute of Technology, Bengaluru, India

<sup>2,3,4,5</sup>Department of Computer Science and Engineering, Acharya Institute of Technology, Bengaluru, India

doi.org/10.64643/IJIRTV12I11-198231-459

**Abstract**—FairFund is a decentralized donation platform utilizing blockchain technology to increase transparency and trust in charitable giving. The system aims to tackle most of the frequent issues experienced by online donors, including lack of detail on fund usage, slow verification process and limited transparency. When donors do a contribution to the recipient, the smart contract kicks in and automatically generates a receipt for the donation amount. To sustain long-term participation, the platform promotes continuous donor engagement via NFT-based rewards. To sum it up, the end results indicate that using blockchain can increase accountability and boost donors' confidence in the digital charity business.

**Index Terms**—Decentralized donation platforms, NFT rewards, smart contracts, transparency and blockchain.

## I. INTRODUCTION

Charitable organizations play an important role in supporting people and communities, but today's donation systems still struggle with issues of transparency and trust. Donors often contribute without any knowledge of where their money goes or how it is used. Many platforms rely on centralized databases, those are not only susceptible to manipulation but also prevent donors from verifying transactions on their own. This lack of visibility creates doubt, and in some cases, discourages people from making donations altogether.

With the advent of blockchain technology, it's possible to rethink how digital donations can be managed. Blockchain offers an open, tamper-proof way of recording information, which is easier for tracking all the funds and ensure accountability. Smart contracts add another layer of reliability by automatically executing donation related processes without manual intervention. These tools together make the designing of systems that are far more

transparent than traditional donation platforms.

FairFund has been developed with a goal in mind. Main idea behind the system is to give donors a clear and trustworthy way to follow their contributions from the moment they donate to the moment the funds are used. The platform also introduces NFT-based donor rewards, which help encourage long-term involvement and make the donation experience more interactive. By combining blockchain, smart contracts, and decentralized storage, FairFund presents a modern approach to solving long-standing problems in the charity sector.

## II. RELATED WORK

Before us several researchers have explored the use of blockchain technology to improve transparency and reliability in the non-profit systems. According to many studies it is said that most of the traditional charity platforms still rely on centralized servers. This makes it difficult to verify the data and vulnerable to any unauthorized changes. Due to this donor have little to no control or visibility once they make their contribution.

In the previous works the results show that blockchain's distributed ledger can solve most of these issues by recording all the transactions in tamper-proof and permanent manner. Like for example, to increase trust among donors each transaction is publicly verifiable with the help of donation tracking systems built on networks like Ethereum. Smart contract also plays significant role by making the tasks like fund transfers, identity verification and reporting automated. This leads to reduction of human errors and making the process more accountable.

Some research works also discussed about using tokens and incentives to keep the donors engaged.

While these systems talk about bringing transparency, mostly they focus only on transaction tracking and did not consist of any features that encourages the donors for long term participation. This is where our platform stands out. By adding NFT rewards and more user-friendly workflow our platform not only provides transparency but also motivates donors to stay involved.

Overall, all the existing research works highlights the need for a reliable donation system, and our FairFund builds on these findings by combining blockchain transparency to traditional engagement tools.

### III. PROPOSED MODEL

#### A. Requirement Analysis

The first step in developing FairFund was to realise the gaps in existing charity platforms. Many systems fail to show users how their donations are being used, and NGOs often face delays in verification. These issues became the backbone to shape the functional requirements of the platform, such as real-time tracking, secure verification, and a clear donation workflow.

#### B. Blockchain Network Selection

After defining the requirements, the next task was choosing an appropriate blockchain. The Ethereum Mumbai testnet was selected because it offers fast transactions and low fees, making it practical for frequent donations. Its compatibility with Ethereum smart contracts also made development more flexible.

#### C. Smart Contract Development

Smart contracts form the core of FairFund. Three contracts were built in Solidity:

1. A donation contract that is used to record contributions.
2. An NGO verification contract to approve and manage organizations, and
3. An NFT reward contract to automatically issue badges when donors meet certain conditions.

These contracts automate key processes and reduce manual involvement.

#### D. User Interface Development

Frontend was developed using Next.js and React. The purpose of it was to make the website clean and simple, so that users could donate without facing any

trouble. MetaMask wallet integration allows donors and NGOs to have secure connection and perform the blockchain actions directly through an easy and interactive interface.

#### E. Decentralized Storage (IPFS)

Instead of storing files on a central server, FairFund uses IPFS to keep NGO documents, campaign details, and metadata. This helps maintain transparency and ensures that stored information cannot be altered without leaving a trace.

This ensures that if any alteration was done with malintention they are tracked. The alteration can be detected and reverted back to ensure no damage is done to the data.

#### F. Testing and Deployment

All smart contracts were tested using Hardhat to check for errors and ensure that transactions executed correctly. After testing, the platform was deployed to the Polygon Mumbai testnet. The front end and contracts were connected, allowing end-to-end testing of donations, NFT rewards, and NGO verification. Below is the workflow of the whole system.

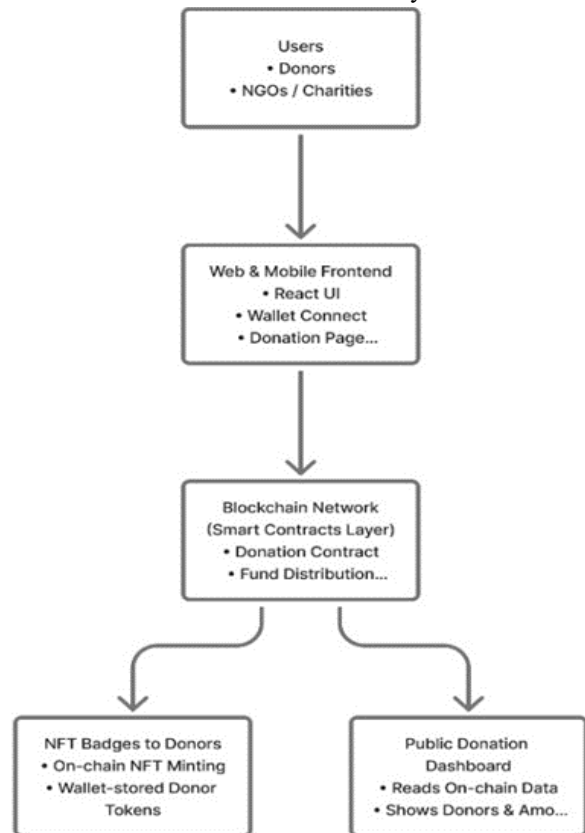


Fig 1: System Architecture

#### IV. SYSTEM IMPLEMENTATION AND WORKFLOW

##### A. Smart Contract Implementation

Solidity handles the core logic of FairFund through a set of contracts and every single one is designed for a specific purpose to keep the system modular and easier to maintain.

- Every contribution along with the donor’s address, campaign ID, and timestamp are recorded by the donation contract.
- The approval process for organizations is tended by NGO registry contract which makes sure that only verified NGOs can create campaigns.
- Digital badges are automatically provided by NFT reward contract when donors reach certain milestones.

All contracts were tested on the Ethereum Mumbai testnet to ensure they executed reliably and produced consistent results.

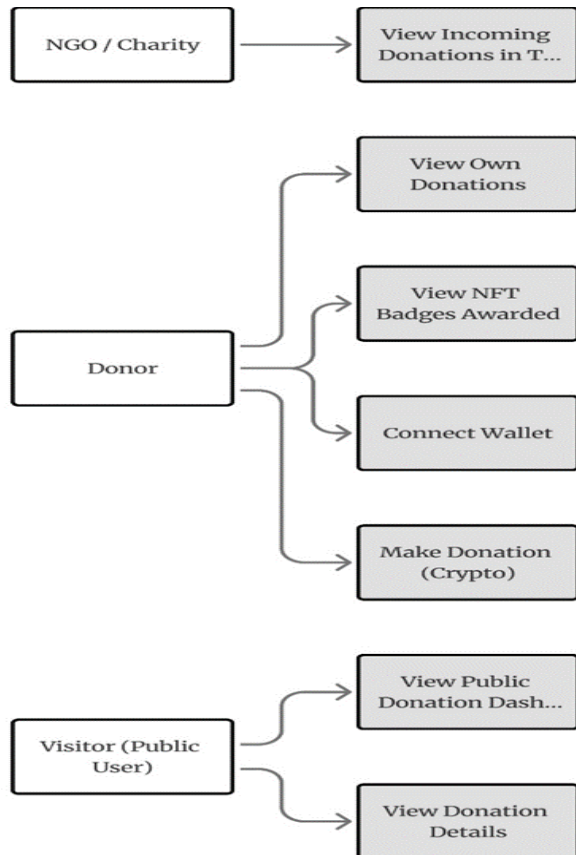


Fig 2: UML Diagram for the Platform

##### B. Front-End Development

The design focuses on a clean layout built using React

and Next.js to keep the platform fast, easy to navigate and allow users to complete actions without confusion. NGOs and donors can sign transactions digitally and securely because of the wallet integration done through MetaMask. The communication between front-end and deployed smart contracts is handled by Ether.js

##### C. Backend and Storage Setup

IPFS, a decentralized storage platform, is being used by FairFund to keep documents and campaign information secure and tamper-proof. This allows campaign files and NGO certificates from being changed or altered after they are uploaded. Other non-sensitive data is stored using standard backend services for faster access, while all critical data stays on IPFS to maintain transparency.

##### Workflow of the System

###### A. User Registration and Wallet Connection

The registration starts when the user connects their digital wallet through MetaMask. This replaces the need for a traditional sign-up process while keeping the onboarding process straightforward and secure as a unique wallet address is created during onboarding. Once connected, the system recognizes the user through their unique wallet address, allowing them to donate, receive NFTs, or interact with campaigns without filling out any forms. With reduced forms, the amount of personal data stored is also reduced. A wallet-based login like this makes the platform easier to use while maintaining a strong level of security and privacy for all users.

###### B. NGO Verification Process

NGOs submit their documents on the platform, that get stored on IPFS. The admin has to review these documents to validate the organization on-chain. Once approved, the NGOs can create campaigns using their connected wallets.

###### C. Donation Flow

When a donor selects any campaign, funds can be sent directly from their own wallet. After the system processes and verifies this transaction, a donation will be made to the blockchain. By way of example, a donor to a relief fund could later open a blockchain explorer and track the transaction in their donation history.

D. NFT Reward Flow

As donors continue contributing, the system tracks their total activity. When they reach specific milestones—such as a certain number of donations or a particular donation amount—the NFT contract automatically mints a reward badge. This NFT appears immediately in the donor’s wallet, providing them with recognition for the support. This is done to keep the donors hooked to the platform and encourage them to keep the donations coming.

E. Campaign Transparency and Tracking

A campaign ID is created every time a donation is made. This allows NGOs and donors to easily track their funds. As all transactions are stored on a block chain, they cannot be altered. NGOs can also update campaign status, and donors can view these updates at any time.

F. Real-Time Feedback and Analytics

Actions like successful donations, NFT minting or campaign updates are met with instant feedback. This helps build trust and makes the experience feel more interactive and engaging.

G. Public Transaction Visibility

FairFund displays transaction details openly on the platform, allowing anyone to see the details about donations to each NGO and which campaign received the funds. This public visibility helps build trust, as users can see where exactly their donation is flowing, without creating an account or connecting a wallet.

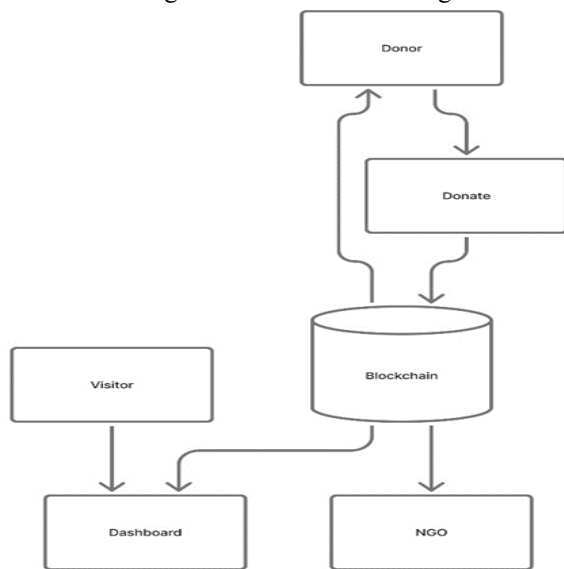


Fig 3: Data Flow Diagram

V. RESULT AND DISCUSSION

A. System Performance

We evaluated the performance of the platform on the Ethereum Mumbai test network under multiple usage scenarios. Across all tests, the platform was able to maintain stable and predictable behavior. Wallet authentication went smoothly and was typically completed within 2–5 seconds, and the donation transactions were confirmed between 6–8 seconds, comparing the network traffic at the time of the testing. These timings are very rational for a decentralized platform and ensures that users can interact with the platform without any long or frustrating delays. Gas fees also remained low throughout the tests, which makes FairFund appropriate not only for the large donations but also suitable for repeated small value contributions. Thus, targeting much larger userbase. Furthermore, the user interface responded smoothly during each navigation. Page transitions were usually quick, and there were no noticeable lags, even when components interacted with the blockchain in the background. This indicates that the frontend and smart contract layers are well-synced.

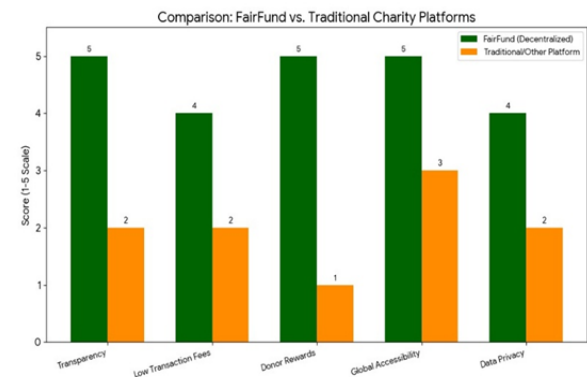


Fig 4: Comparison graph with Traditional Platforms

B. Functional Outcomes

They thoroughly tested each main function of the service to ensure they worked precisely.

- Every donation made during testing was recorded correctly on the blockchain. By verifying their transaction hashes, donors could ensure the validity of their donations.
- The verification by the NGO was working consistently, as only approved NGOs could create campaigns. Thus, increasing overall security.
- We issued the NFTs successfully every time a

donation was made to a charity. These NFTs were minted in the donor’s wallet immediately after the transaction, thus confirming that the reward mechanism worked perfectly.

The tests affirmed the integrated operation of smart contract logic, front-end triggers, and backend flows, clarifying that none of them malfunctioned.

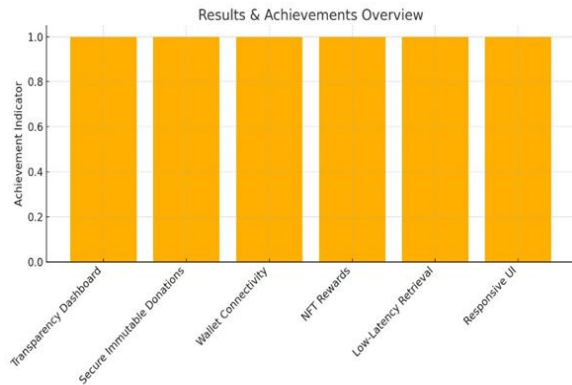


Fig 5: Graph of Results and Achievements

### C. User Experience Observations

The user testing involved participants with mixed levels of experience with blockchain technology, with most of them using the technology for the first time. Despite these differences, most users found the platform intuitive and easy to navigate and didn’t face any problems. On an average, the complete donation process i.e., from connecting the wallet to receiving the donation confirmation took little less than a couple of minutes.

A number of participants mentioned that the donation history and transaction tracking without any hassle to sign in, improved their confidence in the platform. They also appreciated the clarity of information presented during the donation process in the platform. The NFT reward system stood out as a unique element. Most users felt that receiving a digital badge for their contribution added an element of recognition, making the experience more engaging and encouraging them to donate again.

### D. Transparency and Data Reliability

One of FairFund’s primary objectives was to ensure complete transparency to donors for all transactions taking place in the platform. Testing told us that this was successfully achieved by the system. Once a donation is made, it is registered on the blockchain in a way that cannot be changed or hidden. This increased

users’ trust level on our platform.

Users were given features that allowed them to come back and check their whole donation history, something that isn’t normally possible by centralized charity donation platforms. Open communication allows the public to understand decision making better and strengthens the integrity of the system.

### E. Overall Discussion

FairFund aims to be decentralized, give transparency, be reliable and engage with users. These results show they have achieved this. Smart contracts help the platform to minimize manual intervention thereby eliminating risks of human errors or manipulation. Decentralized storage makes sure that the files and documents of the campaign are always accessible and tamper-proof.

The NFT based rewards system brings something new as opposed to existing traditional donation platforms to keep donors interested over time. FairFund is a good model for today’s trust based, security based charitable giving due to the stability of its performance and a clear user journey.

## VI. CONCLUSION

The biggest problem in online donations is the lack of transparency. People don’t know where their money is going. FairFund was developed to address this exact issue. It uses blockchain to permanently record every donation which cannot be changed later. This also gives the donors freedom to check how their donations are utilized at any time, instead of simply trusting screenshots or promises.

The platform gives out NFT rewards as a token or digital badges which make the donating experience more fun and also encouraging people to stay involved in other campaigns as well. During testing, the system ran smoothly. Donations were processed quickly, users had no trouble navigating the interface, and the open display of donation activity helped build trust.

Overall, FairFund is a practical, transparent way to manage donations. Upcoming updates include support for multiple blockchains, better analytics or more donor engagement tools.

The platform has the potential to grow into a widely adopted, transparent, and community-driven system for ethical fundraising.

REFERENCES

- [1] Nadar and S. Yadav, "A platform for tracking charity donations using blockchain," in *Proc. 2nd Int. Conf. Applied Artificial Intelligence and Computing (ICAAIC)*, Salem, India, 2023, pp. 1306–1310, doi: 10.1109/ICAAIC56838.2023.10140888.
- [2] B. S. Anupama, A. R. Das, N. Rattan, R. Jaiswal, and N. R. Sunitha, "Fund tracking system using blockchain technology," in *Proc. 4th IEEE Global Conf. Advancement in Technology (GCAT)*, Bangalore, India, 2023, pp. 1–6, doi: 10.1109/GCAT59970.2023.10353263.
- [3] Y. K. G. N. and S. M., "Smart NGO tracking system using blockchain technology," in *Proc. IEEE 2nd Mysore Sub Section Int. Conf. (MysuruCon)*, Mysuru, India, 2022, pp. 1–6, doi: 10.1109/MysuruCon55714.2022.9972465.
- [4] Shaheen *et al.*, "A track donation system using blockchain," in *Proc. Int. Conf. Electronic Engineering (ICEEM)*, Menouf, Egypt, 2021, pp. 1–7, doi: 10.1109/ICEEM52022.2021.9480649.
- [5] K. Bhole, Y. Galphat, K. Bathija, T. Saini, and A. Bhosale, "Allocation and tracking of public funds using blockchain," in *Proc. 4th Biennial Int. Conf. Nascent Technologies in Engineering (ICNTE)*, Navi Mumbai, India, 2021, pp. 1–4, doi: 10.1109/ICNTE51185.2021.9487782.
- [6] Renat, A. Peresichansky, A. Belenov, and A. Barger, "Karma - blockchain based charity foundation platform," in *Proc. IEEE Int. Conf. Blockchain and Cryptocurrency (ICBC)*, Sydney, Australia, 2021, doi: 10.1109/ICBC51069.2021.9461072.
- [7] X. Fan, "Charity supervision management system based on blockchain," in *Proc. 2nd Int. Conf. Computer Science and Management Technology (ICCSMT)*, Shanghai, China, 2021, doi: 10.1109/ICCSMT54525.2021.00109.