Charity Connect: An Online Donation Management System Development

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Abstract

Charity Connect is a web-based platform designed to simplify and streamline the donation process between donors and charitable organizations. The system provides a centralized interface where NGOs can register, publish their causes, and request support, while donors can browse these causes and contribute securely. The platform aims to enhance transparency by allowing donors to track their donation history and view progress updates from organizations. Admin oversight ensures authenticity by verifying NGOs and monitoring activities within the system. Developed using Django and a relational database, Charity Connect provides an efficient, user-friendly, and accessible digital solution to encourage charitable contributions and bridge the gap between those who want to help and those who need assistance.

Keywords

Online Charity System, Donation Management, NGO Portal, Donor Platform, Web Application, Django Framework, Transparency, Social Welfare, Public Service, Digital Philanthropy.

I. INTRODUCTION

Charity plays a vital role in supporting individuals and communities in need, yet many donors today face difficulty in identifying genuine charitable organizations and understanding how their contributions are utilized. Traditional charity processes often rely on physical interactions, manual record-keeping, and limited communication, which may lead to inefficiencies, lack of transparency, and reduced donor trust.

With the growth of digital technology, there is a growing need for an online system that simplifies donations, provides transparency, and connects donors directly with reputable organizations. **Charity Connect** addresses this need by providing a centralized web-based platform where NGOs can publish their causes and donors can contribute easily and securely. The platform enables NGOs to manage donation requests and share progress updates, while donors can track their contributions and stay informed about the impact of their support.

By integrating user authentication, donation tracking, and administrative verification processes, Charity Connect ensures a reliable and secure environment for charitable activities. The system promotes trust, accessibility, and convenience, ultimately encouraging more individuals to participate in charitable efforts and helping organizations better support their social welfare initiatives.

Charity Connect is a web-based platform designed to facilitate seamless communication and interaction between donors and registered NGOs. The system enables NGOs to create and publish charity campaigns, while donors can explore these campaigns and provide support based on their capacity. In addition, the platform maintains a record of donations and allows donors to track the progress and utilization of their contributions.

The system also includes an administrative layer that verifies NGO registrations, monitors campaign authenticity, and manages platform activities to ensure trust and accountability. By making the donation process transparent, accessible, and well-organized, Charity Connect encourages individuals to participate more actively in social welfare activities and empowers organizations to reach wider communities with greater efficiency.

II LITERATURE SURVEY

Several digital platforms for charitable donations have been proposed and developed over the past years, each aiming to improve transparency, accessibility, and trust in the donation process. Early web-based charity systems primarily focused on listing charitable organizations and allowing donors to contact them manually. However, these systems lacked real- time progress updates, verification mechanisms, and donor engagement features.

A study by **Dosovitsky and Shmueli (2020)** examined how online donation platforms can build trust by making the donation process more transparent and traceable. Their research highlighted that donors are more willing to contribute when they can track how their contributions are used. This supports the need for integrating donation history and progress monitoring in charity management systems.

Fransisca et al. (2021) designed a charity donation system that allows donors to contribute funds to specified causes. Their system introduced basic campaign listings but did not include NGO verification or detailed usage reporting, leaving transparency concerns unaddressed. This suggests the need for improved verification workflows in future systems.

Another study by **Huang and Liu (2022)** proposed using digital ledgers to ensure secure tracking of funds in charitable transactions. While blockchain-based solutions significantly improve transparency, they may be complex to implement for small to mid-scale NGOs. A simpler, database-driven logging system may therefore be more practical for academic and community-level deployment.

In **E-Sharing Donation Platform (2023)**, researchers emphasized the importance of user-friendly interfaces and real-time notifications to encourage donor participation. Their findings indicate that ease of use directly impacts donation frequency and donor retention.

From the review of existing systems, it is clear that there is still a gap in combining **NGO verification**, **transparent donation tracking**, and **user engagement** in a single web-based platform. The proposed system, *Charity Connect*, aims to address this gap by offering a centralized donation management platform with NGO authentication, campaign publishing, donor history tracking, and administrative monitoring to enhance trust and accountability.

III   PROPOSED SYSTEM DESIGN

3.1   High-Level System Architecture

Goals: transparency, trust, low friction for donations, verifiable NGOs/beneficiaries, scalable + secure.

Key components

- **Clients:** Web app (React), Mobile app (Flutter/React Native)

- **API & Gateway:** API Gateway (rate-limit, auth), REST/GraphQL

- **Core Services (microservices or well-layered monolith):**

  o   Identity & Access (AuthN/AuthZ, RBAC)

  o   NGO & Beneficiary Management

  o   Campaigns (fund/material requests)

  o   Donations & Payments (PG integration)

  o   Verification & Interviews (WebRTC + scheduling/recording)

  o   Inventory & Logistics (for in-kind donations)

  o   Notifications (email/SMS/push)

  o   Reports & Analytics

  o   Audit & Compliance (immutable logs; optional blockchain/audit trail)

- **Infra & Data:**

  o   DB (PostgreSQL for transactions) + Cache (Redis)

  o   Object Storage (images/docs/recordings)

o   Search (Elasticsearch/OpenSearch) for campaigns/NGOs

o   Message Broker (Kafka/RabbitMQ) for async jobs

o   Observability (Prometheus + Grafana), CI/CD, IaC (Terraform)

3.2 **Real-Time Interview Communication (WebRTC Model)**

Use-case: live verification calls for NGO onboarding and beneficiary/KYC checks; optional recording for audit.

Components

- **Signaling Service:** WebSocket channel to exchange SDP offers/answers + ICE candidates.

- **STUN/TURN:** NAT traversal; TURN fallback for symmetric NAT/low-bandwidth.

- **Media:** DTLS-SRTP encrypted A/V; adaptive bitrate (Simulcast/SVC).

- **Recording (optional):** server-side SFU recording or client-side composite; store in object storage with metadata & consent flags.

- **Scheduling & Queue:** calendar slots, reminders, interviewer dashboard.

Flow (sequence)

1.   User schedules interview → tokenized meeting link generated.

2.   Both peers connect to **Signaling** (WS) → exchange Offer/Answer, ICE.

3.   Media path established via **STUN/TURN**; DTLS handshake → SRTP.

4.   (If enabled) **Recording** starts with explicit consent capture.

5.   Metadata (duration, outcome, interviewer notes) saved to DB; files to Object Storage; hash of metadata to Audit log.

Reliability in low-bandwidth contexts (common in field settings):

- VP8/H.264 with **bandwidth estimator**, degraded resolution on loss.

- **Audio-first fallback** (mute video) + **ICE restarts**.

- **Network quality feedback** in UI; retry with TURN automatically.
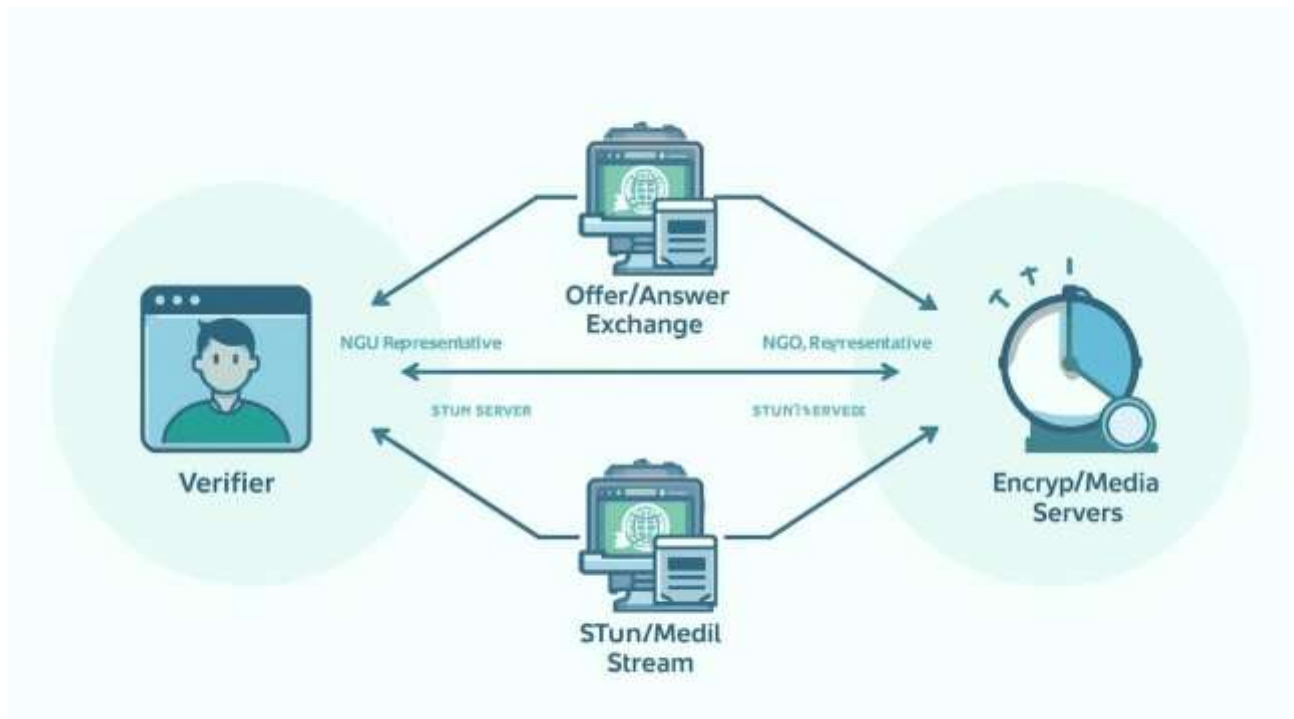
3.3   System Modules

- **Admin**

Verify NGOs/beneficiaries, manage disputes, view audit trail, global reports.

- **NGO**

Profile & documents (12A/80G or local equivalents), create/manage campaigns, inventory intake/outbound, interview slots, impact reports.

- **Beneficiary**

Register requests, upload proofs, attend verification interview, track assistance.

- **Donor**

Browse/search campaigns, donate money/materials, track use of funds/items, receipts & tax certificates.

- **Verification & Interviews**

Slot booking, WebRTC room, KYC checklist, recording, decision workflow.

- **Donations & Payments**

Payment gateway, webhook handlers, refunds, split settlements; generate receipts.

- **Inventory & Logistics**

Stock units (SKU), pickups, delivery, proof-of-delivery uploads.

- **Transparency & Tracking**

Public ledger/audit view (non-PII), campaign progress, disbursal reports.

- **Notifications & Engagement**

Email/SMS/push, reminders, milestones; social share.

- **Analytics & Reports**

Donations over time, donor retention, campaign conversion, NGO SLAs.

- **CMS**

Content pages, FAQs, policies, moderation of campaign content.

3.4 Data Model Structure

The data model of the proposed Online Charity Management System is designed around a relational structure, ensuring consistency, traceability, and clarity in how information flows between donors, NGOs, beneficiaries, and administrative authorities. The model follows a structured entity–relationship approach, where each entity represents a real-world participant or activity within the charity ecosystem.

The **primary entities** in the system include:

1. **User**
2. **NGO (Organization)**
3. **Campaign / Charity Cause**
4. **Donor**
5. **Donation Transaction**
6. **Beneficiary**
7. **Verification / Interview Record**
8. **Audit Log**

Each entity is associated with key attributes and relational links, enabling smooth operational workflows and strong data integrity.

Entity Descriptions

Entity	Description	Key Attributes (Conceptual, No Code)	Relationships
User	Represents any system participant. Uses a unified structure for login and authentication.	Name, Contact Information, Role (Admin/NGO/Donor/Beneficiary), Account Status	One User may be associated with either Donor, NGO Representative, or Beneficiary profile.
NGO (Organizatio n)	Stores information about registered charitable organizations.	Organization Name, Registration/Certification Details, Verification Status	One NGO can create multiple **Campaigns**. Linked to **User** as NGO Representative.
Campaign /Charity Cause	Describes a cause for which donations are collected (funds or items).	Campaign Title, Description, Goal Requirement, Current Progress, Status (Active/Closed)	Each Campaign is linked to exactly one NGO; many Donors may contribute.
Donor	Represents individuals providing monetary or material support.	Personal Profile Details, Donation History Summary	A Donor may contribute to many Campaigns; relationship maintained through **Donation Transaction**.
Donation Transaction	Records each donation activity, ensuring transparency and traceability.	Donation Type (Monetary/Material), Amount/Quantity, Date, Status	Each Donation is linked to one Donor and one Campaign.
Beneficiary	Individuals/communities requesting support.	Personal/Group Details, Need Category, Assessment Status	May be linked to verified **Campaigns** or allocated support records.

Verification / Interview Record	Stores outcomes of identity and legitimacy verification sessions (including real-time interview logs).	Interview Date, Verifier Notes, Outcome Decision, Evidence/Document References	Linked to both NGO and Beneficiary for screening and approval.
Audit Log	Provides a transparency layer ensuring system trust and accountability.	Action Description, Time Stamp, Actor Identity, Affected Entity	Connected to all major system activities to ensure traceable history.

Relationships Overview (Narrative)

- A **User** may act as a **Donor**, **NGO Representative**, **Beneficiary**, or **Administrator**, depending on assigned role.

- Each **NGO** can create multiple **Campaigns** to request help.

- **Donors** may contribute to multiple **Campaigns**, while each **Campaign** may receive contributions from many **Donors**.

- **Beneficiaries** seeking assistance may be associated with NGO-led campaigns or be verified independently.

- The **Verification / Interview Record** entity connects to both NGOs and Beneficiaries, serving as a gatekeeping and authenticity assurance mechanism.

- All actions in the system are recorded in the **Audit Log**, ensuring traceability to build trust and support transparency.

Design Rationale

- The structure promotes **data normalization**, preventing redundancy and maintaining system consistency.

- Relational mappings allow clear **audit trails**, which are essential for trust in donation environments.

- Separation of Donor, NGO, and Beneficiary roles ensures **role-based access control**, security, and privacy.

3.5 Security Model Authentication & Identity

- OAuth 2.1 / OIDC with short-lived access tokens + refresh tokens.

- **MFA** for Admin/NGO; optional for donors.

- Passwords with **Argon2id**; email/phone verified.

Authorization

- **RBAC**: roles (ADMIN, NGO, BENEFICIARY, DONOR, VERIFIER) + fine-grained permissions.

- Row-level checks (only NGO owner edits their campaigns; donors see only their own PII).

Data Protection

- **TLS 1.3** everywhere; HSTS.

- **At-rest encryption** (disk + object storage).

- Data minimization; PII tagging and access logging.

- **Receipts/financial** data isolated; adhere to **PCI DSS** scope boundaries (tokens only; card data never stored).

Web & API Security

- WAF + API rate limiting + IP throttling.

- CSRF protection (web), input validation, output encoding; OWASP Top 10 defenses.

- Signed webhooks (HMAC) with replay protection.

- Secure file uploads: MIME/extension checks, AV scan, size caps, presigned PUT.

WebRTC Security
- DTLS-SRTP media encryption; E2E optional for 1:1 (if you skip server recording).

- Consent banner + recorded-state indicator; access control on recordings.

- Time-boxed retention; immutable audit hash for interview metadata.

Audit & Compliance

- **Tamper-evident logs** (hash-chained entries); clock sync (NTP).

- DPDP 2023/24-style consent + purpose limitation; user data export/delete workflows.

- Secrets in a vault (KMS/HSM); least-privilege IAM; regular key rotation.

Recovery & Resilience

- Daily encrypted backups; PITR for DB.

- DR runbook; chaos tests; incident response SOP.

Web-Based Security Arclutorm

IV SYSTEM METHODOLOGY

The development of the Online Charity Management System follows a structured and iterative methodology to ensure accuracy, usability, and reliability. The approach adopted combines requirement analysis, system design, prototype development, testing, and evaluation. This methodology ensures that the system aligns with user needs while maintaining transparency and efficiency in charity operations.

1. Requirement Analysis

This phase involved identifying the key needs of donors, NGOs, beneficiaries, and administrative authorities. Discussions and observations were conducted to understand challenges in traditional charity processes such as trust issues, lack of verification, manual donation tracking, and limited communication between stakeholders. Functional and non-functional requirements were documented to define the scope of the system.

2. System Design

In this phase, the overall system architecture was structured. The system was divided into logical components including user management, NGO verification, campaign creation, donation processing, and transparency auditing. The data flow between entities such as Donor, NGO, Beneficiary, and Admin was modeled using conceptual database and interaction diagrams. The design emphasized ease of navigation, role-based access, and secure handling of transactions and user information.

3. Development

The development phase involved constructing each module in alignment with the design specifications. User interfaces were created to ensure clarity and accessibility. Core processing logic was implemented to manage user registration, NGO verification workflows, campaign listings, donation logging, and administrative monitoring. The development followed an iterative enhancement approach, where feedback was incorporated continuously.

4. Integration

Module integration ensured that individually developed components work together seamlessly. Interfaces for communication between modules such as Campaign and Donation Management, or NGO Verification and Administration, were coordinated to maintain smooth system operation and consistent data flow across the platform.

5. Testing

The system was evaluated through functional testing, usability testing, and performance assessment. Test cases were applied to validate correctness of user actions, campaign creation, donation tracking, verification workflows, and administrative control. Usability testing was conducted to ensure clarity, accessibility, and ease of navigation for all user categories.

6. Deployment and Evaluation

After successful testing, the system was deployed in a controlled environment. User feedback was collected to measure system acceptance, efficiency, and transparency outcomes. Observations from the evaluation were used to refine system features, enhance clarity, and improve user experience where necessary

IV Result

The Online Charity Management System was successfully developed and evaluated based on functionality, usability, and user satisfaction. The system enabled donors to browse verified charity campaigns, make contributions, and view the status of their donations with improved clarity. NGOs were able to register, undergo verification, create campaigns, and maintain transparency through progress updates. Beneficiaries were provided a structured process to request support and undergo verification when required. The administrative interface ensured centralized monitoring, verification control, and prevention of fraudulent activities.

User testing indicated that the platform effectively reduced confusion surrounding where and how to donate. Donors appreciated the availability of transparent tracking features, while NGOs reported improved outreach potential through online visibility. Overall, the system fulfilled its objective of bridging communication between donors and charitable organizations while improving trust and accessibility in donation activities.

V   Future Scope

Although the system meets the core requirements of charity management, there are several opportunities for future enhancements:

1. **Mobile Application Support**
Introducing a mobile app version can improve accessibility for donors and NGOs, especially in remote regions.

2. **Integration with Government Verification Databases**
Automatic verification of NGO registrations could further strengthen authenticity and reduce manual review time.

3. **AI-Based Recommendation System**
Implementing machine learning to suggest campaigns based on donor interests can increase engagement and recurring contributions.

4. **Blockchain for Full Transaction Transparency**
Blockchain-based donation ledgers can provide an immutable record of fund utilization, increasing trust and accountability.

5. **Real-Time Delivery and Logistics Tracking**
Integration with courier or supply chain systems can allow donors to track the movement of donated goods.

6. **Multi-Language and Accessibility Support**
Expanding language options and support for differently-abled users can enhance inclusivity.

VI   Conclusion

The Online Charity Management System successfully addresses the challenges of transparency, accessibility, and trust in charitable donation activities. By providing a centralized platform for donors, NGOs, beneficiaries, and administrators, the system simplifies the donation process and ensures clear communication among all stakeholders. The verification mechanisms and tracking features promote accountability and enhance donor confidence, while campaign management tools help NGOs reach supporters more efficiently.

The system demonstrates that digital platforms can play a significant role in improving social welfare operations. With further technological advancements and future enhancements, the platform has the potential to grow into a scalable, widely adopted solution that strengthens community support networks and encourages responsible and impactful charitable giving.