CommunityConnect: A Multi-Role Community Support and Welfare Management Platform

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Abstract:

In today's rapidly growing digital world, community welfare activities still face major challenges due to the lack of structured and centralized systems. Although many people are willing to help others, there is often a gap between those who need support and those who can provide it. Existing methods such as social media posts, phone calls, and informal communication channels are widely used, but they are unorganized, difficult to track, and unreliable when the number of requests increases. These limitations lead to delayed responses, duplication of efforts, lack of transparency, and reduced trust among users.

This paper presents **CommunityConnect**, a multi-role community support and welfare management platform designed to address these real-world challenges. The system provides a centralized digital environment where users, NGOs, volunteers, donors, and administrators can interact in a structured and coordinated manner. The core idea of the platform is to treat every welfare request not as a simple submission, but as a complete process that moves through multiple stages such as request creation, verification, acceptance or rejection, volunteer assignment, execution, tracking, and final closure. This workflow-based approach ensures that each request is properly managed, monitored, and completed with accountability.

The platform is developed using modern web technologies to ensure performance, scalability, and usability. The frontend is built using **React with Vite**, providing a responsive and user-friendly interface. The backend is implemented using **Node.js and Express**, which handle business logic, request processing, and API communication. A **MySQL database** is used for structured data storage, enabling efficient management of users, requests, assignments, and system records. Secure authentication is implemented through **email-based OTP verification and JWT-based session management**, ensuring that only authorized users can access the system. Additional features such as media uploads, role-based access control, and integrated communication further enhance system functionality.

The design and development of CommunityConnect are strongly supported by existing research in areas such as digital volunteering, nonprofit technology adoption, and civic engagement platforms. Previous studies highlight that digital platforms can improve participation and coordination, but most of them focus on specific aspects such as volunteer management or donation systems. They lack integration, workflow tracking, and multi-stakeholder coordination. CommunityConnect addresses this research gap by combining multiple functionalities into a single unified platform, enabling better coordination, transparency, and efficiency.

The system has been successfully implemented and deployed on a live environment, demonstrating its real-world applicability. The results show that the platform is capable of improving communication between stakeholders, reducing response delays, increasing user participation, and ensuring better utilization of resources. By providing a structured and transparent workflow, CommunityConnect enhances trust and accountability in community welfare systems.

Thus, CommunityConnect is not only a technical solution but also a socially impactful platform that leverages digital technology to strengthen community support mechanisms and improve the overall effectiveness of welfare activities in modern society.

Keywords: Community Welfare, Digital Platform, Workflow Management, NGO Coordination, Volunteer Management, Role-Based Access Control, Request Lifecycle, Web Application, Transparency, Resource Sharing

1. Introduction

Community welfare has always been an essential part of society, where people help each other during times of need. Traditionally, this support system was based on personal connections, local communities, and direct communication. However, in today's fast-paced and urbanized world, these traditional methods are no longer sufficient. People often live in large cities where they may not know their neighbours, and organizations operate across multiple locations. As a result, the connection between people who need help and those who are willing to provide help has become weak and unorganized.

In practice, most community support activities still rely on informal methods such as phone calls, WhatsApp messages, social media posts, or personal networks. While these methods may work for small-scale situations, they become inefficient when the number of requests increases. Important requests may get lost in chats, volunteers may not receive clear instructions, and donors may not know whether their contributions are being used properly. This lack of structure leads to delays, confusion, duplication of effort, and sometimes complete failure to address genuine needs.

With the growth of digital technology, there has been a shift towards using online platforms to improve community participation and coordination. Research in this area shows that digital systems can act as bridges between people and opportunities. For example, civic action platforms help connect individuals with social initiatives by organizing and presenting opportunities in a structured way [1]. Similarly, studies on volunteer-based systems highlight that digital platforms must reflect real-world coordination needs, such as communication, task clarity, and field-level execution, rather than being purely technical solutions [2]. These insights show that technology can improve welfare systems, but only when it is designed according to practical requirements.

In addition to participation, nonprofit organizations are also undergoing digital transformation. Research indicates that technology plays a significant role in improving NGO operations, enabling better management of tasks, communication, and service delivery [3]. Digital volunteer services, especially in emergency situations, have demonstrated how structured platforms can improve response time and coordination among large groups of people [4]. However, despite these advancements, most existing systems focus on only one part of the problem. Some platforms focus mainly on donations, others on volunteer registration, and some on specific domains such as animal adoption or campaign management.

Another important aspect identified in the literature is the need for proper task allocation and coordination. Studies suggest that assigning the right volunteers to the right tasks significantly improves the effectiveness of welfare activities [5]. Furthermore, frameworks for integrating volunteers into decision-support systems emphasize the importance of structured workflows, role-based access, and data-driven coordination [6]. These findings clearly indicate that community support cannot be managed effectively without a well-defined system that organizes activities and responsibilities.

Despite all these developments, a major limitation still exists. Most platforms are narrow in scope and do not provide a complete, integrated solution. For example, a donation platform may allow users to contribute money, but it does not track how the request is handled. A volunteer platform may list opportunities, but it does not ensure proper execution or completion of tasks. Similarly, adoption systems focus only on animal welfare and do not connect with broader community needs [9]. Research on nonprofit digital transformation also highlights that although the importance of digital systems is widely recognized, their implementation is still fragmented and inconsistent [10].

This gap becomes even more clear when we look at real-world user behaviour. Many people are willing to help others, but they often do not know where help is needed or how they can contribute effectively. At the same time, people who require support may struggle to find the right organization or platform. In addition, the lack of transparency in existing systems reduces trust, as users are unsure whether their requests or contributions are being handled properly.

To overcome these challenges, there is a clear need for a centralized and structured platform that can connect all stakeholders involved in community welfare. Such a platform should not only provide information but also manage the entire lifecycle of a request, including creation, verification, assignment, execution, and completion. It should support multiple roles such as users, NGOs, volunteers, donors, and administrators, while ensuring transparency, accountability, and efficient coordination.

In response to this need, this paper proposes **CommunityConnect**, a multi-role community support and welfare management platform. The system is designed to bring together all stakeholders into a single digital ecosystem and provide a workflow-based approach to managing community support activities. Unlike traditional systems, CommunityConnect treats every request as a process rather than a one-time action, ensuring that it is properly handled from start to finish.

By integrating multiple welfare domains such as human welfare, animal welfare, resource sharing, and sustainability, the platform provides a comprehensive solution that reflects real-world community needs. The system not only improves coordination and efficiency but also enhances transparency and trust, which are essential for effective community participation.

Thus, CommunityConnect builds upon existing research in digital welfare systems while addressing their limitations, offering a practical, scalable, and human-centered solution for modern community support challenges.

2. Literature Review

In recent years, the use of digital platforms in community welfare and nonprofit activities has gained significant attention. Researchers have explored different aspects of community support systems, including civic engagement, volunteer coordination, NGO digital transformation, and domain-specific welfare applications. However, most of these studies focus on specific components rather than providing a fully integrated solution.

One of the early approaches in this domain is the concept of civic action brokering platforms, where digital systems act as intermediaries between individuals and community opportunities. Gordon and Baldwin-Philippi [1] explain that such platforms can improve participation by organizing and presenting opportunities in a structured manner. Their work highlights that simply providing information is not enough; platforms must actively connect users with meaningful actions. While this idea is important, these systems do not address operational challenges such as request verification, execution tracking, and multi-role coordination.

Further research emphasizes the importance of designing systems that reflect real-world welfare practices. Seguin et al. [2] studied volunteer-led migrant support systems and found that digital platforms must be aligned with actual field conditions, including communication, coordination, and task execution. Their work shows that a purely technical system is not sufficient unless it supports real-life workflows. This insight is highly relevant, as many existing platforms fail because they do not match practical needs.

The role of technology in nonprofit organizations has also been widely studied. Zubler et al. [3] highlight that digital tools are becoming essential for NGOs, not only for improving efficiency but also for managing operations and delivering services effectively. Their research suggests that digital transformation is no longer optional for nonprofit organizations. However, while such studies focus on organizational improvements, they do not provide a unified system that connects NGOs with users, volunteers, and donors in a coordinated workflow.

Another important area of research is digital volunteering. Sha et al. [4] examined volunteer services in emergency situations and found that digital platforms can significantly improve response time and participation. These systems allow volunteers to contribute remotely or in a coordinated manner, overcoming the limitations of traditional volunteering. However, these platforms are often limited to specific contexts, such as emergencies, and do not support broader community welfare activities.

Volunteer-task matching is another critical aspect of welfare systems. Kaur et al. [5] proposed an optimization-based approach for assigning volunteers to tasks based on skills and preferences. Their study shows that proper task allocation can improve the effectiveness of volunteer work. Similarly, Yazdani et al. [6] introduced a framework for integrating volunteers into decision-support systems, emphasizing structured data layers, role-based access, and workflow management. These studies clearly indicate that unstructured assignment of volunteers reduces efficiency, and a systematic approach is necessary.

In addition to general welfare systems, some studies focus on specific application domains. For example, research on pet adoption platforms highlights the importance of structured and location-based systems for improving adoption

processes [9]. These systems address specific problems effectively but are limited in scope and do not integrate with broader welfare activities such as human support or resource sharing.

At a broader level, Cipriano et al. [10] studied the digital transformation of nonprofit organizations and concluded that although the importance of digital platforms is widely recognized, their implementation remains fragmented. Many organizations adopt partial solutions, leading to disconnected systems that do not communicate with each other. This fragmentation reduces the overall effectiveness of welfare activities.

From the above studies, a clear pattern can be observed. Digital platforms have the potential to improve community welfare, but most existing solutions focus on isolated aspects such as participation, volunteering, or donations. Very few systems provide an integrated platform that supports multiple stakeholders and manages the complete lifecycle of a welfare request.

This limitation highlights an important research gap. Existing systems lack:

- A centralized platform connecting all stakeholders
- Structured lifecycle management of requests
- Integration of multiple welfare domains
- Transparency and accountability mechanisms
- Effective coordination between users, NGOs, volunteers, and donors

To address these limitations, there is a need for a system that combines the strengths of existing approaches while overcoming their weaknesses. The proposed system, CommunityConnect, is designed to fill this gap by providing a unified, workflow-based platform that integrates multiple roles and supports end-to-end management of community welfare activities.

Thus, the literature review clearly shows that while significant progress has been made in individual areas, there is still a strong need for a comprehensive and practical solution that can handle real-world community support in an organized and scalable manner.

Table 1 summarizes and compares the key studies discussed above, highlighting their focus areas, main findings, and limitations.

Sr. No.	Title of Paper / Study	Description	Relevance to Proposed System
1	Civic Action Brokering Platforms – Gordon & Baldwin-Philippi, 2014 [1]	This study explains how digital platforms act as intermediaries between citizens and community opportunities. It highlights the importance of structuring opportunities to improve participation.	Helps in understanding how CommunityConnect connects users, NGOs, and volunteers. However, it lacks request lifecycle and tracking, which our system provides.
2	Co-designing Digital Platforms for Volunteer-led Migrant Support – Seguin et al., 2022 [2]	Focuses on designing platforms that reflect real-world coordination needs such as communication and task execution. Emphasizes co-design with users.	Supports the idea that CommunityConnect should match real-world workflows like request handling, NGO review, and volunteer coordination.
3	User-driven Technology in NGOs – Zubler et al., 2025 [3]	Discusses how digital transformation improves NGO operations, service delivery, and internal management.	Justifies NGO-centered workflow in CommunityConnect where NGOs validate, manage, and coordinate requests.

4	Digital Volunteer Services in Emergency Situations – Sha et al., 2025 [4]	Explores how digital platforms enable fast and large-scale volunteer coordination in emergency situations.	Supports the volunteer module of CommunityConnect, especially for quick response and coordination.
5	Optimization Framework for Volunteer Assignment – Kaur et al., 2024 [5]	Proposes structured methods to assign volunteers based on skills and preferences for better efficiency.	Supports structured volunteer-task assignment in CommunityConnect instead of random allocation.
6	Volunteer Integration in Decision Support Systems – Yazdani et al., 2024 [6]	Introduces a layered system for integrating volunteers using data, decision-making, and workflow structures.	Aligns with CommunityConnect's architecture where volunteers are integrated into a structured workflow system.
7	Supporting Students in Translation Volunteering – Angelucci et al., 2023 [7]	Highlights the importance of meaningful engagement, task clarity, and sustained participation in volunteering platforms.	Reinforces the need for clear tasks and engagement features in CommunityConnect.
8	Platform Volunteering in Urban Governance – Fenger et al., 2023 [8]	Discusses how digital platforms are reshaping volunteering and improving trust in community systems.	Supports the concept of CommunityConnect as a digital platform for organized community participation.
9	Proximity-Based Pet Adoption System – Research Study [9]	Focuses on improving adoption systems through structured and location-based digital platforms.	Supports the animal welfare and adoption module in CommunityConnect.
10	Digital Transformation in Nonprofits – Cipriano et al., 2025 [10]	Examines how nonprofits are adopting digital systems, but highlights fragmentation and lack of integration.	Strongly justifies the need for a unified platform like CommunityConnect.

Table 1

3. Problem Statement and Motivation

In today's society, community welfare activities such as providing help to people in need, supporting animal welfare, organizing social campaigns, and sharing resources are essential for maintaining social balance and inclusivity. However, despite the presence of many NGOs, volunteers, and donors, the overall system of delivering support remains highly fragmented and unstructured. Most welfare activities are still managed through informal methods such as phone calls, WhatsApp messages, social media posts, or personal networks. While these approaches may work at a small scale, they become highly inefficient and unreliable when the number of requests increases.

One of the major problems in the current system is the **lack of a centralized platform**. Information related to requests, volunteers, NGOs, and donations is scattered across multiple channels. A person in need may not know which organization to approach, while a volunteer may not know where their help is required. Similarly, donors often face difficulty in identifying genuine causes and ensuring that their contributions are used effectively. This fragmentation leads to poor coordination and reduces the overall efficiency of community welfare activities.

Another critical issue is the **absence of a structured workflow** for handling requests. In most existing systems, a request is treated as a one-time submission rather than a continuous process. There is no clear mechanism to track whether a request has been reviewed, accepted, assigned, or completed. As a result, many requests are either delayed, ignored, or lost entirely. This lack of lifecycle management creates confusion among stakeholders and reduces accountability in the system.

The problem of **transparency and trust** is also significant. Users who raise requests often do not receive updates about the status of their requests. Donors are unsure whether their contributions are reaching the intended beneficiaries. Volunteers may hesitate to participate due to uncertainty about the authenticity of requests. This lack of visibility and traceability weakens trust, which is a fundamental requirement for any welfare system.

In addition, there is a noticeable gap between **willingness to help and actual participation**. Many individuals are interested in contributing to community welfare, but they are unable to do so due to lack of proper information, guidance, and accessible opportunities. Existing systems do not provide clear pathways for users to engage in meaningful actions. As a result, potential volunteers and donors remain disconnected from real needs.

From a technological perspective, most available platforms are **limited in scope**. Some systems focus only on fundraising, others on volunteer management, and a few on specific domains such as animal adoption. These systems do not provide an integrated environment where multiple stakeholders can interact and collaborate effectively. The absence of multi-role coordination leads to communication gaps, duplication of effort, and inefficient use of resources.

Furthermore, **communication in existing systems is often unorganized and disconnected from the actual workflow**. Important discussions take place outside the system through personal messages or calls, which are not recorded or linked to the task. This results in loss of information, misunderstandings, and difficulty in tracking progress.

Another major limitation is the **lack of proper data management and historical tracking**. Without structured records, it becomes difficult to analyse system performance, monitor completed tasks, or identify common patterns in community needs. This prevents organizations from improving their processes and making data-driven decisions.

The literature review also supports these observations by highlighting that while digital platforms can improve participation and coordination, most existing solutions focus on isolated aspects such as volunteering, donations, or NGO operations. There is a clear lack of systems that integrate all stakeholders and manage the complete lifecycle of welfare activities in a structured manner [1]–[6], [10].

Based on these challenges, the core problem can be defined as follows:

There is no integrated, centralized, and workflow-based digital platform that effectively connects users, NGOs, volunteers, donors, and administrators, while ensuring proper coordination, transparency, tracking, and completion of community welfare activities.

This problem is not only technical but also social in nature, as it directly affects the efficiency and reliability of community support systems. A poorly managed request may lead to delayed help, misuse of resources, or complete failure to address a genuine need. Therefore, there is a strong need for a system that can bring structure, accountability, and efficiency into community welfare processes.

The motivation behind this work is to bridge the gap between **help-seekers and help-providers** by leveraging modern web technologies and structured workflows. The proposed system, CommunityConnect, is designed to address all the identified limitations by providing a unified platform where requests are not only created but also managed throughout their entire lifecycle. By integrating multiple stakeholders and supporting real-time coordination, the system aims to improve participation, build trust, and enhance the overall effectiveness of community welfare activities.

4. Proposed System

The limitations identified in existing community welfare systems clearly indicate the need for a more structured, centralized, and transparent solution. To address these challenges, this paper proposes CommunityConnect, a multi-role community support and welfare management platform designed to improve coordination, efficiency, and accountability in welfare activities.

CommunityConnect is not just an informational platform but a workflow-driven system that manages community support activities as structured processes. Unlike traditional systems where requests are treated as simple submissions, this platform treats every request as a complete lifecycle, ensuring that it is properly handled from creation to closure.

4.1 Overview of the Proposed System

CommunityConnect provides a unified digital environment where multiple stakeholders can interact and collaborate effectively. The platform connects:

- Users (request creators)
- NGOs (validators and coordinators)
- Volunteers (task executors)
- Donors (resource providers)
- Administrators (system controllers)

Each stakeholder has a specific role and responsibility, and the system ensures that all interactions are organized through a structured workflow.

The main objective of the proposed system is to eliminate fragmentation and bring all welfare-related activities into a **single, centralized platform**. This improves communication, reduces delays, and ensures that no request is lost or ignored.

4.2 Key Features of the Proposed System

The proposed system includes several important features that directly address the limitations of existing systems:

1. Centralized Platform

All community welfare activities are managed in one place. This removes the need to depend on multiple platforms or informal communication channels.

2. Workflow-Based Request Management

Each request follows a defined lifecycle:

- Creation
- Verification
- Acceptance / Rejection
- Assignment
- Execution
- Completion

This ensures proper tracking and accountability.

3. Role-Based Access Control

Different users have different permissions based on their roles. This improves system organization and security.

4. Real-Time Tracking and Updates

Users can track the status of their requests at any stage, which increases transparency and trust.

5. Integrated Communication System

Stakeholders can communicate within the platform, ensuring that discussions are linked to the request and not lost.

6. Multi-Domain Support

The platform supports various types of welfare activities such as:

- Human welfare
- Animal welfare
- Resource sharing
- Sustainability initiatives

- Campaign participation

7. Media and Proof Upload

Users and volunteers can upload images and videos as proof of work, improving accountability.

4.3 Request Lifecycle Model

One of the most important aspects of CommunityConnect is its **request lifecycle model**, which ensures that every request is handled in a structured and transparent manner.

Activity Diagram:

https://drive.google.com/file/d/1gSz0cz0TS_czeQ7Y1RG0eLa2Yku3yLN5/view?usp=drive_link

The lifecycle of a request includes the following stages:

1. **Request Creation**
A user submits a request with details such as category, description, location, and media.

2. **Request Storage and Visibility**
The request is stored in the database and made visible to relevant stakeholders.

3. **NGO Review and Verification**
NGOs evaluate the request and decide whether to accept or reject it.

4. **Task Assignment**
If accepted, the request is assigned to a volunteer.

5. **Execution**
The volunteer performs the required task in the real world.

6. **Progress Tracking**
Updates, notes, and media are added during execution.

7. **Completion and Closure**
The request is marked as completed after verification.

This lifecycle ensures that every request is properly managed and tracked throughout its journey.

4.4 Role-Based Interaction

The system is designed to support multiple stakeholders, each with specific responsibilities:

- **User** → Creates requests and tracks progress
- **NGO** → Reviews, verifies, and manages requests
- **Volunteer** → Executes tasks and updates progress
- **Donor** → Contributes resources or funds
- **Admin** → Monitors and manages the entire system

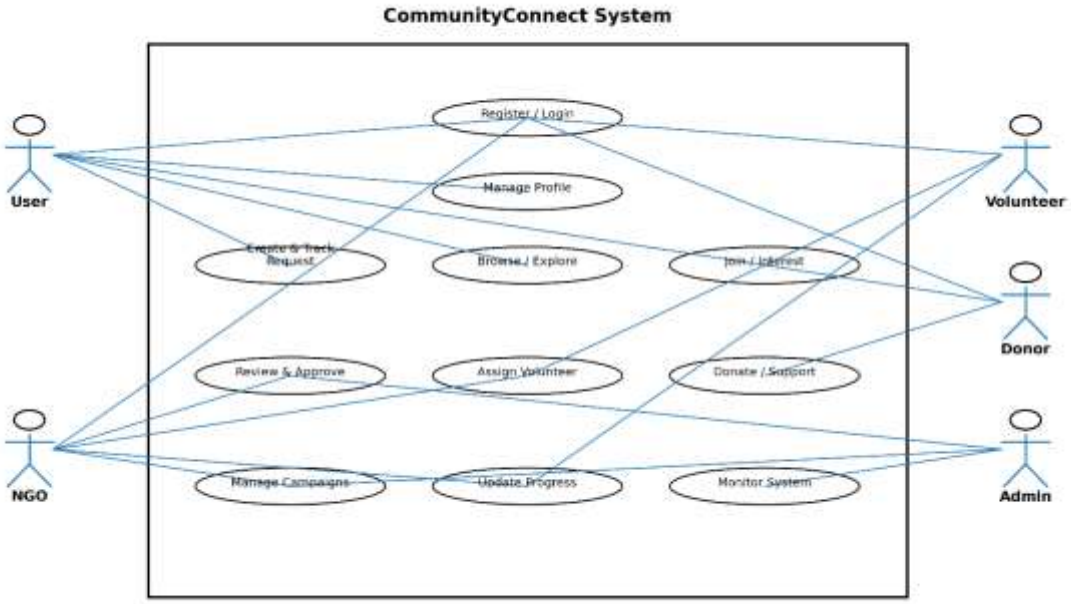


Figure 1: Main Use-Case Diagram

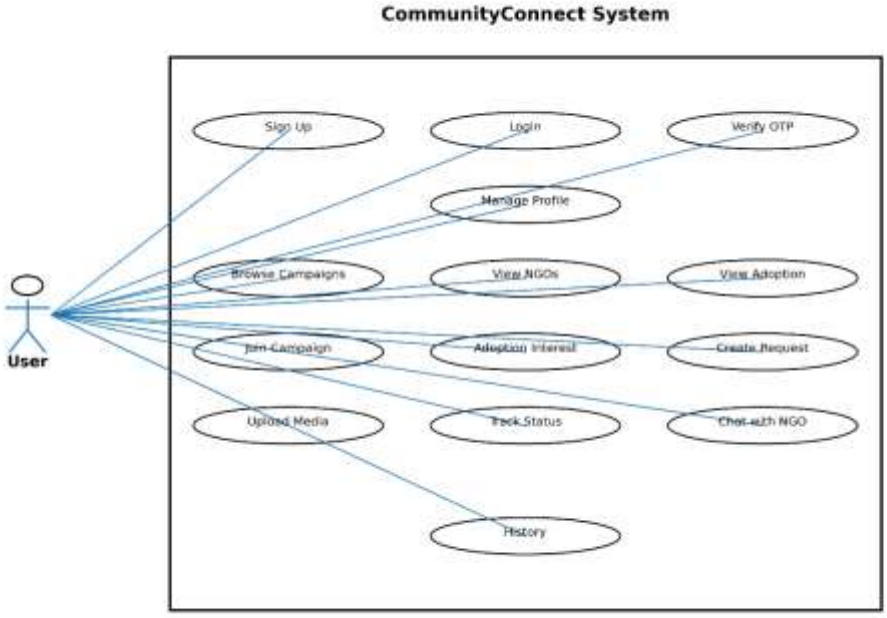


Figure 2: User Use-Case Diagram

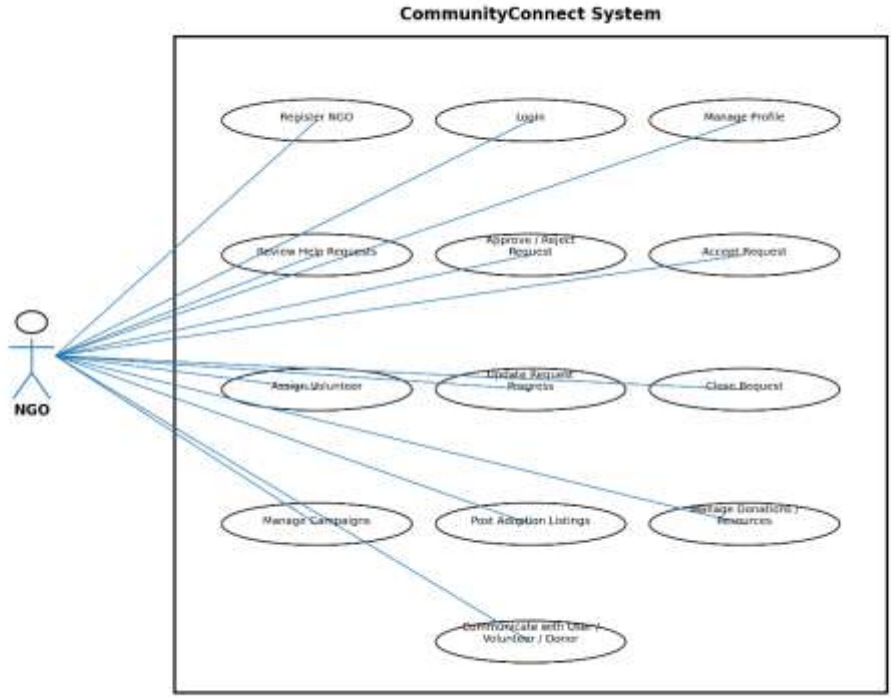


Figure 3: NGO Use-Case Diagram

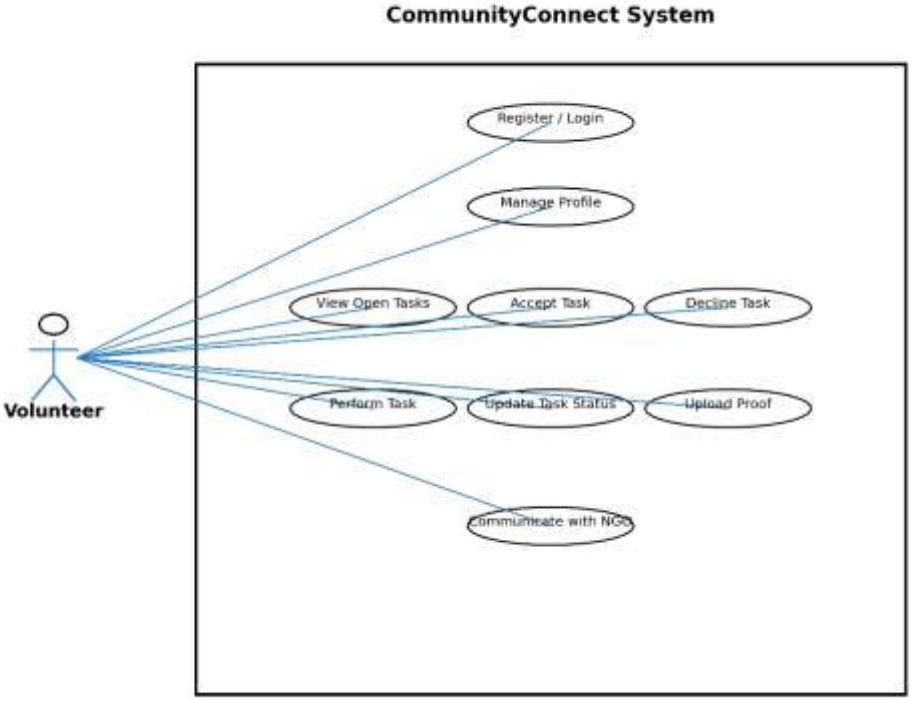


Figure 4: Volunteer Use-Case Diagram

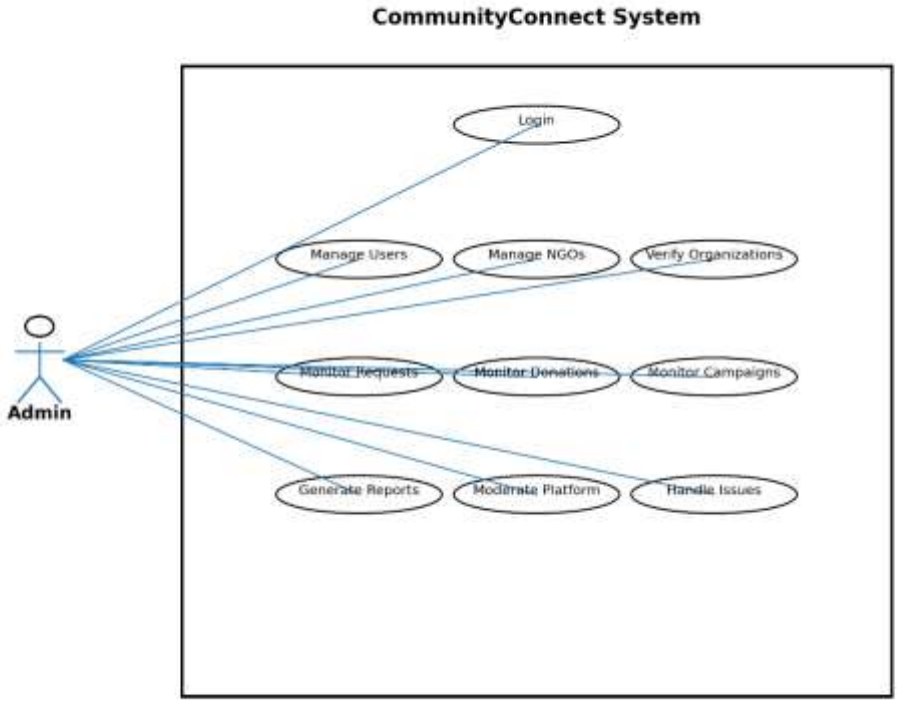


Figure 5: Admin Use-Case Diagram

This role-based structure ensures clear responsibilities and avoids confusion in the workflow.

4.5 Advantages of the Proposed System

The proposed system offers several advantages over existing approaches:

- Eliminates fragmentation by providing a centralized platform
- Ensures structured handling of requests through lifecycle management
- Improves transparency through real-time tracking
- Enhances trust among users, NGOs, and donors
- Encourages active participation from volunteers
- Supports multiple welfare domains in one system
- Provides a scalable and practical solution for real-world use

4.6 Summary

The proposed system, CommunityConnect, is designed to address the major gaps identified in existing welfare systems by introducing a **centralized, workflow-driven, and multi-role platform**. It not only improves coordination and efficiency but also builds trust and transparency, which are essential for effective community welfare.

5. System Architecture

The system architecture defines how different components of CommunityConnect are structured and how they interact with each other. Since the platform is designed as a multi-role, workflow-based system, a well-defined architecture is essential to ensure scalability, performance, and maintainability.

CommunityConnect follows a **layered architecture approach**, where the system is divided into multiple layers, each responsible for a specific function. This separation of concerns ensures that the system is modular, easy to manage, and can be extended in the future.

5.1 Architecture Overview

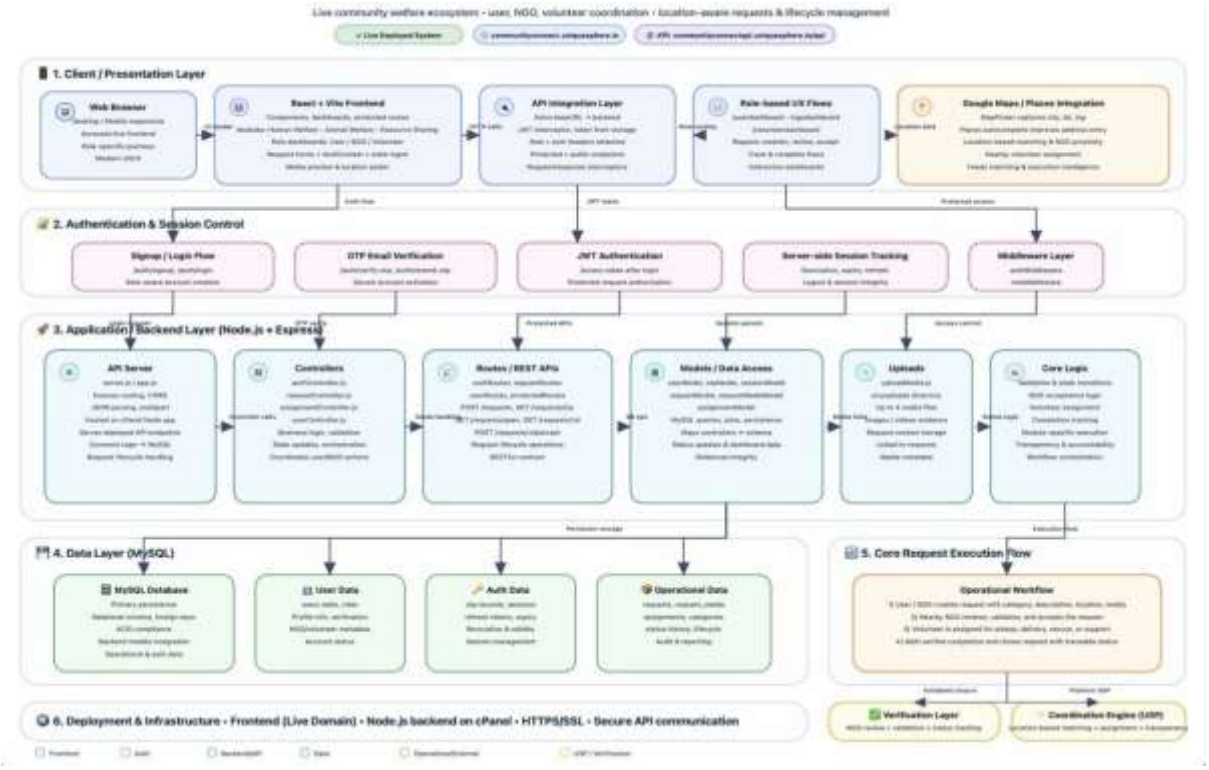


Figure 6: CommunityConnect Architecture Diagram

The architecture of CommunityConnect consists of the following major layers:

1. Presentation Layer (Frontend)
2. API Communication Layer
3. Backend Application Layer
4. Authentication and Security Layer
5. Data Layer (Database)
6. External Integration Layer

Each of these layers works together to ensure smooth functioning of the system.

5.2 Presentation Layer (Frontend)

The presentation layer is responsible for user interaction and interface design. It is developed using React with Vite, which provides a fast and responsive user experience.

This layer includes:

- User dashboards (User, NGO, Volunteer, Admin)
- Forms for request creation
- Campaign and adoption pages
- Navigation and UI components

The frontend communicates with the backend through API calls using Axios. It ensures that users can easily interact with the system without requiring technical knowledge.

The design focuses on:

- Simplicity
- Clarity
- Responsiveness

- Role-based interface

5.3 API Communication Layer

This layer acts as a bridge between the frontend and backend.

It is responsible for:

- Sending HTTP requests from frontend
- Receiving responses from backend
- Handling data exchange

Axios is used for API communication, ensuring:

- Fast data transfer
- Structured request handling
- Error handling

This layer ensures that the frontend and backend remain loosely coupled, improving system flexibility.

5.4 Backend Application Layer

The backend layer is the core of the system and is developed using Node.js and Express.

It is responsible for:

- Handling business logic
- Processing requests
- Managing workflows
- Validating inputs
- Controlling system operations

Key components include:

- Routes (API endpoints)
- Controllers (logic handling)
- Middleware (authentication, validation)
- Models (database interaction)

The backend ensures that all operations such as request creation, NGO verification, volunteer assignment, and status updates are properly managed.

5.5 Authentication and Security Layer

Security is a critical part of the system, as it involves multiple users and sensitive data.

This layer includes:

- OTP-based email verification
- JWT (JSON Web Token) authentication
- Role-based access control
- Session management

The purpose of this layer is to:

- Prevent unauthorized access
- Ensure user identity verification
- Maintain secure communication

Each request is validated before processing, ensuring system integrity and reliability.

5.6 Data Layer (Database)

The data layer is implemented using MySQL, a relational database system.

It stores:

- User information
- Requests and categories
- Assignments
- Media files
- Chat messages
- Campaign data

The database is designed in a structured way to ensure:

- Data consistency
- Efficient querying
- Easy retrieval
- Scalability

Relationships between tables ensure that all data is properly connected and traceable.

Entity-Relationship Diagram:

https://drive.google.com/file/d/11RUs5mNeTaThwMOn2TOHdYWDTwf999cN/view?usp=drive_link

5.7 External Integration Layer

CommunityConnect integrates external services to enhance functionality.

The primary integration includes:

- Google Maps API for location-based services

This helps in:

- Identifying request locations
- Connecting nearby NGOs
- Improving coordination

5.8 Workflow Integration in Architecture

One of the key strengths of this architecture is that it supports a workflow-driven system.

The flow works as follows:

- User creates request → Frontend sends API call
- Backend stores request in database
- NGO reviews request → Backend updates status
- Volunteer accepts task → Assignment stored
- Task executed → Updates saved
- Request completed → Final status updated

This integration ensures that:

- Every action is recorded
- Data flows smoothly between layers
- The system remains consistent and reliable

5.9 Advantages of the Architecture

The chosen architecture provides several advantages:

- Modular design (easy to maintain and update)
- Scalable system (supports future growth)
- Secure communication (authentication and authorization)
- Efficient data handling (structured database)
- Clear separation of responsibilities
- Supports real-world deployment

6. System Workflow Flowchart

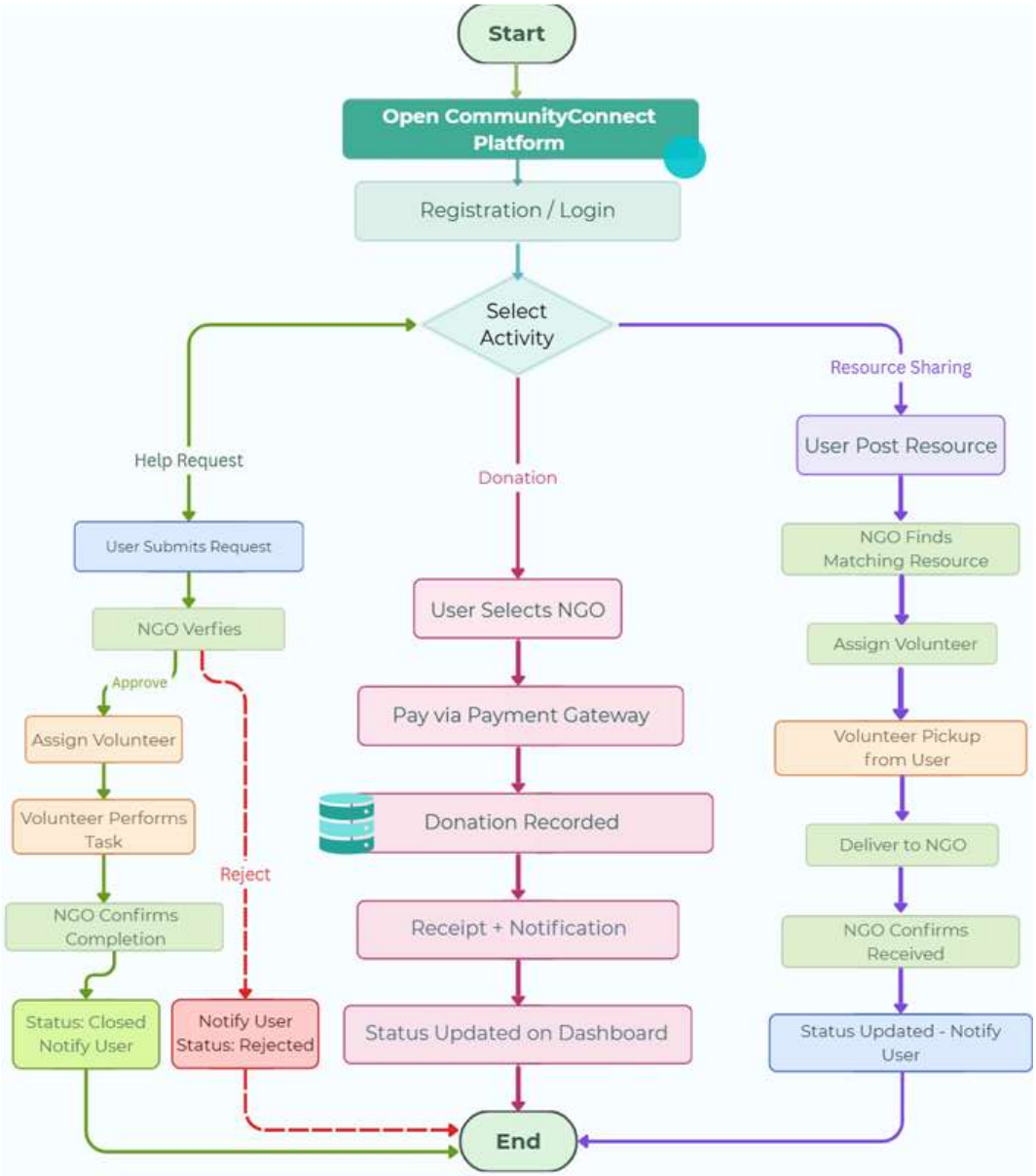


Figure 7: System Flowchart

The flowchart shown above represents the overall workflow of the CommunityConnect system. It provides a high-level visualization of how different activities such as help requests, donations, and resource sharing are processed within the platform.

The process begins when the user opens the CommunityConnect platform and logs into the system. After successful authentication, the user selects the type of activity they want to perform. The system supports three major workflows: help request, donation, and resource sharing.

In the help request workflow, the user submits a request describing the required support. This request is then reviewed by the NGO. If the request is approved, a volunteer is assigned to perform the task. The volunteer executes the task, after which the NGO verifies and confirms completion. Finally, the request is marked as closed, and the user is notified. If the request is rejected, the user is informed accordingly.

In the donation workflow, the user selects an NGO and proceeds to make a contribution through a payment gateway. Once the payment is successful, the donation is recorded in the system. The user then receives a receipt and notification, and the status is updated on the dashboard.

In the resource sharing workflow, the user posts available resources such as items for donation. The NGO identifies matching resources and assigns a volunteer to collect them. The volunteer picks up the resources from the user and delivers them to the NGO. After confirmation, the system updates the status and notifies the user.

This flowchart clearly demonstrates how the platform integrates multiple stakeholders and processes into a structured workflow. It highlights the lifecycle of different activities and ensures that every action is tracked, validated, and completed efficiently. The visual representation also helps in understanding how the system improves coordination, transparency, and accountability compared to traditional unstructured methods.

7. Methodology and Implementation

7.1 Introduction

Methodology and implementation represent the stage where the conceptual design of the system is converted into a working application. In the case of CommunityConnect, the implementation is not limited to developing individual features but focuses on building a complete, real-world system that can handle community welfare activities in a structured and efficient manner.

The system is designed using a full-stack development approach, where frontend, backend, and database components work together to deliver a seamless user experience. The implementation follows a modular structure, ensuring that each component performs a specific function while remaining integrated within the overall workflow.

The key objective of the implementation is to create a production-ready platform that supports real-time coordination between users, NGOs, volunteers, donors, and administrators.

7.2 Development Environment

The development environment consists of the tools, technologies, and platforms used to build the system.

Hardware Requirements

- Processor: Intel i5 or equivalent
- RAM: Minimum 8 GB
- Storage: Minimum 256 GB
- Internet connection for development and deployment

Software Requirements

- Operating System: Windows
- Code Editor: Visual Studio Code

- Backend Runtime: Node.js
- Package Manager: npm
- Database Tool: MySQL Workbench
- API Testing Tool: Postman
- Browser: Google Chrome

7.3 Technologies Used

Frontend

- React (with Vite)
- CSS (modern UI design)
- Axios (for API communication)

Backend

- Node.js
- Express.js

Database

- MySQL (Relational Database)

Authentication

- Email OTP verification
- JWT (JSON Web Token)

Other Integrations

- Google Maps API (for location-based features)

7.4 Frontend Implementation

The frontend of CommunityConnect is developed using React with Vite, which provides fast rendering and efficient development.

The user interface is designed with the following principles:

- Clean and modern design
- Easy navigation
- Role-based dashboards
- Responsive layout

Different dashboards are created for different users:

- User Dashboard
- NGO Dashboard
- Volunteer Dashboard
- Admin Dashboard

Each dashboard displays relevant data and actions based on user roles. React components are used to create reusable UI elements, improving maintainability and scalability.

The frontend communicates with the backend using Axios, which sends API requests and receives responses dynamically.

7.5 Backend Implementation

The backend is developed using Node.js and Express, which handle all core functionalities of the system.

The backend is structured into:

- Routes (API endpoints)
- Controllers (business logic)
- Middleware (authentication and validation)
- Models (database interaction)

Key functionalities implemented in the backend include:

- User authentication and session management
- Request creation and management
- NGO verification and approval system
- Volunteer assignment and tracking
- Donation processing
- Communication handling

The backend ensures that all operations follow the defined workflow and are properly validated before execution.

7.6 Database Implementation

The system uses MySQL as the database to store structured data.

The database includes tables such as:

- Users
- Requests
- Categories
- Assignments
- Media files
- Chat messages
- Campaigns

The database is designed using relational models to ensure:

- Data consistency
- Efficient querying
- Proper relationships between entities

Each request is linked to users, NGOs, and volunteers, ensuring complete traceability of activities.

7.7 Authentication and Security Implementation

Security is a critical component of the system.

The system implements:

- OTP-based email verification for user registration
- JWT-based authentication for secure sessions
- Role-based access control to restrict unauthorized actions

This ensures that:

- Only verified users can access the system
- Data remains secure

- Unauthorized access is prevented

7.8 Workflow Implementation

The most important part of the system is the workflow implementation, which manages the lifecycle of each request.

The workflow includes:

1. Request Creation
User submits request with details and media
2. Request Storage
Request is saved in database
3. NGO Review
NGO verifies authenticity
4. Decision Making
- Accept → Proceed
- Reject → Notify user

5. Volunteer Assignment
NGO assigns volunteer
6. Task Execution
Volunteer performs real-world activity
7. Progress Updates
Media and notes added
8. Completion
NGO verifies and closes request

This structured workflow ensures:

- No request is lost
- Every step is recorded
- Transparency is maintained

7.9 API Implementation

The system uses REST APIs for communication between frontend and backend.

Examples of APIs:

- /api/auth/login
- /api/auth/signup
- /api/requests/create
- /api/requests/accept
- /api/requests/update-status

These APIs ensure smooth data flow and system interaction.

7.10 Deployment Implementation

The system is deployed on a live server environment.

Deployment includes:

- Frontend hosted on domain
- Backend hosted on server
- Database configured
- API connections established

This ensures that the system is not just theoretical but practically usable in real-world scenarios.

8. Result and Discussion

8.1 System Output

8.1.1 Homepage Interface

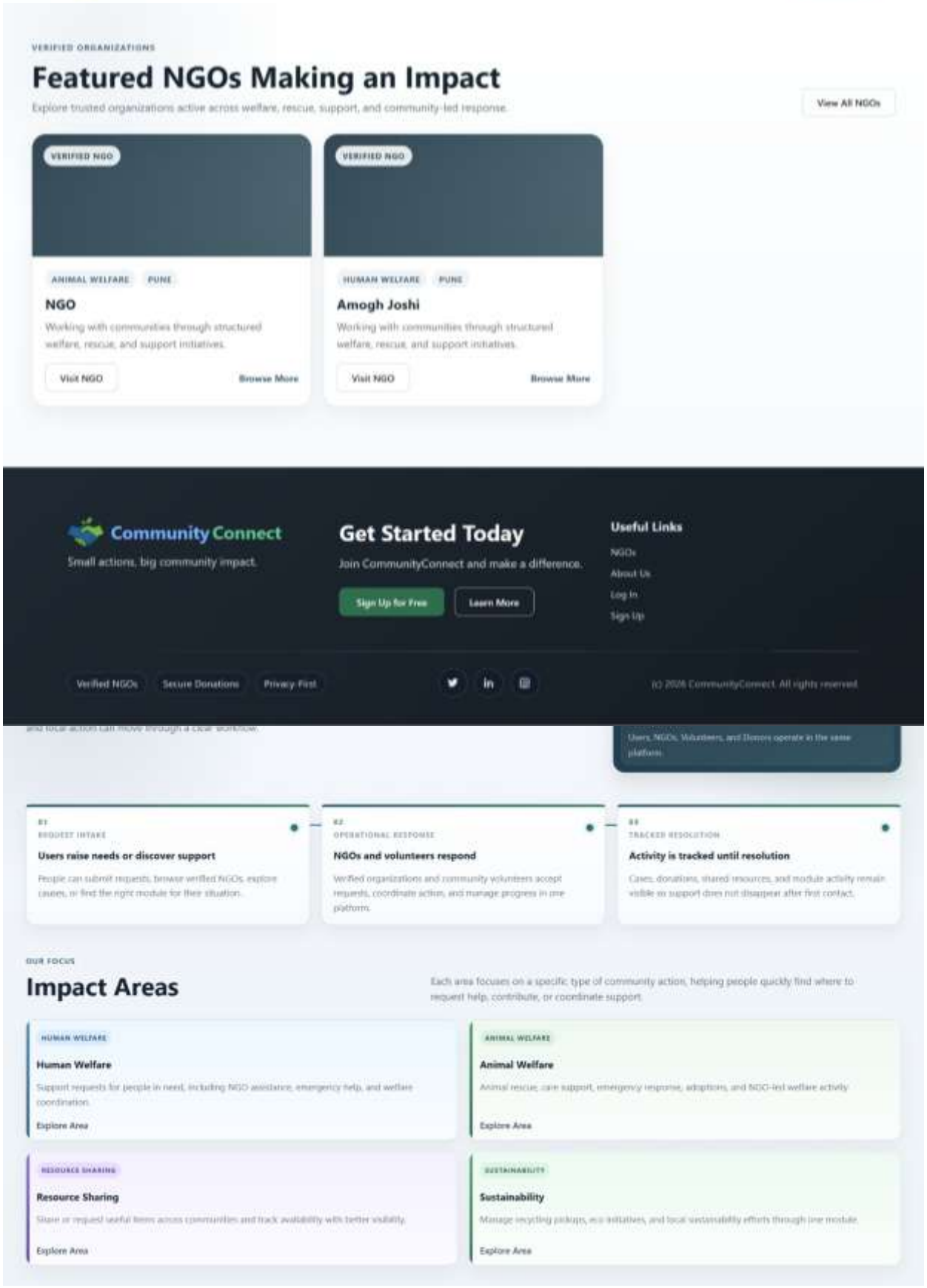


Figure 8: Homepage Interface

The homepage of CommunityConnect provides a clear and user-friendly interface that introduces the platform and guides users toward key actions such as creating requests, exploring NGOs, and participating in activities. The design focuses on simplicity and engagement, ensuring that even first-time users can easily understand the platform.

8.1.2 NGO Dashboard

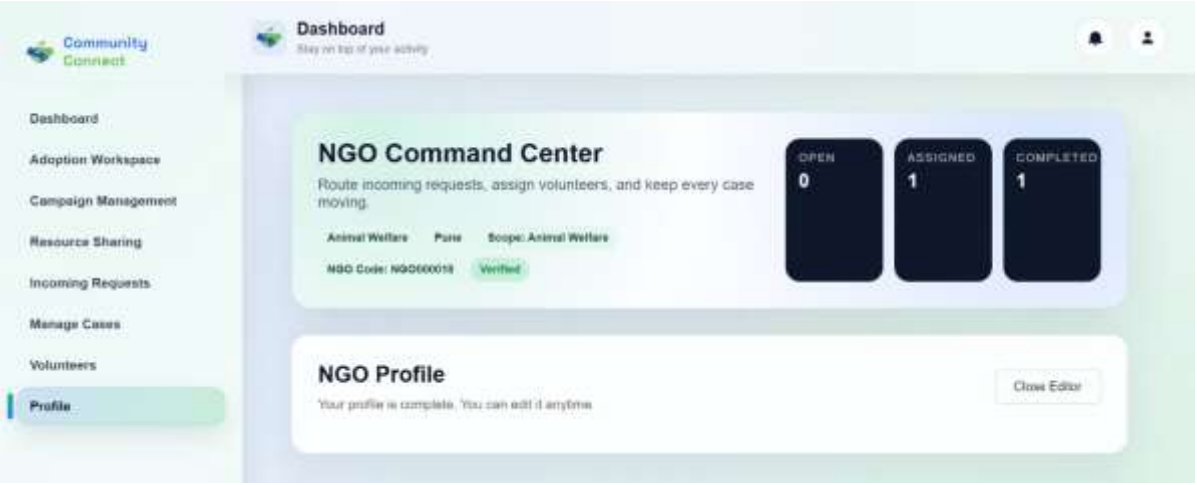
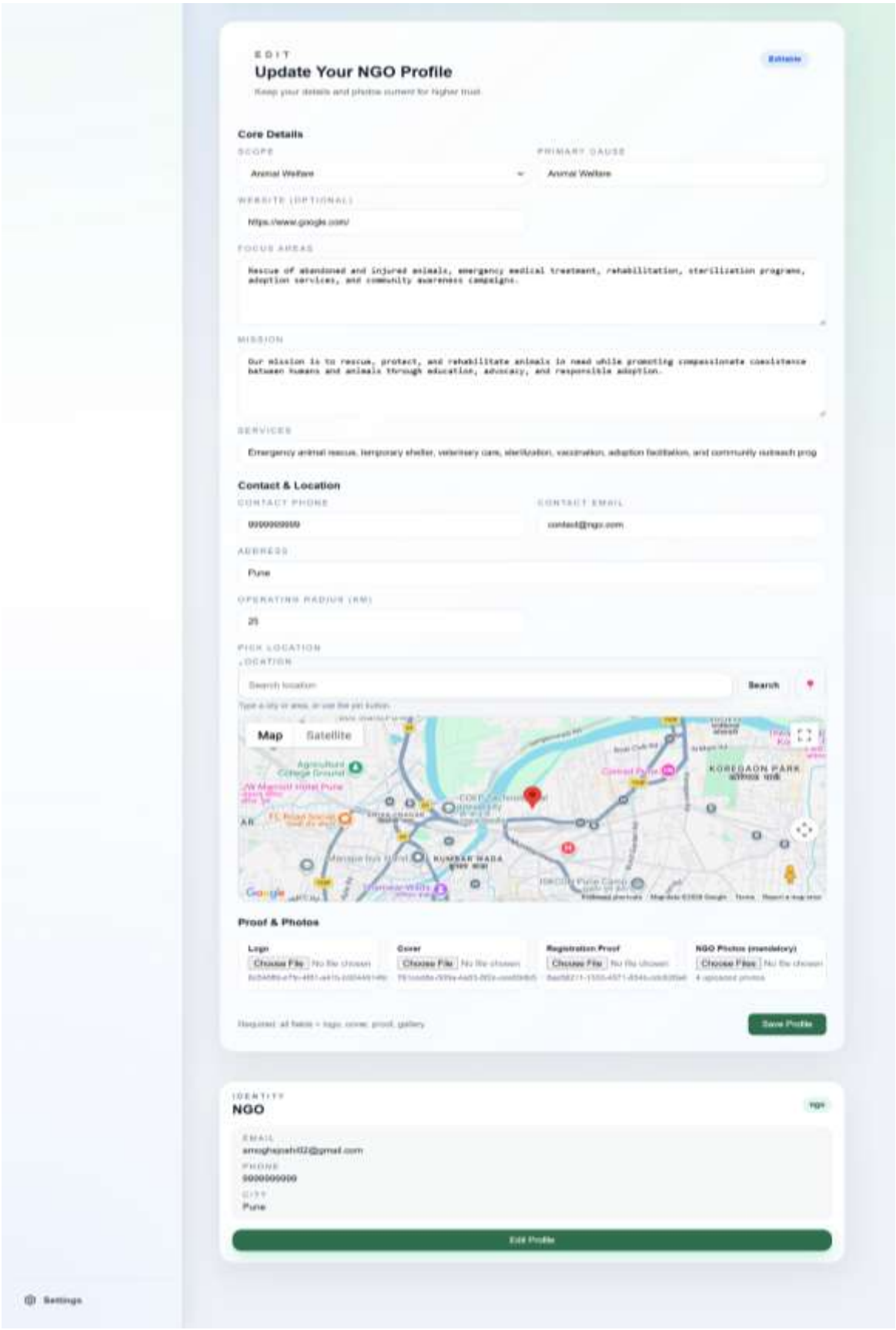


Figure 9: NGO Dashboard

T



The NGO dashboard enables organizations to review requests, verify them, assign volunteers, and monitor progress. This dashboard acts as the decision-making center of the system.

8.1.3 User Dashboard

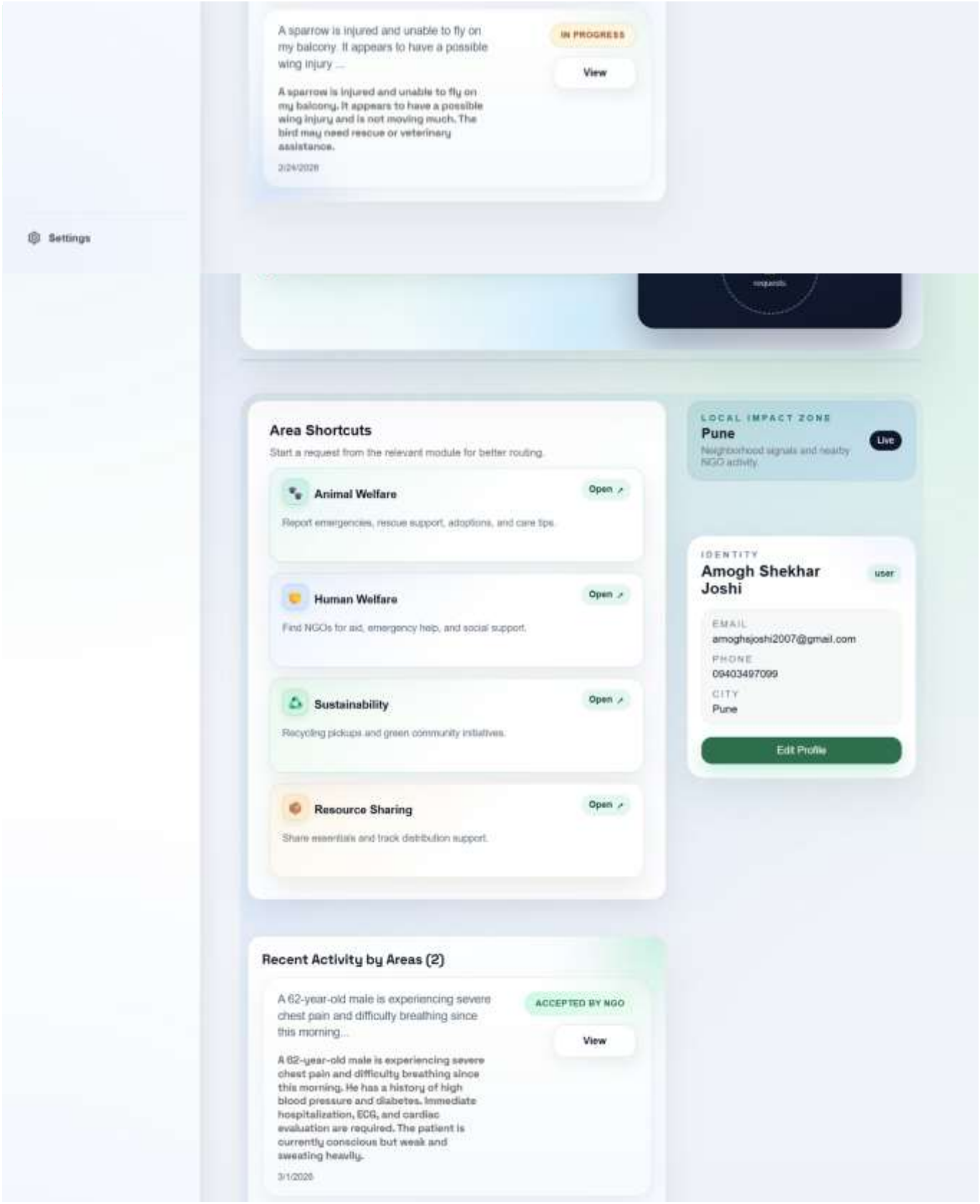


Figure 10: User Dashboard

The user dashboard allows users to create requests, track their status, and interact with NGOs. It provides a centralized view of all activities, ensuring transparency and ease of use.

8.1.4 Volunteer Dashboard

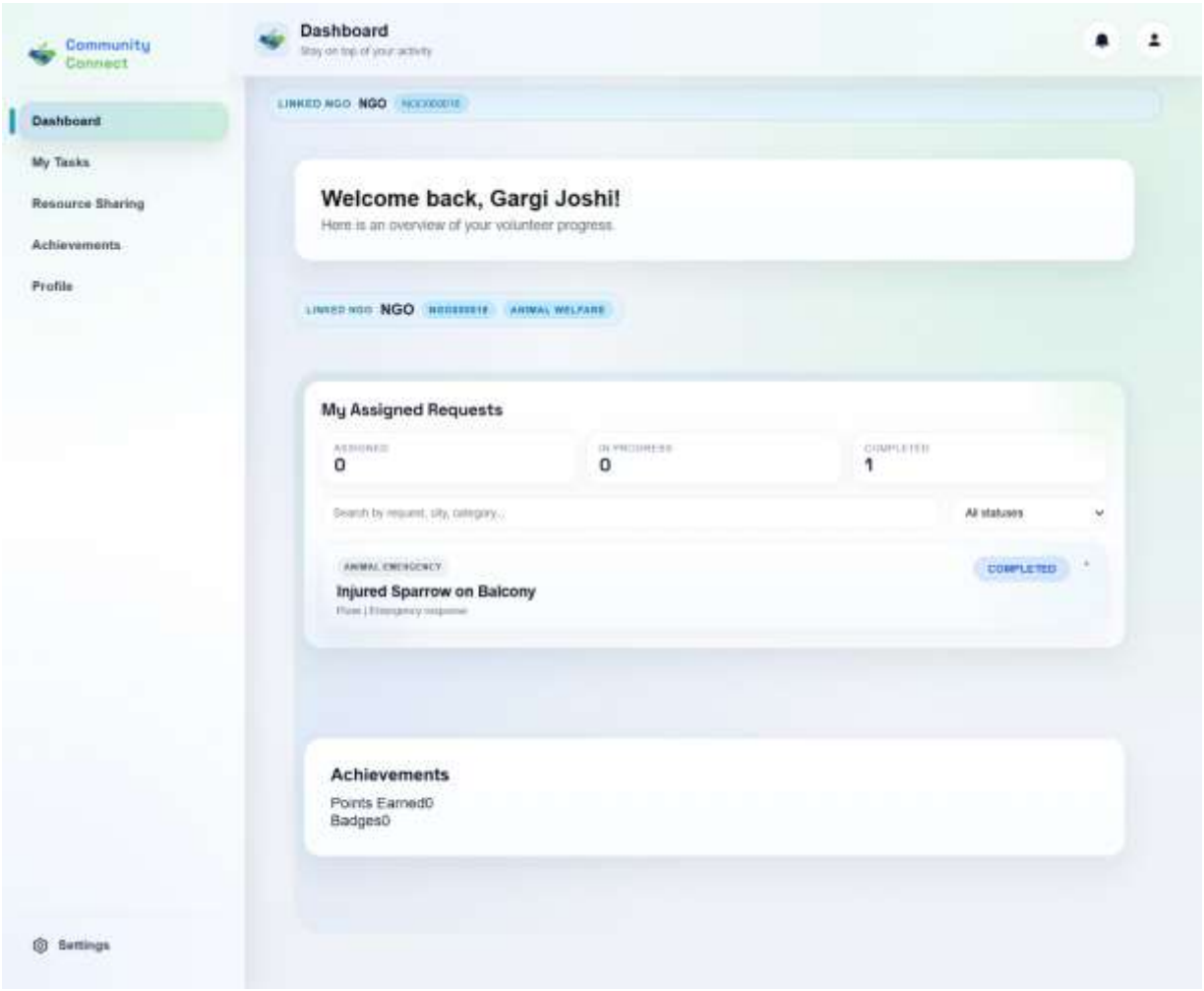


Figure 11: Volunteer Dashboard

8.1.5 Campaign

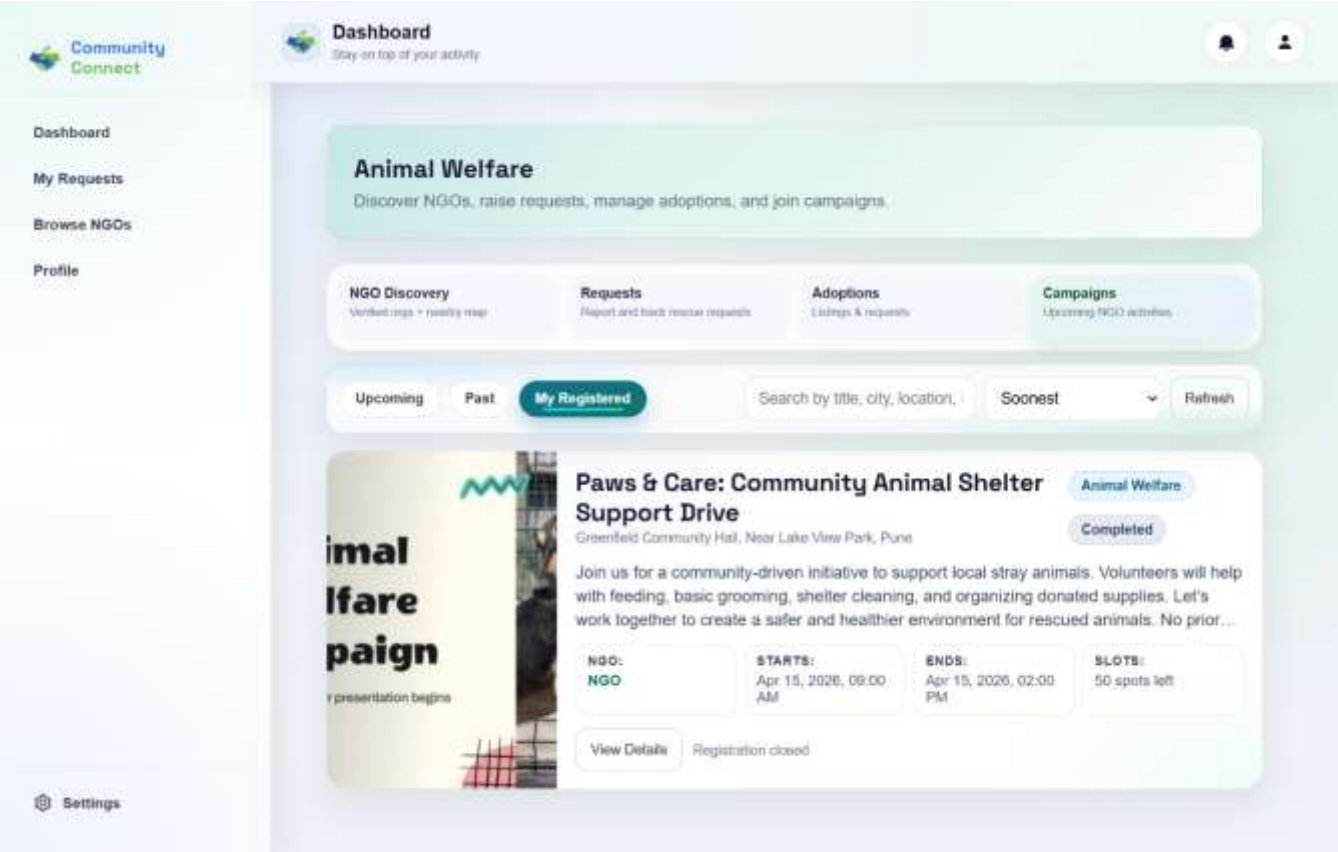


Figure 12: Campaigns

This module allows users to contribute resources or participate in campaigns, improving engagement and participation.

8.2 Discussion of Results

The implementation of CommunityConnect demonstrates significant improvements over traditional community welfare systems. The platform successfully addresses the major problems identified earlier, such as lack of coordination, absence of tracking, and poor transparency.

One of the key outcomes of the system is the introduction of a structured workflow, where each request is processed through defined stages. This ensures that no request is lost and every activity is properly managed. The integration of multiple stakeholders within a single platform improves communication and reduces delays.

The system also enhances transparency and trust by allowing users to track their requests and view updates in real time. This builds confidence among users, volunteers, and donors, encouraging greater participation.

Another important result is the efficient utilization of resources. By connecting users, NGOs, and volunteers in a coordinated manner, the platform ensures that help reaches the right place at the right time.

The system has also demonstrated good usability and accessibility, as users can easily navigate through the platform and perform required actions without technical complexity.

8.3 Real-World Validation

The effectiveness of CommunityConnect is further validated through its real-world deployment and recognition. The system was presented at DIPEX 2026, a prestigious innovation exhibition, where it received the 1st Prize in the Open Innovation category.

- This achievement highlights:
- Innovation in system design
- Practical implementation
- Social relevance
- Real-world usability

The recognition confirms that the system is not only technically sound but also impactful in addressing real societal problems.

9. Conclusion and Future Scope

9.1 Conclusion

In this paper, a multi-role community support and welfare management platform named CommunityConnect has been proposed, designed, and implemented to address the limitations of existing community welfare systems. The study identified key challenges such as lack of centralized coordination, absence of structured workflows, limited transparency, and weak stakeholder interaction.

To overcome these issues, the proposed system introduces a workflow-driven approach, where every request is treated as a complete lifecycle consisting of creation, verification, assignment, execution, and completion. This structured process ensures that all activities are properly managed, tracked, and completed efficiently.

The system successfully integrates multiple stakeholders, including users, NGOs, volunteers, donors, and administrators, into a single platform. By providing role-based access, real-time tracking, and integrated communication, CommunityConnect improves coordination and reduces delays in welfare activities.

The implementation of the system using modern technologies such as React, Node.js, Express, and MySQL demonstrates its practicality and scalability. The deployment of the platform further confirms that it can be used in real-world scenarios.

The results show that the system enhances:

- Transparency and trust
- Resource utilization
- User participation
- Overall efficiency of community welfare processes

Furthermore, the recognition of the project at DIPEX 2026, where it secured 1st Prize in the Open Innovation category, validates its innovation, impact, and real-world applicability.

Thus, CommunityConnect proves to be an effective solution that not only addresses technical challenges but also contributes towards building a more connected, organized, and supportive community ecosystem.

9.2 Future Scope

Although CommunityConnect provides a comprehensive solution, there are several opportunities for future enhancement and expansion.

1. Mobile Application Development

A dedicated mobile application can be developed to improve accessibility and user engagement.

2. AI-Based Recommendation System

Artificial intelligence can be used to suggest relevant NGOs, volunteers, or resources based on user needs and location.

3. Real-Time GPS Tracking

Integration of GPS tracking can improve coordination during task execution and enhance monitoring.

4. Government Integration

The platform can be integrated with government welfare schemes to expand its reach and impact.

5. Advanced Analytics and Reporting

Data analytics can be used to identify patterns, generate reports, and improve decision-making.

6. Multi-Language Support

Adding support for multiple languages can make the platform accessible to a wider audience.

7. Enhanced Security Features

Additional security measures can be implemented to further protect user data and system integrity.

These future enhancements can make CommunityConnect more powerful, scalable, and impactful, enabling it to serve a larger community and address more complex welfare challenges.

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