

SEWA SETU - YOUR BRIDGE TO SERVE

MAJOR PROJECT REPORT

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AWARD OF THE DEGREE OF

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(Computer Science and Engineering)



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CERTIFICATE

This is to certify that the Major Project Report entitled “**Sewa Setu – Your Bridge to Serve**” has been carried out by **Diya Baweja (2203425)**, **Gurjot Kaur (2203433)**, and **Rahul Sachdeva (2203536)** under my supervision and guidance, in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering** at **Guru Nanak Dev Engineering College, Ludhiana**.

The work presented in this report embodies the results of original research and practical implementation undertaken by the above students during the academic session 2025–2026. The project aims to design and develop a digital platform, **Sewa Setu**, that bridges the gap between donors, NGOs, and beneficiaries by providing a transparent, efficient, and collaborative ecosystem for managing donations, campaigns, and community support initiatives.

The students have demonstrated strong technical, analytical, and collaborative skills in developing the application using modern technologies such as the MERN stack, integrated APIs, role-based authentication, payment gateway modules, AI chatbot, and real-time community interaction features. The outcomes of this project reflect their commitment to innovation, social responsibility, and software engineering best practices.

It is further certified that the work embodied in this report is a genuine record of the students' own efforts and has not been submitted to any other university or institute for the award of any degree or diploma.

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ABSTRACT

Sewa Setu – “*Your Bridge to Serve*” is a digital platform designed to connect donors, Non-Governmental Organizations (NGOs), and individuals in need through a unified, transparent, and traceable system. The project aims to bridge the gap between available resources and genuine requirements by providing a structured ecosystem for donations, requests, and community engagement. It promotes digital transformation in social service by ensuring accountability, efficient communication, and real-time coordination among stakeholders. The system architecture of Sewa Setu is built on the MERN stack (MongoDB, Express.js, React.js, Node.js), offering scalability, modularity, and reliability. At its core, the platform includes several major modules—each serving a specific function to streamline operations and improve accessibility. The *Authentication and Role-Based Access Module* ensures secure registration and login for donors, NGOs, and administrators using JWT authentication and role-specific privileges. The *Profile Management Module* allows users to manage their personal and organizational details, maintaining verified and up-to-date records. The *Campaign Management Module* enables NGOs to create and manage awareness or donation campaigns, allowing volunteers and donors to participate effectively. Communication between users is handled through the *Chat and Communication Module*, which facilitates real-time one-to-one and group interactions using Socket.io. The *Assistance Request Module* provides a channel for individuals to raise urgent help requests, while the *Donation Request Module* supports donors in offering resources like food, clothes, and books along with pickup scheduling. NGOs can monitor all these activities through a dedicated *NGO Dashboard Module*, which summarizes donations, requests, and campaign metrics. The integration of the *Payment Module* using Razorpay allows secure financial contributions, linking every transaction with its respective campaign and generating transparent donor receipts. Furthermore, to enhance data accountability, the *Data Transparency and Reporting Module* auto-generates monthly and annual activity reports for NGOs and donors, and presents a public impact dashboard displaying live statistics like total donations, NGOs onboarded, and cities impacted. To improve engagement, the *Gamification and Leaderboard Module* introduces reward-based participation with badges, points, and rankings, fostering a sense of contribution and recognition. The platform further encourages community participation through the *Community and Awareness Module*, allowing NGOs to post success stories and awareness blogs. The addition of a *Voice and Chat Assistant* improves accessibility through speech recognition, helping users navigate the platform effortlessly. Sewa Setu not only digitalizes the donation and volunteering process but also promotes transparency, inclusivity, and civic responsibility. With its scalable architecture, data-driven insights, and community-oriented features, it establishes a foundation for a sustainable, impactful, and future-ready social service ecosystem.

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LIST OF FIGURES

Fig. No.	Figure Description	Page No.
1	Overall System Workflow of Sewa Setu	21
2	Use Case Diagram of Sewa Setu	22
3	Data Flow Diagram– Level 0	22
4	Sequence Diagram– Chat Module	23
5	Activity Diagram– User Authentication	23
6	Campaign and Donation Workflow	24
7	Activity Diagram– Assistance Request Processing	25
8	State Diagram– Assistance/Donation Request States	26
9	Deployment Diagram of Sewa Setu Platform	27
10	Entity-Relationship Diagram for Sewa Setu Database	28
11	Home Page Screen	39
12	Login and Email Verification Result Screens	40
13	User and NGO Registration Screens	41
14	Email Verification Screen	42
15	Edit Profile Screen	42
16	User Profile Screen (Mobile)	43
17	NGO Profile Screen	43
18	All NGO List Screen	44
19	Pending NGO Screen	44
20	Campaign Card	45
21	Campaign List Screen	45
22	Campaign List Screen (Mobile)	46
23	Edit Campaign Screen	46
24	Create Campaign Screen (Mobile)	47
25	Campaigns Created by Current NGO	47

Fig. No.	Figure Description	Page No.
26	Campaign Registrations Screen	48
27	Assistance Request Screen	48
28	Donation Create Screen	49
29	Select NGO for Assistance Request	50
30	Chat Interface (Horizontal)	50
31	Chats Interface and List (Mobile)	51
32	Assisstance Request Work Flow	52
33	Notifications Screen	52
34	User Leaderboard	53
35	Badges Progress Bar	54
36	AI Assisstant Navigation	55
37	AI Assisstant Query Handling	56
38	Creating a Post	57
39	View Story	57
40	Posts on Feed Screen	58
41	Analytics Cards Display	59
42	Analytics Dashboard Overview	59
43	Dashboard Charts Screen	60
44	Line Chart Display for Donation Trends	60

LIST OF TABLES

Table No.	Table Description	Page No.
1	Leaderboard and Point Accumulation System	19
2	Badge Unlocking System	20
3	Languages, IDEs, Tools and Technologies Used	33
4	Sample Test Cases for Core Functionalities	35
5	List of Database Collections and Their Descriptions	62

TABLE OF CONTENTS

Contents	Page No.
<i>Abstract</i>	i
<i>Acknowledgement</i>	ii
<i>List of Figures</i>	iii
<i>List of Tables</i>	iv
<i>Table of Contents</i>	v
Chapter 1: Introduction	3
1.1 Introduction to Project	3
1.2 Project Category	4
1.3 Problem Formulation	4
1.4 Recognition of Need	5
1.5 Existing System	6
1.6 Objectives	7
1.7 Proposed System	8
1.8 Unique Features of the Proposed System	9
Chapter 2: Requirement Analysis and System Specification	12
2.1 Feasibility Study	12
2.2 Software Requirement Specification (SRS)	13
2.3 SDLC Model Used	15
Chapter 3: System Design	16
3.1 Design Approach	16
3.2 Detailed Design	16
3.2.1 Authentication and Role-Based Access Module	17
3.2.2 Campaign Management Module	17
3.2.3 Chat and Communication Module	17
3.2.4 Profile Management Module	17
3.2.5 Assistance Request Module	18
3.2.6 Donation Request Module	18

3.2.7 NGO Dashboard Module	18
3.2.8 Location Detection Module	19
3.2.9 Payment Integration Module	19
3.2.10 Reporting and Transparency Module	19
3.2.11 Gamification and Leaderboard Module	20
3.2.12 Community and Awareness Module	22
3.2.13 Voice Assistant and Accessibility Module	22
3.3 Overall System Flow	23
3.3.1 Use Case Diagram	23
3.3.2 Data Flow Diagrams (DFDs) - DFD Level 0	24
3.3.3 Sequence Diagrams - Chat Module Interaction	25
3.3.4 Activity Diagram	25
3.3.5 State Diagram	28
3.3.6 Deployment Diagram	29
3.3.7 Database Design (E-R Diagram)	29
3.4 User Interface Design	31
3.5 Methodology	33
Chapter 4: Implementation and Testing	34
4.1 Introduction to Languages, IDEs, Tools and Technologies used for Project Work	34
4.2 Testing Techniques	36
4.3 Test Cases	36
Chapter 5: Results and Discussions	39
5.1 User Interface Representation	39
5.1.1 Brief Description of Various Modules of the System	39
5.1.2 Snapshots of the System with Discussion	40
5.2 Back-End Representation (Database)	53
5.2.1 Database Design Overview	53
5.3 Discussion	55
Chapter 6: Conclusion	58
Chapter 7: Future Scope	59
References	60

1 Introduction

1.1 Introduction to Project

In a world where technology drives social impact, *Sewa Setu – Your Bridge to Serve* has been developed as a comprehensive digital platform aimed at *connecting donors, non-governmental organizations (NGOs), and beneficiaries through a seamless, transparent, and engaging ecosystem*. The project aspires to create a bridge between those willing to contribute to society and those in need of support, thereby promoting a culture of service, transparency, and trust.

The primary objective of the project is to *streamline the donation and assistance process* by providing an integrated platform for NGOs and donors. It ensures data transparency through *auto-generated reports, impact visualization, and analytics dashboards*, thereby strengthening accountability and credibility within the system. The platform enables NGOs to manage campaigns, post updates, and generate monthly or annual reports automatically, reducing manual overhead and improving operational efficiency.

To enhance user engagement, *Sewa Setu* incorporates a *gamification and leaderboard system* that rewards donors and NGOs based on their activity. Points, badges, and progress indicators motivate continuous participation while fostering a healthy sense of competition. Analytical insights are also provided to administrators, helping them track engagement trends, identify top contributors, and send personalized recommendations or milestone notifications.

Another key component of the platform is the *Community and Awareness Module*, which enables NGOs to post stories, updates, and awareness articles, while allowing users to like, comment, and interact. This transforms the platform into an active social space for collaboration and impact sharing. To ensure inclusivity and ease of access, the project also features a *Voice and Chat Assistant* using the Web Speech API, which guides users through donation and request processes, and optionally supports text-to-speech for enhanced accessibility.

From a technological standpoint, *Sewa Setu* is developed using the MERN stack—MongoDB, Express.js, React, and Node.js—with secure *authentication* through JWT and email noti-

fications via Nodemailer. The backend leverages Node.js cron jobs and MongoDB aggregations for scheduled report generation, while the frontend employs Recharts and Chart.js for visually appealing dashboards.

Overall, *Sewa Setu – Your Bridge to Serve* represents a fusion of social welfare and modern technology, empowering organizations to operate more transparently and individuals to contribute more meaningfully. The project not only simplifies charitable activities but also nurtures a digital ecosystem of empathy, accountability, and community service—aligning technological innovation with humanitarian goals.

1.2 Project Category

The project *Sewa Setu – Your Bridge to Serve* falls under the **Application-Based Project category** because it involves the design and development of a *functional web-based platform* aimed at solving a real-world problem — bridging the gap between NGOs, donors, and beneficiaries.

It focuses on implementing practical features such as user authentication, donation management, report generation, analytics dashboards, and gamification systems, integrating technologies like React, Node.js, Express, and MongoDB.

While it demonstrates elements of *social innovation and community service*, its primary emphasis is on application development and deployment, rather than theoretical research or institutional process automation — hence it is classified as Application-Based.

1.3 Problem Formulation

In today's society, countless individuals and organizations are engaged in social service, charity, and welfare activities. However, a significant gap persists between those who wish to help and those who are in need of help. Numerous Non-Governmental Organizations (NGOs), donors, and volunteers work tirelessly toward social causes, yet their impact often remains limited due to *fragmented communication, lack of centralized platforms, and inefficient coordination*. Many potential donors remain unaware of where their contributions can make the most difference, while NGOs struggle to reach the right audience or manage their activities effectively.

The absence of a unified digital system results in *duplicated efforts, transparency concerns, and underutilization of resources*. Traditional methods of outreach and reporting are time-consuming and prone to delays, making it difficult to maintain trust and accountability. On the other hand, beneficiaries often face challenges in connecting with the right organizations or verifying the authenticity of aid providers.

To address these issues, there is a need for an intelligent, user-friendly, and transparent digital solution that can *connect NGOs, donors, and beneficiaries on a single platform, streamline communication, and ensure that resources are utilized effectively*. The platform should facilitate real-time collaboration, donation tracking, event management, and performance monitoring, thereby promoting transparency and community trust.

Thus, the problem formulated for this project is to design and develop a *web-based application that bridges the gap between service providers and seekers, enabling seamless interaction, secure data handling, and efficient management of social service activities* — empowering individuals and organizations to serve better, together.

1.4 Recognition of Need

In recent years, the growing number of social welfare initiatives, NGOs, and volunteer-driven campaigns has emphasized the need for a *unified digital ecosystem* that can effectively connect *helpers and those in need*. Despite the rapid advancement of technology, many welfare activities still depend on manual coordination, isolated social media efforts, or word-of-mouth communication, limiting their reach and efficiency.

The key challenges identified are as follows:

- **Lack of a centralized platform:** There is no unified interface where NGOs, donors, and volunteers can collaborate effectively.
- **Transparency issues:** Donors and beneficiaries often lack real-time visibility into how resources are allocated and utilized.
- **Limited engagement:** NGOs and individuals find it difficult to share updates, stories, and progress in an interactive and safe environment.
- **Poor accessibility:** Many users struggle to find verified organizations or make secure

donations with confidence.

- **Manual operations:** Campaign management, reporting, and communication still rely on repetitive manual processes.

The proposed platform, *Sewa Setu – Your Bridge to Serve*, addresses these issues through:

- **Community-driven collaboration:** Enabling users, NGOs, and donors to connect, share posts, and spread awareness seamlessly.
- **Transparency and reporting:** Providing auto-generated reports, public dashboards, and data-driven insights to enhance accountability.
- **AI-based assistance:** Integrating a chatbot that guides users, answers FAQs, and assists with navigation and donation queries.
- **Gamification and motivation:** Encouraging participation through leaderboards, badges, and milestone notifications.
- **Security and moderation:** Ensuring content safety using AI moderation for text and images, creating a reliable digital space.

Hence, this project fulfills an essential societal need by creating a *transparent, accessible, and scalable solution* that empowers individuals and organizations to contribute effectively toward community welfare and sustainable impact.

1.5 Existing System

In the present scenario, several digital platforms and social media applications attempt to support welfare initiatives and donation drives; however, they remain fragmented and lack the integration needed to create a holistic ecosystem for social service management. Most existing systems are designed either for *single-purpose fundraising* or *volunteer coordination*, but not both, resulting in inefficiencies and information gaps.

The key limitations observed in the existing systems are summarized below:

- **Fragmented communication:** NGOs, donors, and beneficiaries often rely on separate platforms (such as email, WhatsApp groups, or social media) to coordinate their efforts, making tracking and follow-up difficult.

- **Absence of centralized data management:** Information related to donations, assistance requests, and volunteer participation is stored manually or scattered across multiple spreadsheets and tools.
- **Limited transparency:** Donors and contributors seldom receive verified updates on how their donations are utilized or whether a request has been fulfilled.
- **Lack of engagement features:** There is minimal motivation for users to stay connected once their immediate contribution is completed. The absence of interactive feeds, stories, or achievements reduces sustained involvement.
- **No intelligent guidance:** Users have to manually navigate forms or NGO listings without assistance, often leading to confusion or incomplete submissions.
- **Minimal content moderation:** Open forums and social groups may face issues of spam, misinformation, or abusive content due to the lack of automated moderation systems.

These drawbacks demonstrate that the current solutions are unable to provide a **secure, transparent, and engaging environment** that fosters long-term community participation. There is thus a clear need for an integrated system like **Sewa Setu**, which unifies donation management, volunteer collaboration, and awareness creation under a single, user-friendly platform enhanced by AI-driven support and moderation.

1.6 Objectives

The objectives of the Sewa Setu project are predefined as follows:

1. **To build a web platform that connects donors with NGOs for donating excess food, books, clothes, and other essentials, while also enabling the scheduling of pickups.**
2. **To provide an interface where people can report requests for assistance, ensuring appropriate rescue and care.**
3. **To generate monthly reports reflecting the work done by NGOs and individuals, to be shared with the government for recognition.**

1.7 Proposed System

The proposed system, *Sewa Setu – Your Bridge to Serve*, is designed as an all-in-one digital platform that connects NGOs, donors, volunteers, and beneficiaries to promote transparency, accessibility, and engagement in community service activities. It eliminates the inefficiencies of the existing system by integrating multiple functionalities—ranging from donation tracking to gamification—into a single, intelligent ecosystem.

The platform is developed using the MERN (MongoDB, Express.js, React.js, Node.js) stack, *ensuring scalability, responsiveness, and seamless data synchronization*. The system leverages advanced technologies such as AI-based moderation, chatbot integration, real-time notifications, and automated report generation to enhance user experience and operational efficiency.

The major components and features of the proposed system are as follows:

- **Donation and Assistance Management:** Users can either raise requests for help or make donations directly to verified NGOs or beneficiaries. Every transaction is securely recorded and tracked to maintain transparency.
- **Payment Integration:** A secure payment gateway allows seamless fund transfers. The system automatically updates the donation status and triggers notifications to donors and NGOs when transactions are completed.
- **Data Transparency and Reporting Module:** Monthly and annual reports are auto-generated in PDF or CSV formats, displaying donation summaries, completed requests, and campaign analytics. Public dashboards highlight the overall community impact—such as total meals donated, NGOs onboarded, and cities served.
- **Gamification and Leaderboards:** To encourage continued participation, the system awards points and badges (Bronze, Silver, Gold, Platinum) based on user activity. Leaderboards for top donors and NGOs promote healthy competition and engagement.
- **Community and Awareness Platform:** A social feed enables users and NGOs to share posts, reels, and stories related to campaigns or awareness activities. Engagement through likes, comments, and follows helps strengthen the community.

- **AI Chatbot and Voice Assistant:** An intelligent chatbot assists users with navigation, donation guidance, NGO registration, and FAQs. Integrated using Hugging Face's open-source models, it supports both text and voice interaction for accessibility.
- **Content Moderation and Safety:** Every post, comment, and media upload undergoes automated moderation using AI models (such as toxic-bert) to detect spam, abuse, or inappropriate content, ensuring a safe and trustworthy environment.
- **Notification System:** Real-time in-app and email notifications are sent to users when donation requests are updated, milestones are reached, or new campaigns are launched.
- **Report and Impact Visualization:** The system generates insightful visual analytics for NGOs and admins using charts and graphs. Cron jobs ensure periodic report updates, while public dashboards reflect live community statistics.

The proposed system thus provides a *transparent, intelligent, and engaging digital ecosystem* that not only simplifies the process of connecting donors and NGOs but also fosters accountability and long-term participation.

1.8 Unique Features of the Proposed System

The proposed system, *Sewa Setu – Your Bridge to Serve*, stands out due to its holistic approach to social welfare management. Unlike conventional donation or NGO portals, it integrates multiple intelligent, community-driven, and analytics-based components into one cohesive platform. The following unique features distinguish Sewa Setu from existing systems:

- **Unified Ecosystem:** Combines donors, NGOs, volunteers, and beneficiaries within a single platform, enabling smooth collaboration and reducing dependency on third-party applications or intermediaries.
- **AI-Powered Chatbot and Voice Assistant:** A smart conversational assistant guides users through donation processes, registration, and navigation using both text

and speech interfaces. It utilizes open-source language models via Hugging Face APIs to provide accurate, context-aware responses.

- **Community Awareness Hub:** A dedicated space for sharing posts, reels, and stories to raise awareness about social causes, campaigns, and success stories. The interactive interface allows likes, comments, and shares—creating an engaging and supportive online community.
- **Automated Report Generation:** The system auto-generates detailed monthly and annual reports for NGOs and donors in PDF/CSV formats using cron jobs. These reports include metrics such as total donations, completed requests, and campaigns joined, promoting data transparency.
- **Gamification and Recognition System:** Users earn points and achievement badges (Bronze, Silver, Gold, Platinum) based on their contributions and engagement. Leaderboards for donors and NGOs encourage participation through friendly competition and visible impact tracking.
- **AI-Based Content Moderation:** All user-generated text and media undergo automated moderation using AI models like *toxic-bert* to detect harmful or spam content, ensuring a safe and inclusive environment for all users.
- **Notification and Engagement System:** Real-time notifications and emails keep users informed about request status updates, campaign milestones, and community activities, fostering better engagement and timely action.
- **Impact Visualization Dashboard:** A publicly accessible dashboard presents live metrics such as total meals donated, NGOs onboarded, cities served, and active campaigns through visually appealing charts and analytics.
- **Scalability and Extensibility:** The system architecture follows modular design principles, allowing future integration of features like AI-based donation recommendations, secure payments, or government collaboration without major structural changes.

- **Enhanced Accessibility and Inclusivity:** Through responsive design, intuitive UI/UX, and speech-based interaction, the platform ensures that users of all backgrounds can participate with ease, promoting inclusivity in digital social service.

In essence, *Sewa Setu* is not just a donation management platform—it is a comprehensive, intelligent, and community-driven solution that bridges the gap between technology and social welfare, enabling measurable and sustainable impact.

2 Requirement Analysis and System Specification

2.1 Feasibility Study

Before the implementation of the Sewa Setu platform, a feasibility study was conducted to assess its practicality and sustainability in terms of technical, economic, and operational aspects.

Technical Feasibility

- The proposed system is developed using the **MERN stack (MongoDB, Express.js, React.js, Node.js)**, ensuring scalability, flexibility, and modern web standards.
- The architecture supports modular integration of additional features such as payment gateways, AI chatbots, and content moderation services without affecting existing functionalities.
- Deployment on cloud-based infrastructure (AWS, Azure, or GCP) guarantees high availability, load balancing, and performance optimization.
- Utilization of APIs such as Razorpay, Leaflet.js, and Hugging Face ensures that the system leverages proven and secure technologies.
- Hence, the system is technically feasible given the available tools, frameworks, and hardware resources.

Economic Feasibility

- The platform is designed with open-source tools and frameworks, significantly reducing licensing and maintenance costs.
- Cloud hosting offers a pay-as-you-go model, making it affordable for NGOs and administrators to operate within budget constraints.
- Minimal hardware investment is required on the client side since the application is browser-based and compatible across multiple devices.

- Future monetization possibilities include optional donor subscriptions or verified NGO listings to sustain long-term maintenance.
- Therefore, the project is economically feasible for both development and deployment stages.

Operational Feasibility

- The platform provides an intuitive and user-friendly interface for all user roles—donors, NGOs, volunteers, and administrators.
- Role-based dashboards simplify workflows and ensure that users only see relevant options and data.
- Automation in reporting, notifications, and moderation minimizes manual intervention and improves system efficiency.
- Training requirements are minimal due to the simplicity of the UI and the inclusion of the AI chatbot for in-app guidance.
- Hence, the project is operationally feasible for real-world deployment and scaling.

2.2 Software Requirement Specification (SRS)

The Software Requirement Specification defines the detailed functional and non-functional requirements for the Sewa Setu platform.

1. Data Requirements

- User profiles, NGO details, donation records, and requests are stored in MongoDB collections.
- Relationships between users, NGOs, and requests are maintained using unique identifiers and timestamps.
- Media uploads (images, videos, reels) are stored on cloud platforms like Cloudinary or AWS S3 with secure access links.

2. Functional Requirements

- Authentication and Role-based Access for Donors, NGOs, and Admins.
- Campaign Management with creation, update, and participation functionalities.
- Assistance and Donation Request creation, tracking, and status management.
- Communication via chat module and notification system.
- Automated Report Generation and Analytics Dashboard.
- Community Posts, Reels, and Stories for awareness and engagement.
- AI Chatbot for navigation, reasoning, and donation assistance.

3. Performance Requirements

- The system should support concurrent access for up to 1000 active users without degradation in response time.
- Average API response time should remain under 300 ms under normal load.
- Database queries must be optimized with indexes to ensure fast data retrieval.

4. Dependability Requirements

- The platform must ensure data consistency and reliability even under high load or system failures.
- Automatic backups and redundancy mechanisms will maintain data integrity.
- The system shall ensure 99.5% uptime through cloud infrastructure.

5. Maintainability Requirements

- Code is modular and version-controlled using Git and GitHub.
- Each module follows clear documentation and naming conventions for easy debugging.
- Dockerized setup allows quick redeployment and testing across environments.

6. Security Requirements

- Authentication and authorization handled via JWT tokens.
- Passwords stored using bcrypt hashing with salting.
- HTTPS enforced for all communication.
- Input validation and rate limiting prevent malicious requests.

7. Look and Feel Requirements

- The platform should have a clean, modern interface using Tailwind CSS and responsive layouts.
- Role-specific dashboards with intuitive navigation and visual feedback.
- Use of React Charts and subtle animations for an engaging experience.

2.3 SDLC Model Used

The project follows the **Agile Software Development Life Cycle (SDLC)** model.

- Development was carried out in multiple **sprints**, each focused on building and testing specific modules such as authentication, campaign management, chatbot integration, and reporting.
- Regular **feedback cycles** ensured continuous improvement and refinement of features based on team reviews.
- The modular nature of Agile allowed seamless integration of new functionalities such as gamification, community feed, and AI-based moderation after the mid-term stage.
- **Continuous integration and testing** were maintained to ensure stability and reliability after every sprint deployment.

The Agile model proved ideal for Sewa Setu, given its evolving scope and the need to incorporate advanced functionalities incrementally.

3 System Design

3.1 Design Approach

The design approach adopted for **Sewa Setu – Your Bridge to Serve** is **Object-Oriented**, supported by modular and component-based development principles. This ensures reusability, scalability, and maintainability across the entire platform. Each module is designed as an independent, loosely coupled component, interacting through well-defined interfaces and APIs.

- **Object-Oriented Modeling:** Every entity such as *User*, *NGO*, *Campaign*, *Donation*, and *Request* is represented as a class encapsulating attributes and methods.
- **Layered Architecture:** The system follows the MVC (Model-View-Controller) architecture, separating data handling, business logic, and user interfaces for better clarity.
- **Component-Based Design:** Independent modules like Authentication, Campaign Management, and Communication are implemented as separate React and Node.js components, allowing flexible updates and feature extensions.
- **Scalability and Reusability:** Each feature is developed to be reusable across different workflows—such as verification logic being shared between user onboarding and NGO approval.

3.2 Detailed Design

The detailed design phase translates the system requirements into structured, visual representations that illustrate data flow, control flow, and component interactions. This phase focuses on defining the architecture and design logic of the system through diagrams and database models.

The system is organized into several major modules, each corresponding to the functional requirements identified in the earlier stages of analysis.

3.2.1 Authentication and Role-Based Access Module

- **Purpose:** Provide secure login and registration for donors, NGOs, and administrators with differentiated access levels.
- **Key Features:**
 - Email verification for authenticity.
 - JWT-based session management.
 - Role-specific dashboards and privileges.

3.2.2 Campaign Management Module

- **Purpose:** Allow NGOs to create, update, and manage campaigns, and enable users to register for them.
- **Key Features:**
 - CRUD (Create, Read, Update, Delete) operations for campaigns.
 - Event-based registration by donors and volunteers.
 - Campaign visibility through search and filters.

3.2.3 Chat and Communication Module

- **Purpose:** Facilitate direct communication between donors, NGOs, and campaign participants.
- **Key Features:**
 - One-to-one chat between donors and NGOs.
 - Group chat for campaigns or events.
 - Message history stored in the database.

3.2.4 Profile Management Module

- **Purpose:** Maintain updated information of donors and NGOs for personalized interaction.

- **Key Features:**

- Editable profile details (contact, address, description).
- Verification documents for NGOs.
- Profile visibility across campaigns and requests.

3.2.5 Assistance Request Module

- **Purpose:** Allow individuals or NGOs to raise requests for urgent help (food, shelter, medical, educational needs).

- **Key Features:**

- Request creation with details (category, urgency, location).
- Tracking of request status (pending, accepted, fulfilled).
- Routing to nearby NGOs using location data.
- Notifications sent to users when the status of their request changes.

3.2.6 Donation Request Module

- **Purpose:** Enable donors to create donation requests for NGOs to accept.

- **Key Features:**

- Itemized donations (food, clothes, books, etc.).
- Scheduling pickup times and locations.
- Status updates and acceptance logs and notifications.

3.2.7 NGO Dashboard Module

- **Purpose:** Provide NGOs with an interface to monitor and manage incoming requests, donations, and campaigns.

- **Key Features:**

- Dashboard with summary of requests and donations.
- Analytics on activities (donations received, assistance provided).

- Report generation for government recognition.

3.2.8 Location Detection Module

- **Purpose:** Map users, NGOs, and requests using Leaflet for better resource allocation.
- **Key Features:**
 - Interactive maps for donation pickup points.
 - Location-based NGO search.
 - Real-time display of assistance requests.

3.2.9 Payment Integration Module

- **Purpose:** Facilitate secure fundraising for NGO campaigns.
- **Key Features:**
 - Razorpay payment gateway integration.
 - Payment logs linked to campaigns.
 - Donor receipts for transparency.

3.2.10 Reporting and Transparency Module

- **Purpose:** Enhance accountability by providing comprehensive reports for NGOs, donors, and administrators, showing platform-wide impact.
- **Key Features:**
 - Auto-generate monthly and annual activity reports in PDF or CSV formats.
 - Summaries include donations made, requests completed, and campaigns participated in.
 - Scheduled report generation via cron jobs or manual “Generate Report” functionality.
 - Public impact dashboard displaying live statistics.

3.2.11 Gamification and Leaderboard Module

- **Purpose:** Motivate donors and NGOs by rewarding contributions, encouraging participation, and promoting a culture of community service.
- **Key Features:**
 - Gamification logic assigning points for donations, assistance, and campaign participation.
 - Dynamic badge system (Bronze, Silver, Gold, Platinum) based on cumulative contribution points.
 - Leaderboards showcasing top donors and NGOs, filterable by “This Month” or “All-Time.”
 - Progress bars and milestone notifications on user profiles.
 - Email or in-app notifications when users unlock badges or reach contribution milestones.

Table 1: Leaderboard and Point Accumulation System

Action	Performed By	Points Awarded	Leaderboard Updated	Logic / Trigger Description
Register as a donor	User	+10	Donor Leaderboard	Awarded once upon successful signup
Register as an NGO	NGO	+10	NGO Leaderboard	Given upon first registration approval
Make a donation	User	+50	Donor Leaderboard	Points scale with amount
Receive a donation	NGO	+50	NGO Leaderboard	Awarded when donation is confirmed
Join a campaign	Donor	+20	Donor Leaderboard	Each joined campaign adds points
Create a campaign	NGO	+40	NGO Leaderboard	For verified and published campaigns
Successfully complete campaign	NGO	+60	NGO Leaderboard	Verified by admin; status = “Completed”
Provide assistance / volunteering	User	+30	Donor Leaderboard	Could scale with volunteer hours (+10/hr)
Provide feedback / rating	User / NGO	+10	Respective Leaderboard	Points added to user account
Hit milestone (e.g., 5 donations)	User	+25	Donor Leaderboard	Milestone auto-check on every donation

Table 2: Badge Unlocking System

Badge	Points Required (Cumulative)	Badge Color / Symbol	Status / Tier Meaning
Bronze	100 Points	Bronze	Beginner Contributor
Silver	300 Points	Silver	Consistent Supporter
Gold	500 Points	Gold	Trusted Contributor
Platinum	1000 Points	Platinum	Top Tier / Elite Contributor

3.2.12 Community and Awareness Module

- **Purpose:** Build a collaborative community space for NGOs and users to share stories, updates, and awareness content.
- **Key Features:**
 - Blog/forum section for NGOs to post success stories and ongoing initiatives.
 - Comment and like functionalities to improve engagement.
 - Post moderation workflow allowing admin review and approval before publication.
 - Option to tag posts by category (Health, Education, Environment, Disaster Relief, etc.).

3.2.13 Voice Assistant and Accessibility Module

- **Purpose:** Improve accessibility for users through voice-based interactions and guidance.
- **Key Features:**
 - Integration of **Speech-to-Text** (Web Speech API) for filling donation or request forms via voice commands.
 - **Text-to-Speech** assistance for visually impaired users or low-literacy regions.

- Simple chatbot interface guiding users through major actions like “Donate,” “Find NGO,” or “Create Request.”
- Optional local language support using multilingual speech APIs.

Each of these modules contributes to the seamless operation of the platform and collectively achieves the objectives of transparency, accessibility, and efficient resource allocation.

3.3 Overall System Flow

The Sewa Setu platform is designed to facilitate seamless interaction between donors, NGOs, and beneficiaries. Figure 1 illustrates the high-level system workflow, showing the primary features and their coordination.

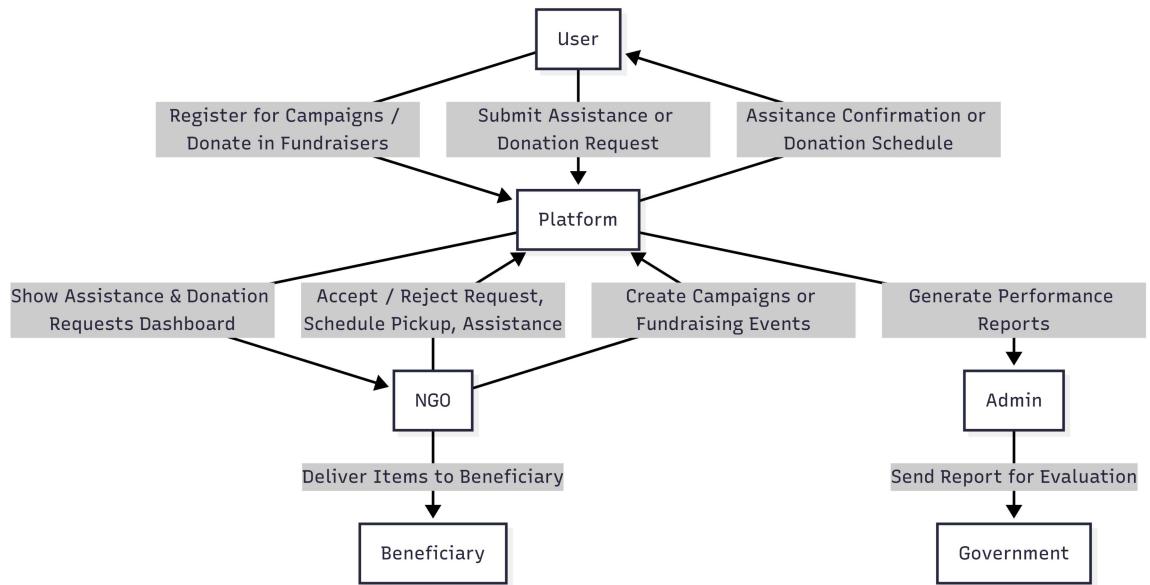


Figure 1: Overall System Workflow of Sewa Setu

3.3.1 Use Case Diagram

Figure 2 highlights the primary actors (User, NGO, Admin) and their interactions with the system.

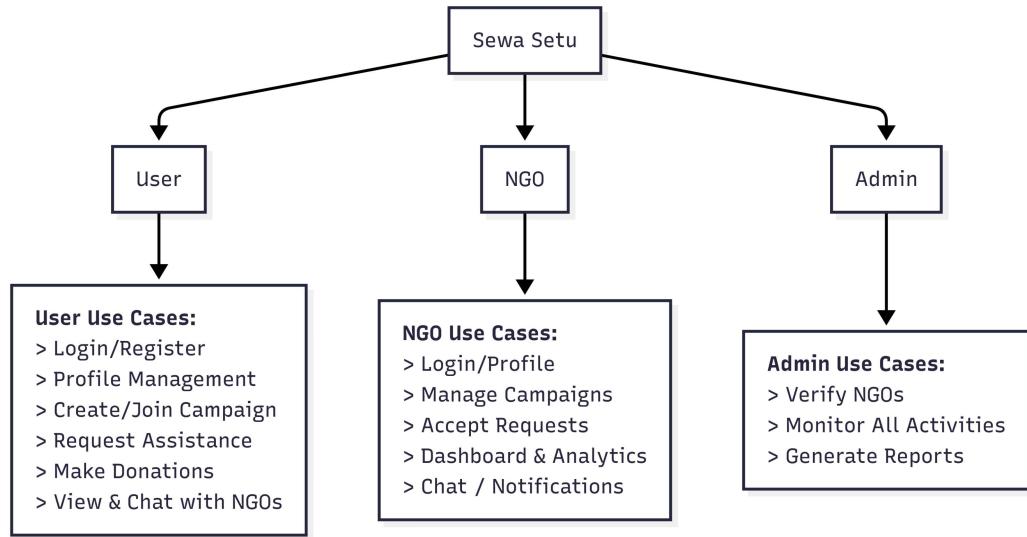


Figure 2: Use Case Diagram of Sewa Setu

3.3.2 Data Flow Diagrams (DFDs) - DFD Level 0

Represents interactions between external entities and the platform.

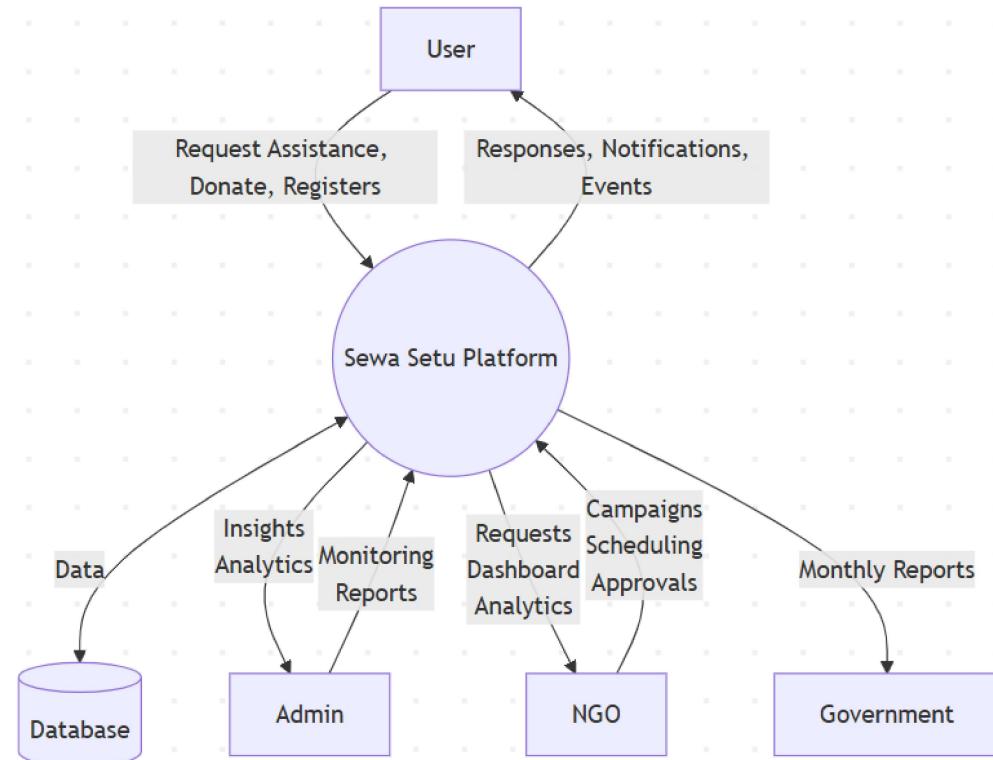


Figure 3: Data Flow Diagram – Level 0

3.3.3 Sequence Diagrams - Chat Module Interaction

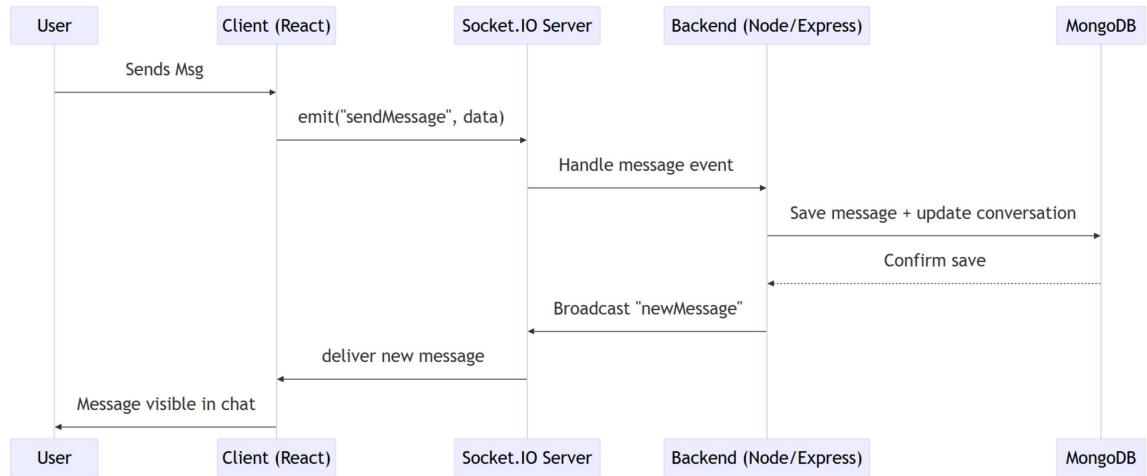


Figure 4: Sequence Diagram – Chat Module

3.3.4 Activity Diagram

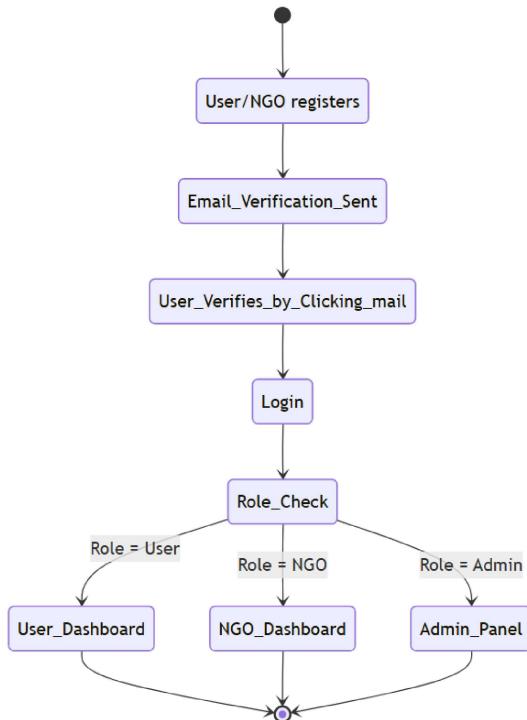
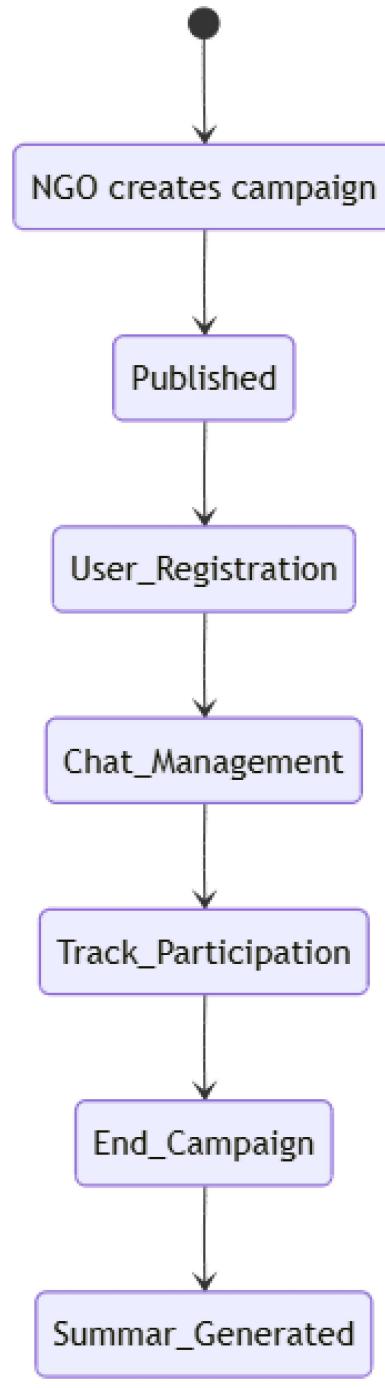
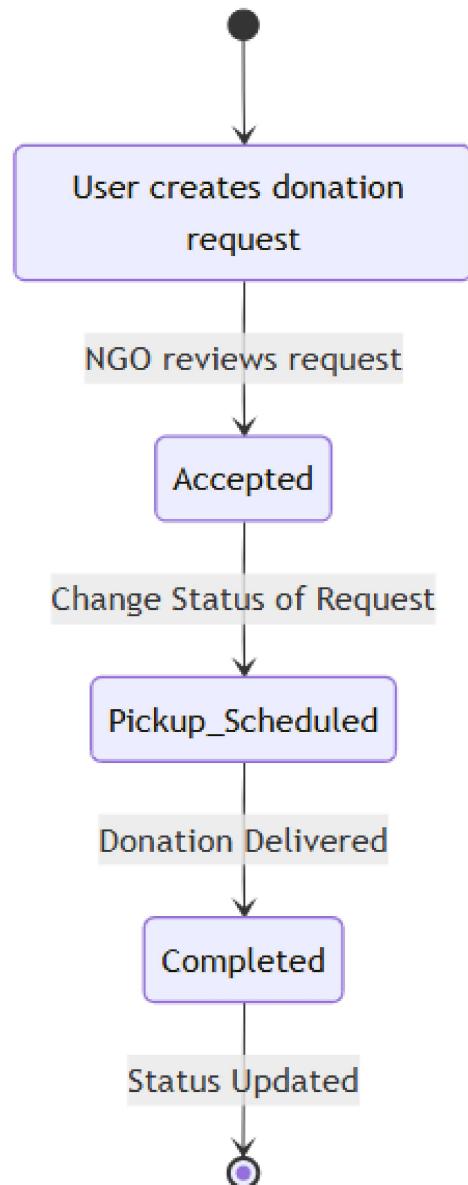


Figure 5: Activity Diagram – User Authentication



(a) Campaign Workflow



(b) Donation Workflow

Figure 6: Campaign and Donation Workflow

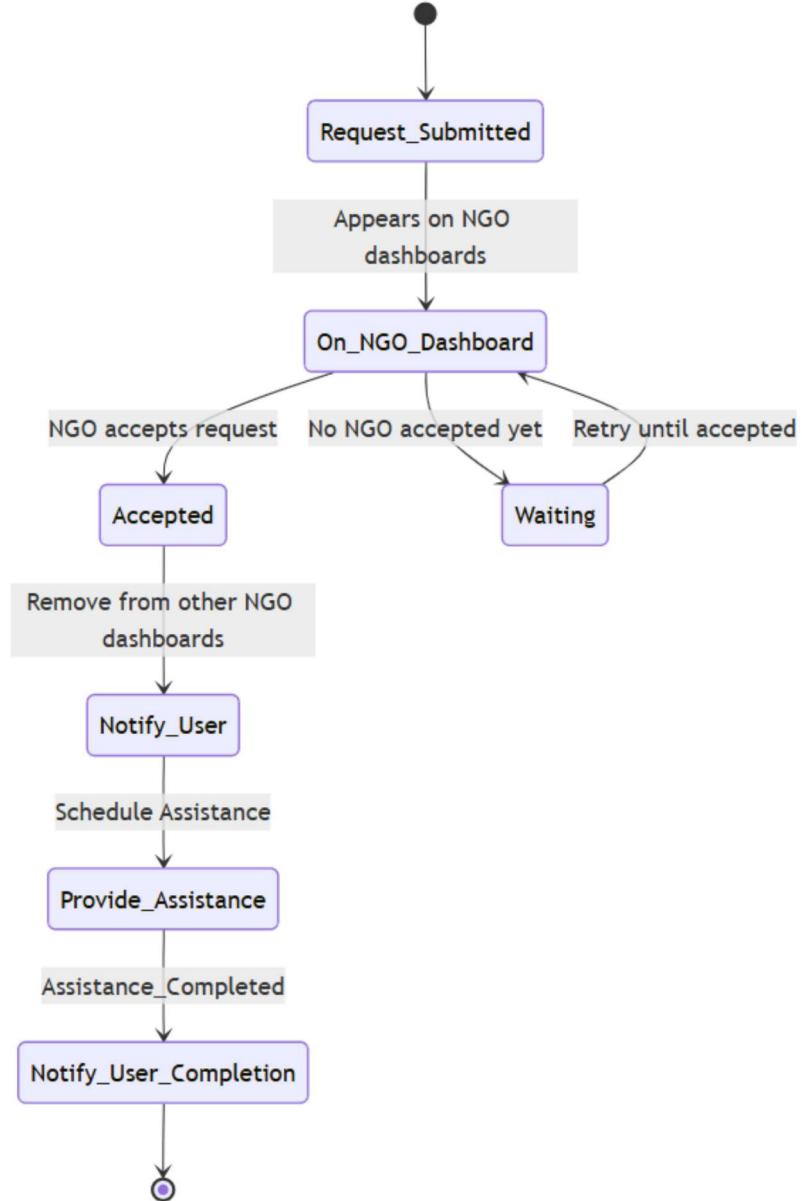


Figure 7: Activity Diagram – Assistance Request Processing

3.3.5 State Diagram

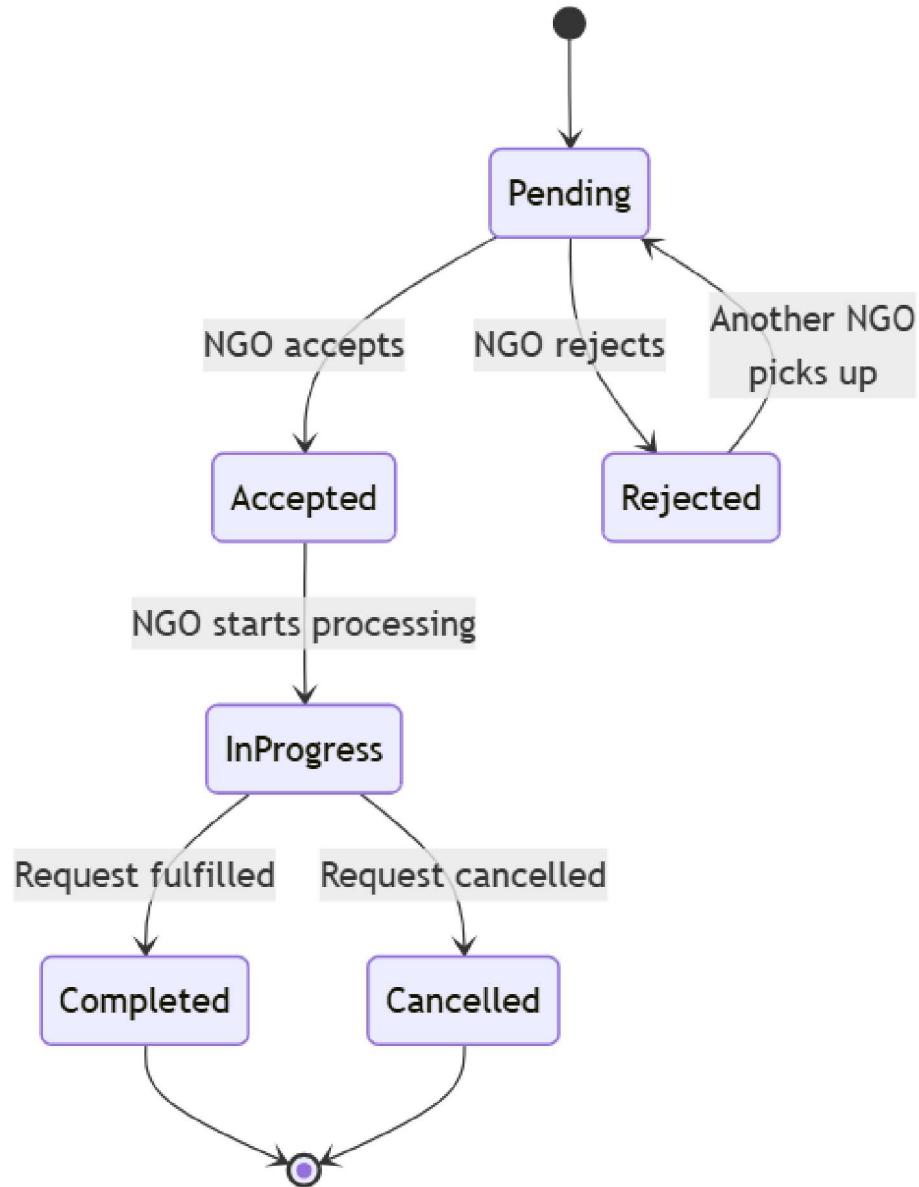


Figure 8: State Diagram – Assistance/Donation Request States

3.3.6 Deployment Diagram

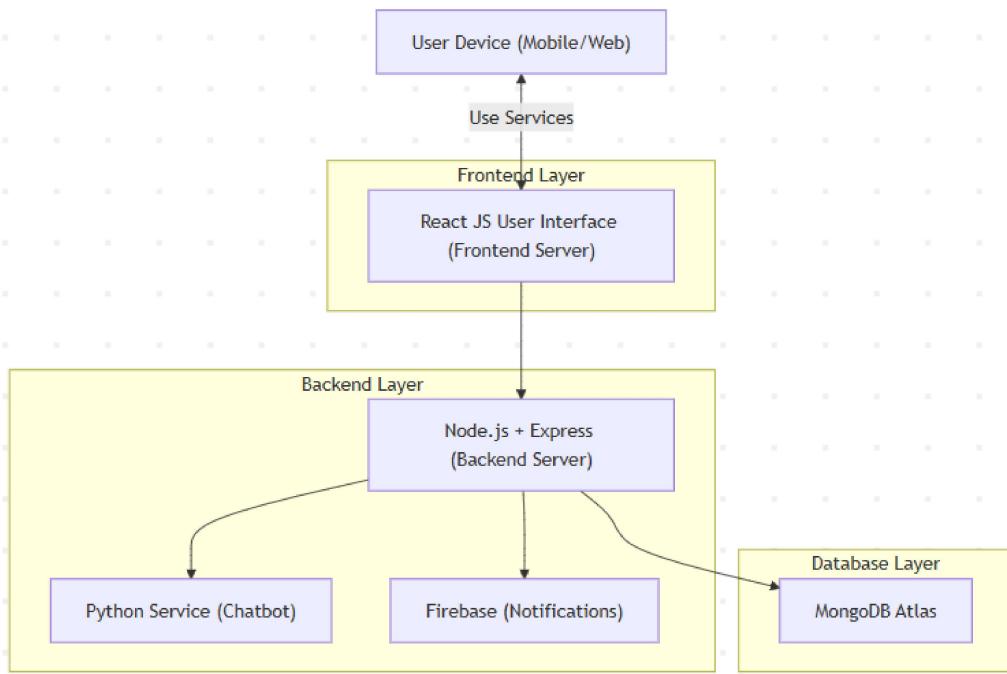


Figure 9: Deployment Diagram of Sewa Setu Platform

3.3.7 Database Design (E-R Diagram)

The ER diagram in Figure 10 shows the entities and their relationships.

*Key Database Tables

User

- name, email, phone, password, about, user_type, ngo, address, city, state, profile_image, verificationToken, verificationTokenExpiry, following, location_coordinates, isVerified

NGO

- name, email, phone, registration_number, category, address, city, state, location_coordinates, documents, logo, description, gallery, verification_status, pushTokens, account, members, campaigns, followers

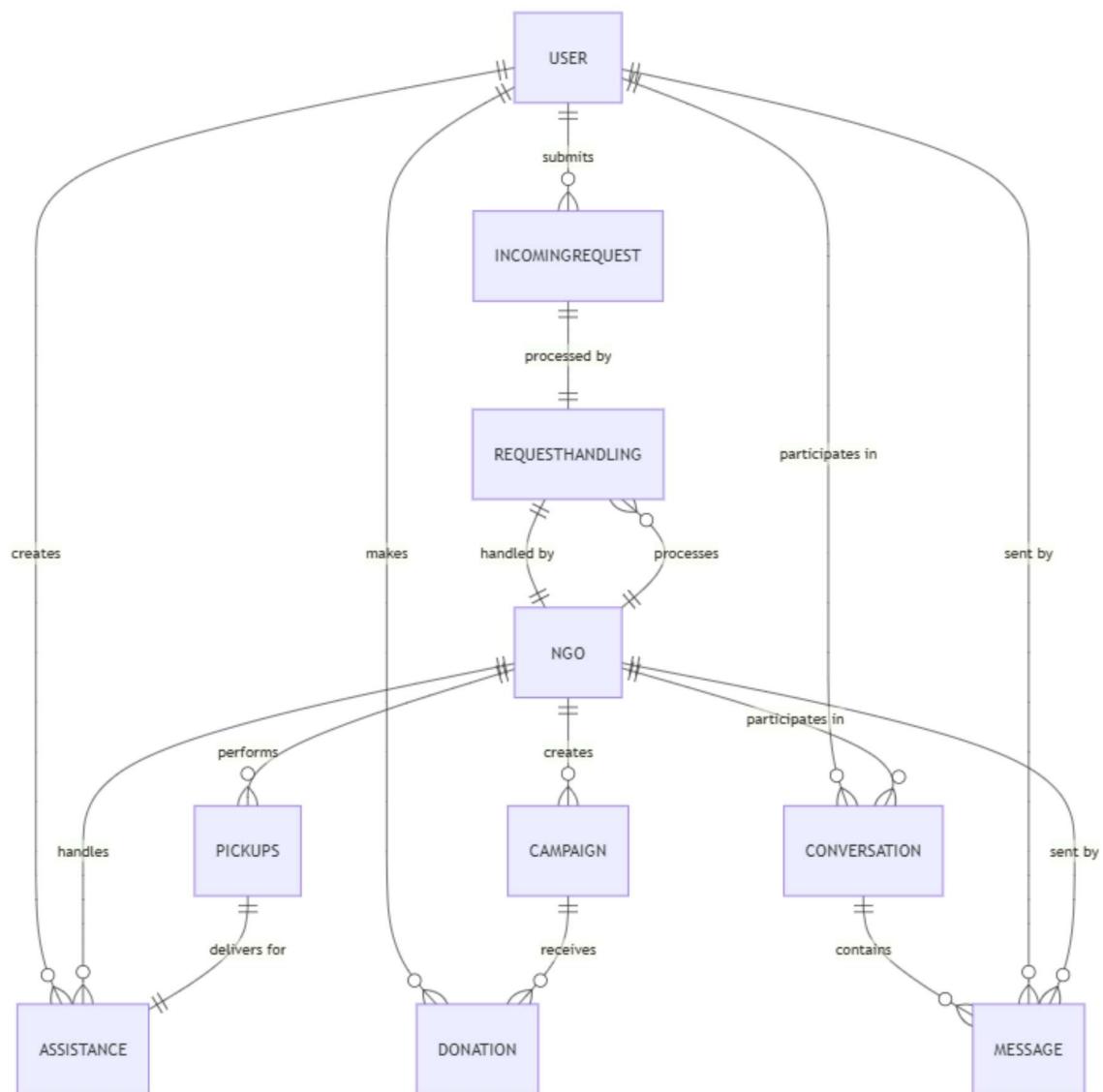


Figure 10: Entity-Relationship Diagram for Sewa Setu Database

Campaign

- ngo, title, description, category, startDate, endDate, location_coordinates, bannerImage, participants, targetFunds, collectedFunds, targetVolunteers, status, address

AssistanceRequest

- request_id, full_name, phone, address, location_coordinates, category, description, priority, status, requestedBy, selectedNGOs

Donation

- title, description, category, images, quantity, condition, donor, donation_status, assigned_ngo, pickup_id, pickup_coordinates, city

Pickup

- donation_id, volunteer_id, ngo, pickup_coordinates, drop_coordinates, status, scheduledAt, pickedAt, deliveredAt, images, delivery_notes

Conversation

- type, participants, ngo, campaign, isGroup, lastMessage

Message

- conversation, senderType, sender, text, attachments, readBy, readByType

IncomingRequest

- request, ngo, status, notifiedAt, read, emergency

RequestHandling

- request_id, handledBy, status, assignedAt, updatedAt, scheduled_details

3.4 User Interface Design

The user interface of **Sewa Setu** has been meticulously designed to provide an intuitive, secure, and responsive experience for all user types. Developed using **React.js** and **Tailwind CSS**, it adheres to the principles of modern web design, ensuring accessibility and visual consistency across devices. The platform follows the **Progressive Web App (PWA)** model, enabling seamless use even under low network conditions.

A key aspect of the platform is its **Role-Based Access System**, which dynamically customizes views and permissions for three distinct roles — **User (Donor/Volunteer)**, **NGO**, and **Admin**. Each role interacts with a different interface tailored to its responsibilities and access privileges.

- **Home / Landing Page:** Accessible to all visitors without login, the landing page introduces the mission of Sewa Setu, highlights ongoing campaigns, displays live statistics (such as total donations, NGOs onboarded, and impacted cities), and invites users to register or log in.
- **Authentication Interfaces:** Dedicated login and registration pages support role-specific sign-ups for Users, NGOs, and Admins. Authentication is handled securely using **JWT (JSON Web Tokens)**, ensuring protected access and session management.
- **Role-Based Views:**
 - **User Interface:** Donors and volunteers can create donation requests, join campaigns, track contribution history, view badges and leaderboard rankings, and engage through chat or forums.
 - **NGO Interface:** NGOs have access to dashboards for managing donation and assistance requests, creating campaigns, generating reports, posting community updates, and monitoring analytics.
 - **Admin Interface:** Administrators oversee the platform, verify NGO registrations, moderate community posts, manage campaigns, and access system-wide analytics and transparency reports.
- **Donation and Assistance Modules:**
 - *Donation Form:* Enables users to donate food, clothes, books, or funds, along with scheduling pickups and adding geolocation details.
 - *Assistance Request Form:* Allows individuals or NGOs to raise verified requests for help, view progress, and receive status updates.
- **Campaign Management:** Includes a *List of Campaigns* page where users can explore ongoing campaigns and a *Create Campaign* page for NGOs to launch new initiatives.
- **Gamification and Leaderboard:** Features badges, ranks, and progress indicators to encourage active participation. The leaderboard highlights top donors and NGOs

based on impact metrics.

- **Chat and Communication:** Integrated with **Socket.io**, this module enables real-time conversations between donors, NGOs, and admins, ensuring effective coordination.
- **Profile Management:** Separate profile pages for Users and NGOs allow them to edit personal or organizational details, track activity, and manage settings.

The entire interface follows a modular component-based architecture, with each route and view conditionally rendered based on the user's role and access level. This approach ensures data privacy, streamlined navigation, and an engaging experience that aligns with the project's mission.

3.5 Methodology

The development of **Sewa Setu – “Your Bridge to Serve”** was guided by the **Agile Software Development Methodology**, emphasizing adaptability, collaboration, and iterative progress. The Agile approach was selected over traditional models due to the modular nature of the project and its continuous requirement refinements across multiple functional teams.

- **Iterative and Incremental Development:** The system was divided into distinct modules—such as Authentication, Campaign Management, Communication, Payment Integration, and Data Transparency. Each module was designed, implemented, and validated through short iterative sprints, ensuring working deliverables at the end of every cycle.
- **Collaborative and Role-Based Workflow:** The team was structured into dedicated roles such as *Data Transparency and Reporting Lead*, *Gamification and Leaderboard Lead*, and *Community and Voice Assistant Lead*. Each role focused on developing and refining specific functional areas while maintaining seamless integration through version control.
- **Adaptive Planning:** Requirements evolved dynamically based on stakeholder feedback, UI testing, and performance reviews. Agile planning allowed for the inclusion of

advanced components—like Razorpay payment gateway, speech-based voice assistant, and public analytics dashboards—without disrupting existing modules.

- **Continuous Integration and Deployment (CI/CD):** The project employed **GitHub** for source control and collaboration. Regular commits, code reviews, and pull requests ensured stable builds. Docker environments were used during testing to maintain consistency across deployment stages.
- **Testing and Validation:** Each sprint concluded with functional testing, UI responsiveness checks, and validation of database operations. Feedback loops were maintained through peer evaluations and supervisor reviews to ensure user-centered improvements.
- **Feedback-Driven Enhancement:** Agile retrospectives helped identify areas for optimization—such as simplifying navigation flows, improving campaign creation UX, and refining analytics visualization using Recharts and MongoDB aggregations.
- **Scalability and Extensibility:** The Agile approach allowed the project to evolve into a scalable ecosystem, where future modules—such as AI-based campaign recommendations, route optimization, and multilingual support—can be seamlessly integrated.

By adopting Agile practices, the development team achieved efficient coordination, reduced rework, and a continuously deployable platform. This methodology ensured that **Sewa Setu** evolved in alignment with real-world social service needs, combining structured design with the flexibility essential for innovation.

4 Implementation and Testing

4.1 Introduction to Languages, IDEs, Tools and Technologies used for Project Work

The development of *Sewa Setu – Your Bridge to Serve* utilized modern web technologies and development tools that ensure performance, scalability, and ease of collaboration. The

project was built using the **MERN stack** — MongoDB, Express.js, React.js, and Node.js — which collectively provide an efficient full-stack development environment.

The following table lists the tools, languages, and technologies used throughout the project:

Table 3: Languages, IDEs, Tools and Technologies Used

Component	Description
Programming Languages	JavaScript, HTML5, CSS3 for frontend; Node.js for backend scripting.
Frontend Framework	React.js for developing dynamic user interfaces using components and hooks.
Backend Framework	Express.js for handling server-side logic and building RESTful APIs.
Database	MongoDB (NoSQL) for storing users, NGOs, donations, and campaign data.
Authentication	JSON Web Token (JWT) and bcrypt.js for secure user authentication and password hashing.
Visualization Libraries	Recharts and Chart.js for rendering analytical dashboards and progress visualization.
AI Integration	Hugging Face Transformers and Web Speech API for chatbot and voice assistance.
Styling Libraries	Tailwind CSS and Material UI for responsive and accessible user interfaces.
Notification System	Nodemailer and WebSockets for real-time in-app and email notifications.
Development Tools	Visual Studio Code as IDE, Git & GitHub for version control, and Postman for API testing.
Deployment Platforms	Vercel (Frontend), Render (Backend), and MongoDB Atlas (Database Hosting).
Reporting Tools	HTML2PDF and Node.js Cron Jobs for automated report generation in PDF/CSV formats.

These technologies collectively provided a robust environment for developing a high-performance, scalable, and interactive donation management platform.

4.2 Testing Techniques

Testing is an essential phase in software development that ensures system reliability, functionality, and user satisfaction. For this project, multiple testing methodologies were adopted, each focusing on different levels of the software architecture.

- **Unit Testing:** Each function, module, and API endpoint was individually tested using Postman and Jest to verify their correctness and expected output.
- **Integration Testing:** Conducted to ensure smooth interaction between frontend (React components) and backend (Node.js APIs), focusing on API calls, data synchronization, and authentication flow.
- **System Testing:** Verified the entire application's behavior under real-world usage, ensuring that all components work cohesively without system crashes or performance drops.
- **User Acceptance Testing (UAT):** Carried out with NGO representatives and donors to validate ease of navigation, clarity of reports, and responsiveness of the chatbot.
- **Security Testing:** Ensured encrypted password storage, JWT-based session management, and validation of restricted routes for role-based access control.
- **Performance Testing:** Monitored API response times and page loading speeds to ensure scalability under multiple concurrent requests.

Through these techniques, the system achieved high accuracy, stability, and reliability in a real-world test environment.

4.3 Test Cases

The test cases were designed to validate core functionalities such as registration, login, donation requests, report generation, and chatbot response. Each case was evaluated based

on expected vs. actual output.

Table 4: Sample Test Cases for Core Functionalities

Test Case No.	Test Description	Expected Result
1	User Registration with valid credentials	Account created successfully and redirected to login page
2	User Login with incorrect password	Display error message “Invalid Credentials”
3	Submit Donation Request	Request saved to database and confirmation email sent
4	NGO Approves Donation Request	Status updated to “Completed” and reflected in donor dashboard
5	Generate Monthly Report (Admin)	Auto-generated PDF displayed with all records
6	Chatbot User Query Handling	Displays accurate guidance for donation or registration steps
7	Content Moderation Check	Blocks or flags inappropriate words or media uploads
8	Leaderboard Update after Donation	User’s rank updated based on new points earned
9	Campaign Display on Campaign Launch	Campaign displayed to all registered users in View Campaigns Page
10	Voice Assistant Interaction	Responds to voice input and performs correct navigation
11	Notification Trigger on Request Updates	Notifications sent to users on change in the status of assistance or donation request
12	Donate Funds to a Campaign	Funds added to Campaign Account
13	Chat with NGO or other users	Chat messages notified and displayed on chat interface

All the designed test cases were executed successfully, and the outcomes consistently matched the expected results. This validates that each module of the system, including donation management, NGO registration, communication channels, gamification, and analytics dashboards, performs as intended. Both functional and non-functional requirements—such as usability, performance, reliability, and data integrity—were thoroughly verified during the testing phase.

The comprehensive testing process not only helped in identifying and resolving minor issues during integration but also ensured smooth interaction between all modules of the MERN-based architecture. The results demonstrate that the system is capable of handling concurrent users efficiently while maintaining security and responsiveness across different devices.

Hence, the implementation and testing phases collectively ensured that *Sewa Setu – Your Bridge to Serve* is a stable, secure, and scalable solution, ready for real-world deployment in promoting transparency, collaboration, and social impact within the community service ecosystem.

5 Results and Discussions

5.1 User Interface Representation

5.1.1 Brief Description of Various Modules of the System

The developed platform, *Sewa Setu – Your Bridge to Serve*, integrates multiple modules that work cohesively to ensure seamless interaction between NGOs, donors, volunteers, and beneficiaries. Each module is designed using the MERN (MongoDB, Express.js, React.js, Node.js) stack, ensuring scalability, interactivity, and a consistent user experience.

- **Authentication and Role-Based Access:** Provides secure login and registration workflows with email verification. Role-based access ensures that each user type—Admin, NGO, Donor, or Beneficiary—accesses only relevant features.
- **Campaign Management Module:** Allows NGOs to create, edit, and manage campaigns for donation drives or awareness programs. Users can register for active campaigns, and registration details are updated in real-time.
- **Assistance and Donation Requests:** Enables users to raise assistance or donation requests directed toward specific NGOs. Status tracking ensures transparency from request creation to fulfillment.
- **Payment Gateway Integration:** A secure payment system (Razorpay planned for final integration) facilitates donations directly to NGOs. Each successful transaction updates the database and triggers confirmation notifications.
- **Chat and Communication System:** Real-time chat using Socket.IO enables communication between NGOs, donors, and admins. The chat list displays ongoing conversations and new messages trigger notifications instantly.
- **Gamification and Leaderboards:** Introduces engagement-based reward systems. Users earn badges (Bronze, Silver, Gold, Platinum) and impact points for donations or volunteer activities. Leaderboards promote healthy competition.

- **NGO Dashboard:** Displays real-time analytics for NGOs, including donation statistics, ongoing campaigns, fulfilled requests, and community impact metrics. It simplifies activity tracking and decision-making.
- **Location Detection and Mapping:** Integrated using Leaflet API, it visualizes NGO and beneficiary locations on maps, enhancing request management and on-ground coordination.
- **Community Feed and Awareness Platform:** Users and NGOs can post updates, success stories, and awareness campaigns. The feed supports likes, comments, and shares, fostering a collaborative environment.
- **AI Chatbot and Voice Assistant:** A conversational assistant built using Hugging Face models assists users with queries related to donations, registration, and platform navigation via text and voice input.
- **Content Moderation Module:** Implements AI models (e.g., *toxic-bert*) to automatically flag or remove inappropriate posts or comments, maintaining a safe and trustworthy environment.
- **Notification and Alert System:** Real-time notifications inform users about campaign updates, donations, and new messages. Email alerts are also triggered for key actions like registration or donation success.
- **Report Generation and Impact Analytics:** Periodic reports (PDF/CSV) summarize NGO performance, donation flow, and campaign analytics. Public dashboards visually display community-level impact metrics.

5.1.2 Snapshots of the System with Discussion

The following figures illustrate key interfaces of the developed platform and demonstrate its functionality and design flow. Each snapshot represents a significant feature of the system, from authentication and profile management to campaign creation, donations, and real-time interactions.

Home Page: The *Home Page* of the system serves as the entry point for users and NGOs. It displays active campaigns, featured NGOs, and key engagement options, providing an intuitive overview of the platform's services.



Figure 11: Home Page Screen

Login and Email Verification: The authentication process includes a secure login and email verification mechanism. **Figure 12a** shows the mobile-friendly login interface, while **Figure 12b** depicts the email verification confirmation that ensures verified and trusted users on the platform.

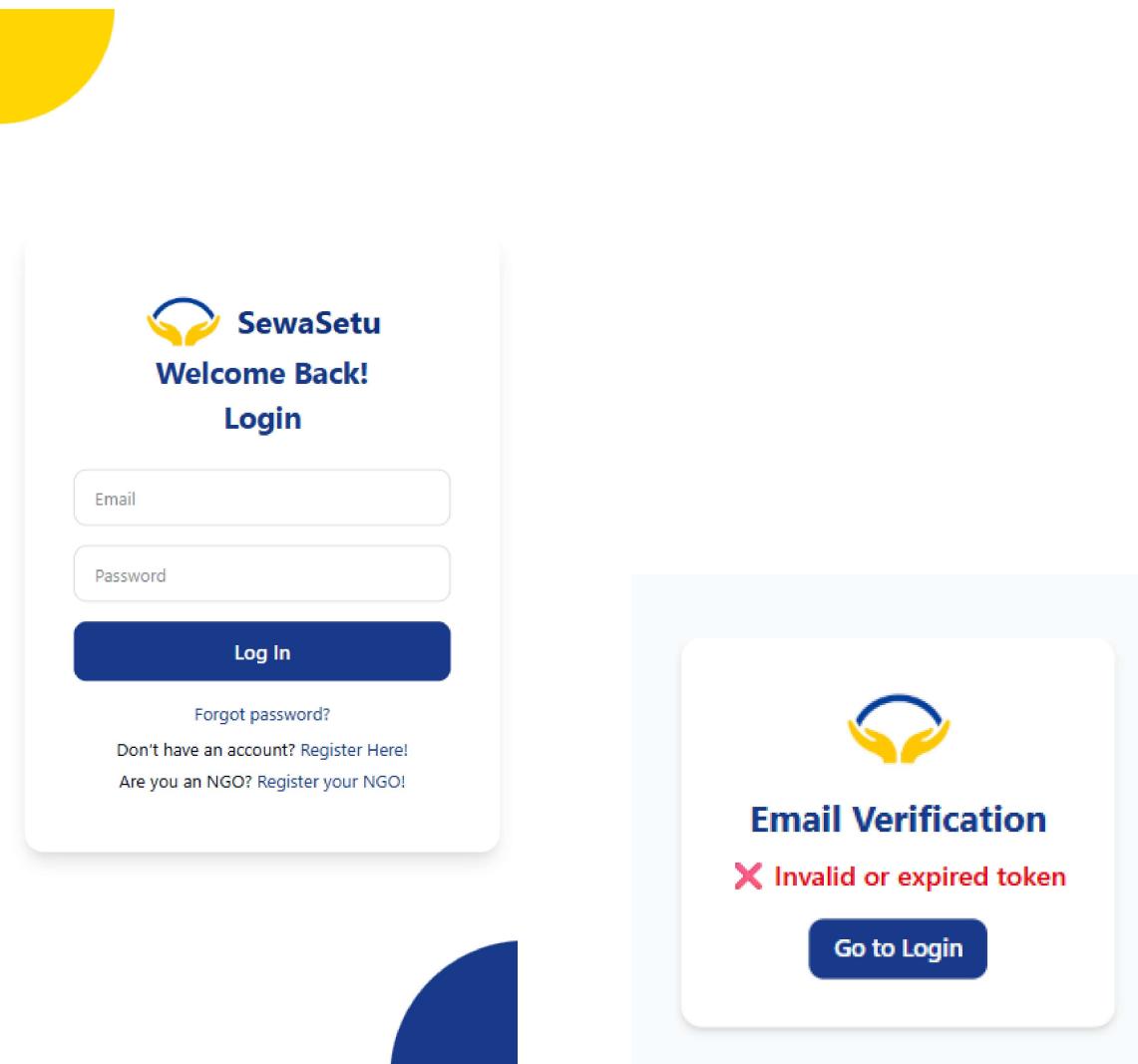
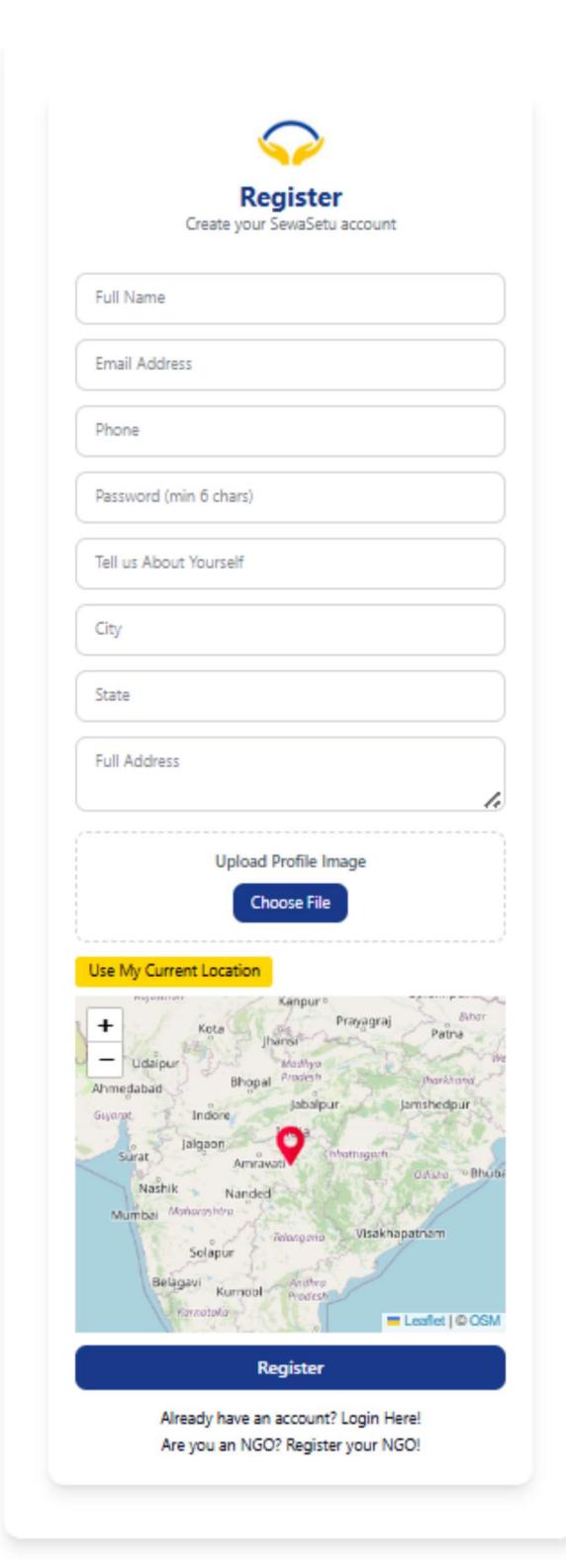


Figure 12: Login and Email Verification Result Screens

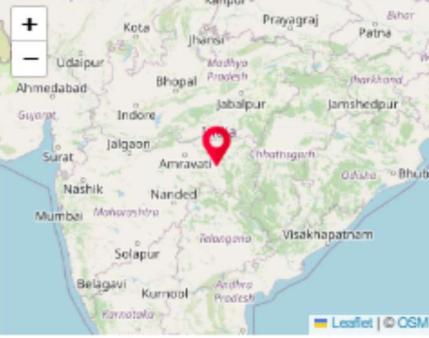
Registration: User and NGO registration are core onboarding processes for accessing the system. As shown in **Figures 13a** and **13b**, both interfaces capture essential details and perform validation checks to ensure authenticity and completeness.



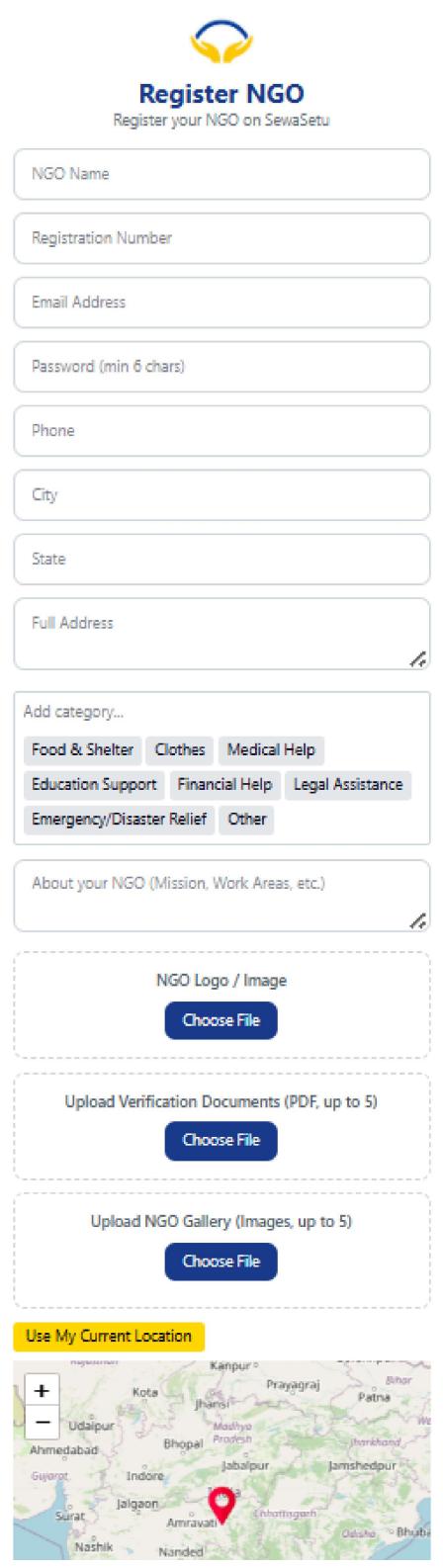
Register
Create your SewaSetu account

Full Name
Email Address
Phone
Password (min 6 chars)
Tell us About Yourself
City
State
Full Address

Upload Profile Image

Use My Current Location


Already have an account? [Login Here!](#)
Are you an NGO? [Register your NGO!](#)



Register NGO
Register your NGO on SewaSetu

NGO Name
Registration Number
Email Address
Password (min 6 chars)
Phone
City
State
Full Address

Add category...

About your NGO (Mission, Work Areas, etc.)

NGO Logo / Image

Upload Verification Documents (PDF, up to 5)

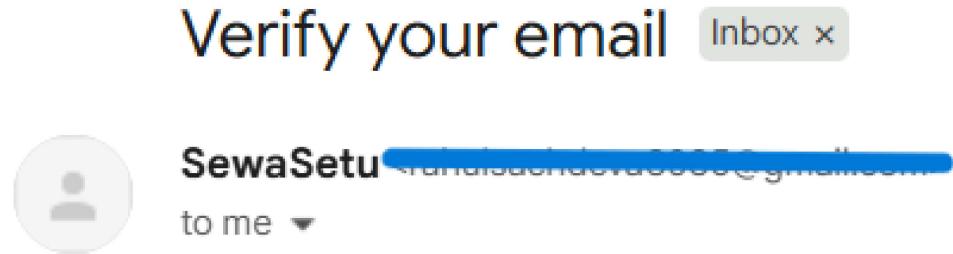
Upload NGO Gallery (Images, up to 5)

Use My Current Location


(a) User Registration Screen (b) NGO Registration Screen

Figure 13: User and NGO Registration Screens

Email Verification Flow: Once registered, users receive an automated email verification as shown in **Figure 14**, confirming successful authentication and activation of the account.



Email Verification

Hello Rahul Sachdeva,

Please verify your email by clicking the link below:

[Verify Email](#)

This link will expire in 1 hour.

Figure 14: Email Verification Screen

Profile Screens: Profile management allows users and NGOs to view, edit, and update their information. Figures 15, 16, and 17 display the editable user profile, mobile view, and NGO profile interface respectively, ensuring flexibility and personalization.

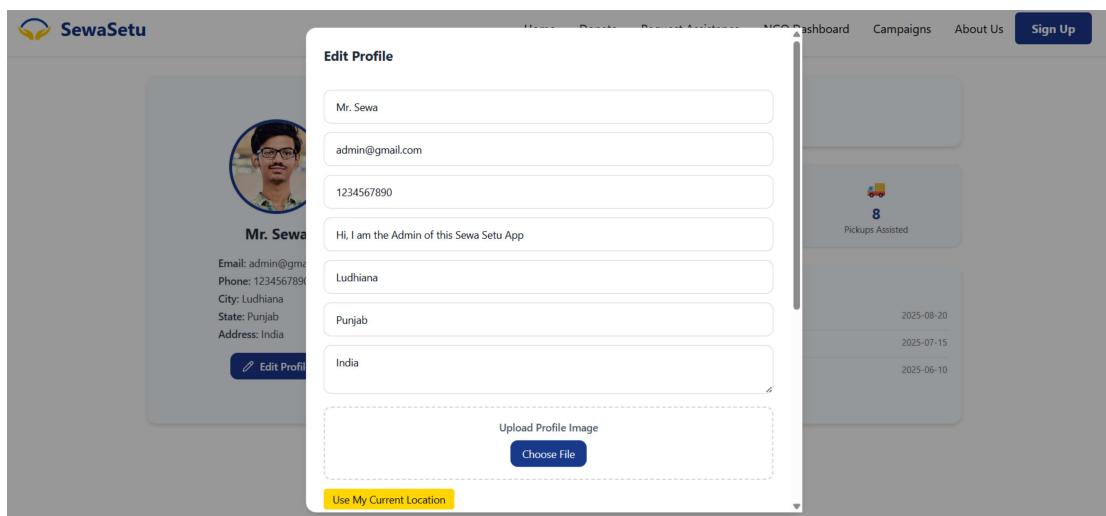


Figure 15: Edit Profile Screen





Mr. Sewa

Email: admin@gmail.com
 Phone: 1234567890
 City: Ludhiana
 State: Punjab
 Address: India

[Edit Profile](#)

About

Hi, I am the Admin of this Sewa Setu App



Recent Contributions

Donated Clothes to XYZ NGO 2025-08-20

Figure 16: User Profile Screen (Mobile)

SewaSetu
Home
Donate
Request Assistance
NGO Dashboard
Campaigns
About Us
Sign Up



Bal Raksha Bharat
"Empowering lives, changing futures."

PENDING

[Follow](#)

NGO Details

Registration No: 4561
 Email: sa.ngofoundation90@gmail.com
 Phone: 1231231234
 City: Ludhiana
 State: Punjab
 Address: D-61, East of Kailash, Ludhiana, Punjab

[About](#) [Campaigns](#) [Gallery](#) [Contributions](#) [Members](#)

About Us

Bal Raksha Bharat (globally known as Save the Children) works relentlessly to help educate and empower the marginalised children of India. Our work revolves around ensuring that children in need have improved access to equitable, safe and quality learning environment in our intervention areas. We work across 16 states with children, teachers, caregivers, parents, communities, and government representatives to help improve children's learning. We also work towards helping those children continue their schooling who dropped out of school for some reason.


Document 1


12
 Campaigns Run


340
 Donations Received


120
 Volunteers Engaged

Figure 17: NGO Profile Screen

NGO Management Screens: Figures 18 and 19 illustrate the NGO management module, which lists all registered organizations and pending verification requests. Admin-

istrators can manage approvals, ensuring legitimacy within the platform.

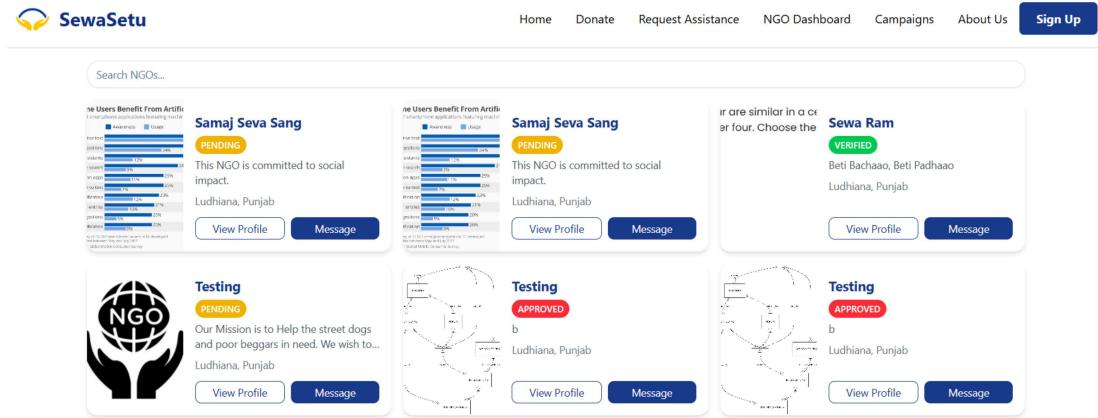


Figure 18: All NGO List Screen

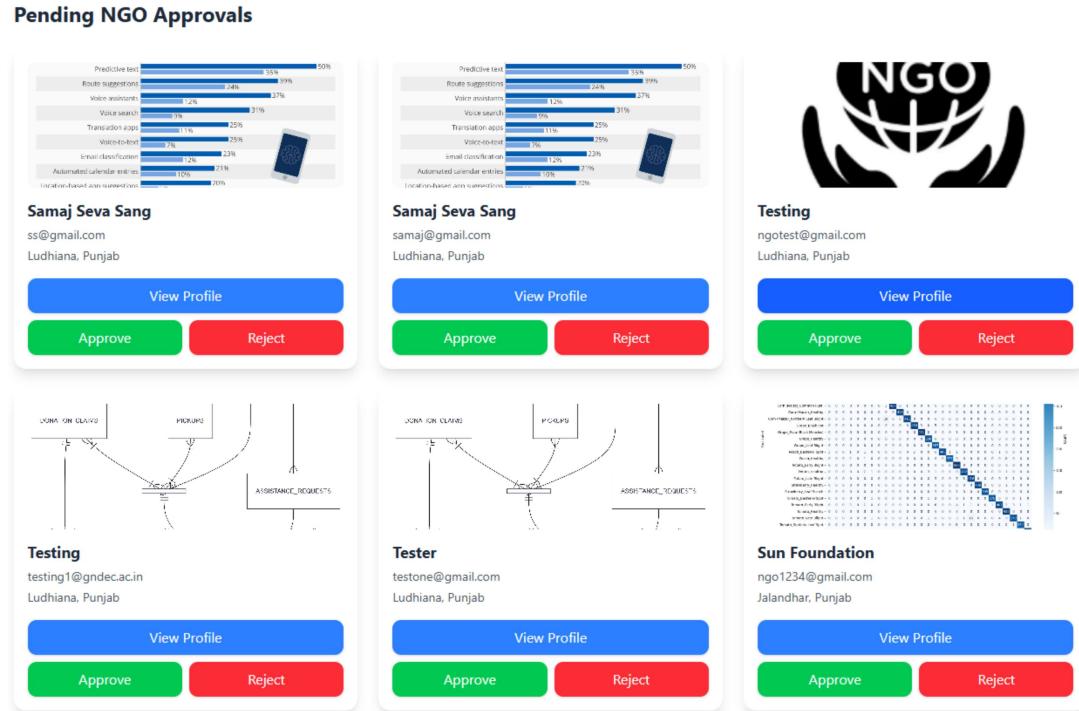


Figure 19: Pending NGO Screen

Campaigns Screens: Campaign management is a central feature of Sewa Setu. Figures 20–26 showcase campaign creation, editing, listing, and registration views, allowing NGOs to promote causes and track participation effectively.

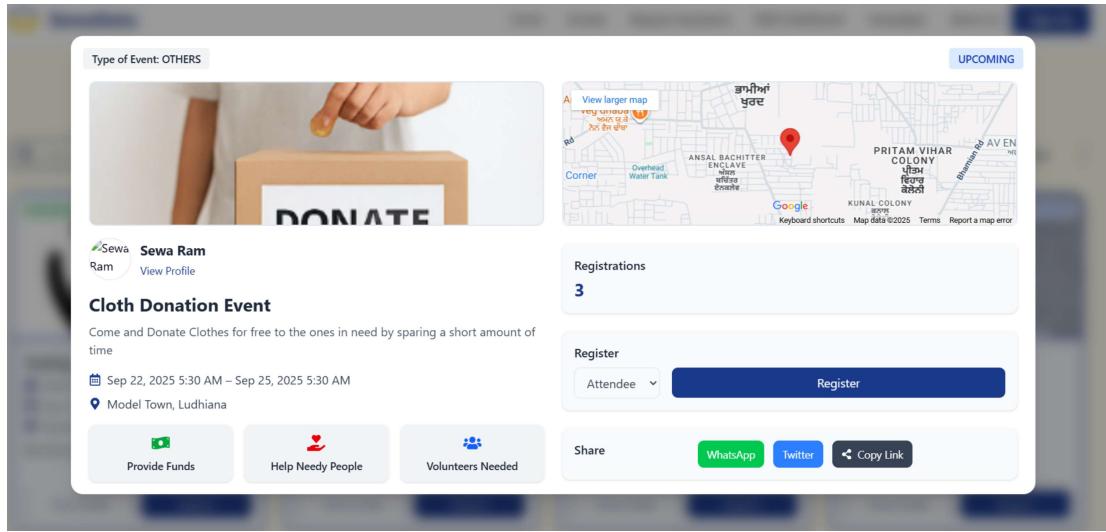


Figure 20: Campaign Card

The image shows the 'Discover Campaigns & Drives' section of the platform. At the top, there is a search bar with 'Search campaigns...' and filters for 'All Categories' and 'All Status'. Below are four campaign cards:

- FUNDRAISING**: 'Testing' by Sewa Ram (Sep 19, 2025 - Sep 24, 2025) at 'My Home'. Buttons: 'View Details', 'Register'.
- BLOOD DONATION**: 'Water Clothes Donation Drive 2025' by 'Hello' (Sep 2, 2025 - Sep 18, 2025) at 'Your Home'. Buttons: 'View Details', 'Register'.
- OTHERS**: 'Cloth Donation Event' by Sewa Ram (Sep 22, 2025 - Sep 25, 2025) at 'Model Town, Ludhiana'. Description: 'Come and Donate Clothes for free to the ones in need by sparing a short amount of time'. Buttons: 'View Details', 'Register'.
- MEDICAL CAMP**: 'Conversation Testing' by Sewa Ram (Sep 17, 2025 - Sep 30, 2025) at 'Your Home'. Description: 'let's talk'. Buttons: 'View Details', 'Register'.

Figure 21: Campaign List Screen

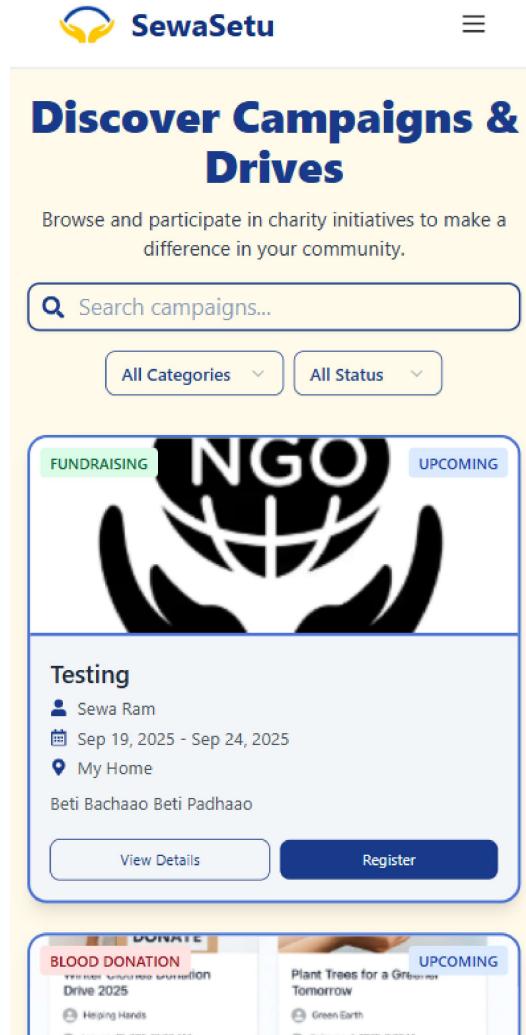


Figure 22: Campaign List Screen (Mobile)

Figure 23: Edit Campaign Screen



SewaSetu

≡

Create a New Campaign

Fill in the details below to start a new campaign for your NGO.

Basic Information

Title

Description

The Sun Foundation is going to Conduct a Blood Donation camp in Ludhiana on 5th October, 2025. Users are recommended to register here and come for the same.

Category

Dates & Address

Start Date

End Date

Address

Figure 24: Create Campaign Screen (Mobile)

My Campaigns

FOOD DRIVE UPCOMING



Welfare Club

update test
👤 Sewa Ram
📅 Sep 10, 2025 - Sep 29, 2025
📍 a
1

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FOOD DRIVE UPCOMING

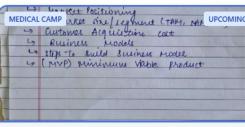


GURU NANAK ENGINEERING COLLEGE
10TH YEAR OF EXCELLENCE

Test
👤 Sewa Ram
📅 Sep 4, 2025 - Sep 11, 2025
📍 a
test

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OTHERS UPCOMING



Conversation Testing
👤 Sewa Ram
📅 Sep 17, 2025 - Sep 30, 2025
📍 Your Home
let's talk

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BLOOD DONATION UPCOMING



Welfare Club Blood Donation Drive 2025
👤 Helping Hands
📅 January 10, 2025, 10:00 AM
📍 123 Main St, New York
Collecting soon: clothes for the homeless

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FUNDRAISING UPCOMING



NGO

Plant Trees for a Greener Tomorrow
👤 Green Earth
📅 February 1, 2025, 9:00 AM
📍 Central Park, New York
The planting drive is open to all to help environment.

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OTHERS UPCOMING



Cloth Donation Event
👤 Sewa Ram
📅 Sep 22, 2025 - Sep 25, 2025
📍 Model Town, Ludhiana
Come and Donate Clothes for free to the ones in need by sparing a short amount of time

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Figure 25: Campaigns Created by Current NGO

Campaign Registrations					
Name	Email	Role	Status	Registered At	
Rahul Sharma	rahul@example.com	Volunteer	approved	9/15/2025	
Ananya Gupta	ananya@example.com	Participant	pending	9/18/2025	
Arjun Verma	arjun@example.com	Organizer	rejected	9/20/2025	

Figure 26: Campaign Registrations Screen

Assistance/Donation Screens: The assistance and donation modules form the operational backbone of the system. Figures 27–29 illustrate how users can request help, donate to campaigns, and choose verified NGOs to ensure their contributions reach the right place.

Need Help? Submit Your Request

Full Name

Phone

Email (optional)

Address

Current Location Coordinates (optional)

Use my location

Assistance Category

Describe Your Need

My car got shut down accidentally in a lonely road and not working, please help

Figure 27: Assistance Request Screen

Donate Items & Schedule Pickup

Full Name

John Doe

Phone / Email

1234567890 / email@example.com

Pickup Location

123 Main St, City

Item Type

Select Item Type

Description

Describe the items you want to donate

Quantity

1

Figure 28: Donation Create Screen

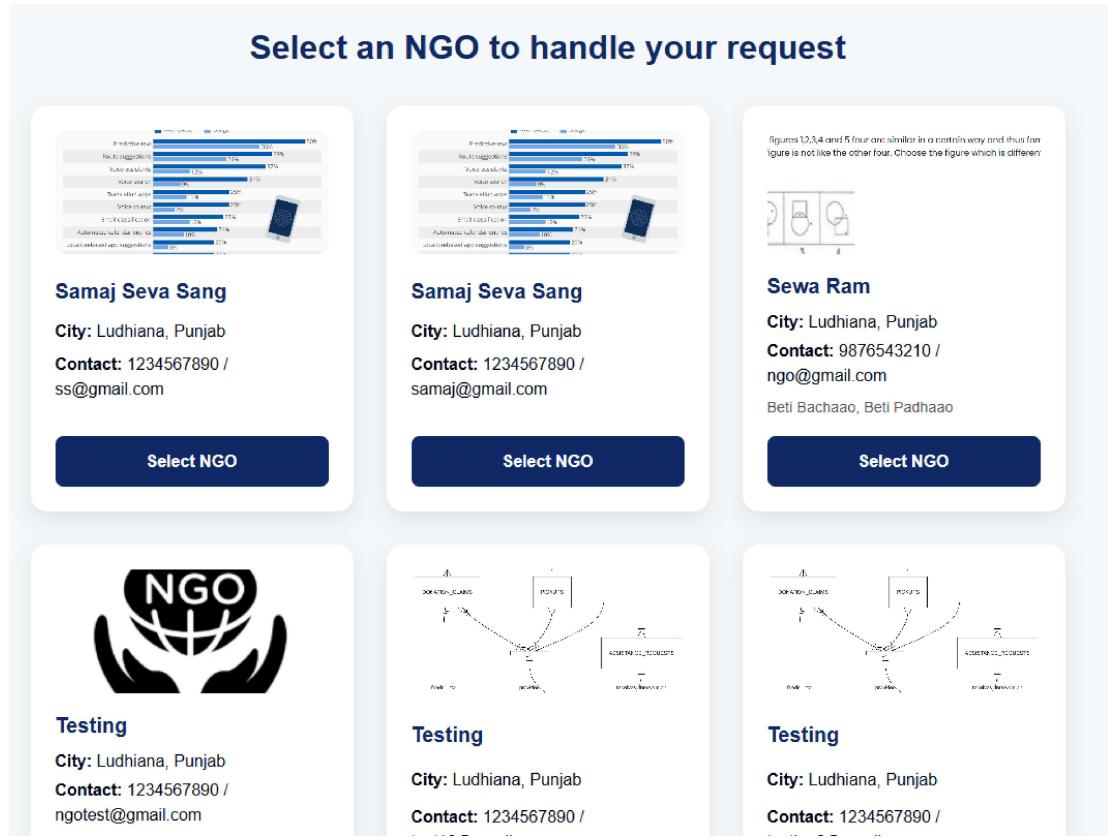


Figure 29: Select NGO for Assistance Request

Chat Screens: Finally, communication is supported through the integrated chat system. As shown in Figures 40–31b, users and NGOs can exchange messages seamlessly, with real-time updates and notifications enhancing collaboration and responsiveness.

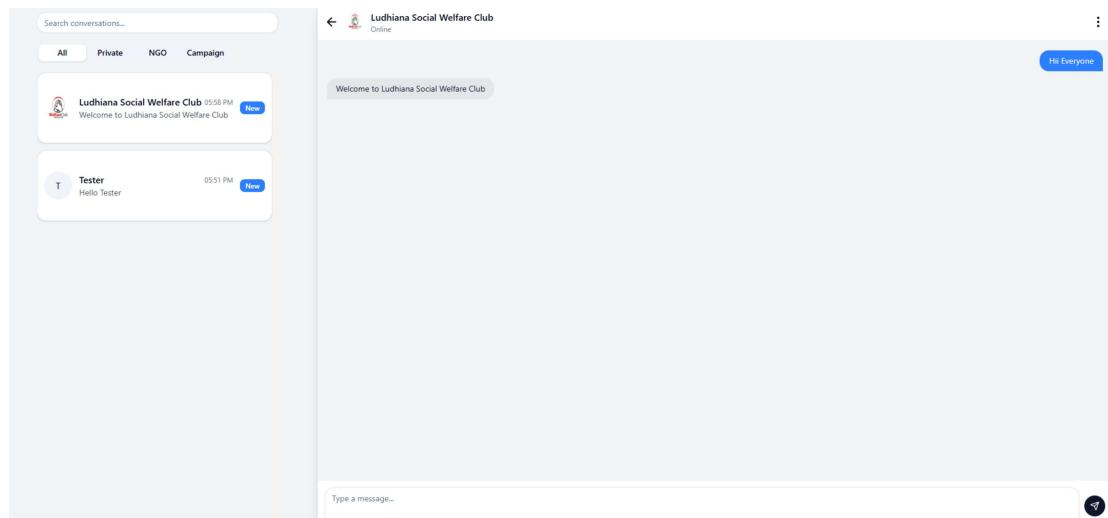


Figure 30: Chat Interface (Horizontal)

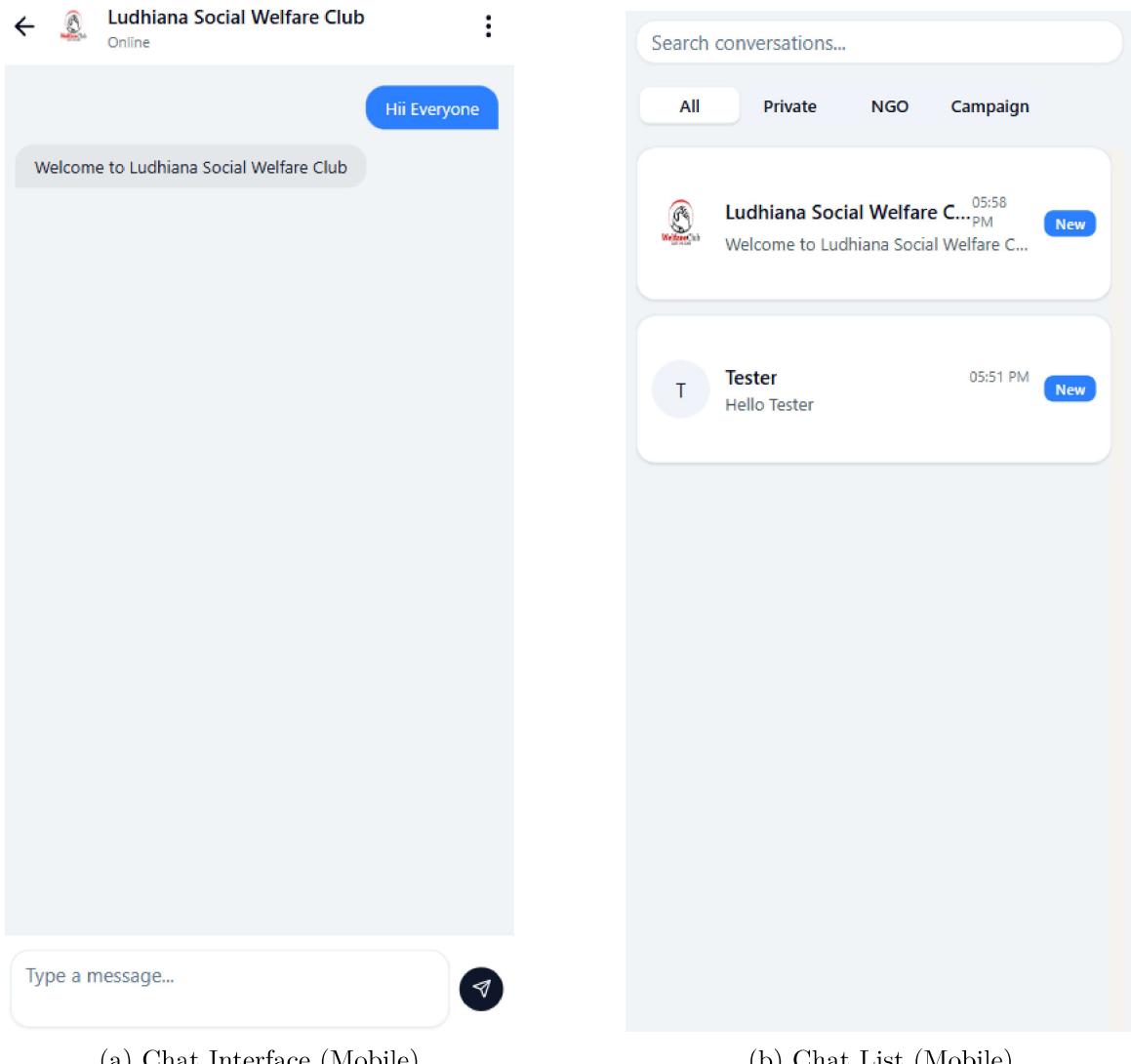


Figure 31: Chats Interface and List (Mobile)

Assistance Request Workflow and Notifications screen: The **Assistance Request Workflow** illustrates how users can raise requests for help, which are then routed to verified NGOs based on category and location. Each request progresses through stages such as submission, review, and action, ensuring transparency and efficient handling. Notifications are automatically triggered to inform users and NGOs about updates or responses related to their requests.

Your Requests & NGO Assistance Status

Request ID: 68d94013d33d7ca1b14a5b66
Category: Education Support
Description: Education support for my house help's kids.
Location: 123, Phase 1, Dugri, Ludhiana
Date Submitted: 9/28/2025

▼ NGOs Requested (1)
Bal Raksha Bharat
Status: Accepted

Request ID: 68d93f89d33d7ca1b14a5b3f
Category: Food & Shelter
Description: Food and shelter for dogs of my area.
Location: 123, Phase 3, South City, Ludhiana
Date Submitted: 9/28/2025

Figure 32: Assisstance Request Work Flow

Notifications 62

Assistance Request Completed
Your request "Food & Shelter" has been completed by NGO.
8 Nov 25, 06:29 pm

Assistance Request Scheduled
Your request "Food & Shelter" has been scheduled by NGO.
8 Nov 25, 06:28 pm

Assistance Request Accepted
Your request "Food & Shelter" has been accepted by NGO.

Figure 33: Notifications Screen

Gamification and Leaderboard Screen: The Gamification and Leaderboard Module adds an engaging element to the system by rewarding active users for their contributions and participation. The leaderboard ranks users based on their impact scores—calculated through donations, assistance provided, and campaign involvement—fostering healthy competition and sustained engagement. The **Badges Progress Bar** visually represents each

user's progress toward different achievement levels, such as "Active Donor" or "Top Volunteer." This feature encourages consistent interaction, promotes motivation among users, and builds a sense of community and recognition within the platform.

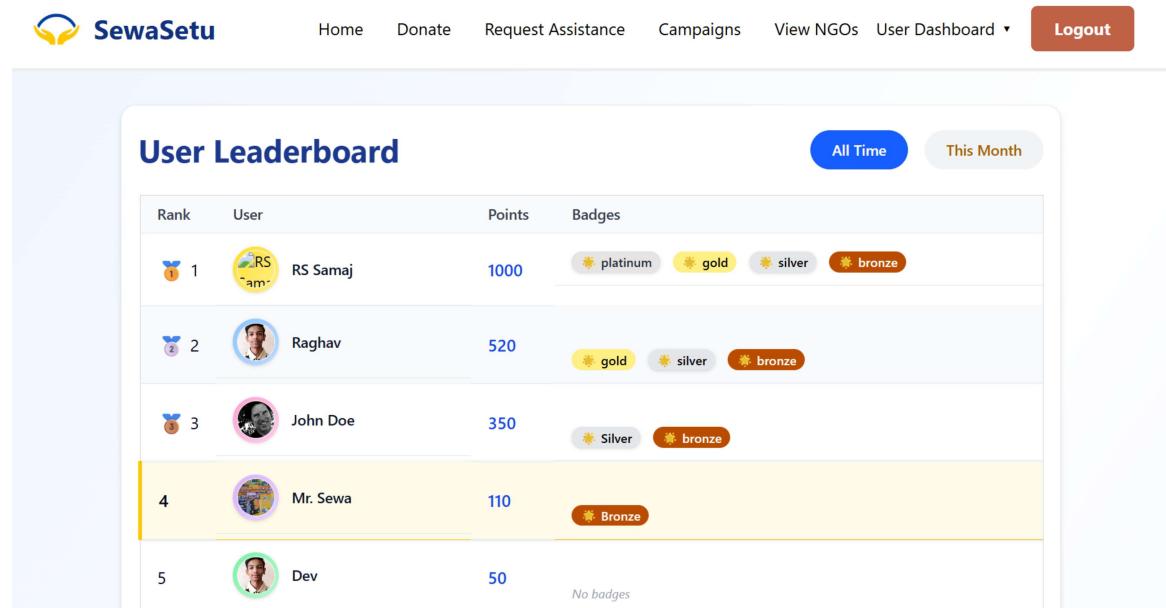


Figure 34: User Leaderboard



Mr. Sewa

Points: 110

Bronze

Progress to **Silver** badge: 110 / 300 pts



Email

user@gmail.com

Phone

1234567123

City

Figure 35: Badges Progress Bar

Chatbot Assistant: The **AI Chatbot Assistant** enhances user interaction and accessibility by providing automated guidance, real-time query resolution, and personalized navigation throughout the platform. Integrated with natural language processing capabilities, it assists users in exploring NGOs, joining campaigns, and initiating donations or

assistance requests with minimal manual effort.

The chatbot's interface includes an intuitive navigation panel (Figure 40) that allows users to select from predefined options or type custom queries. As shown in Figure 31a, the assistant processes these inputs to deliver relevant, context-aware responses—significantly improving overall usability and user engagement on the Sewa Setu platform.

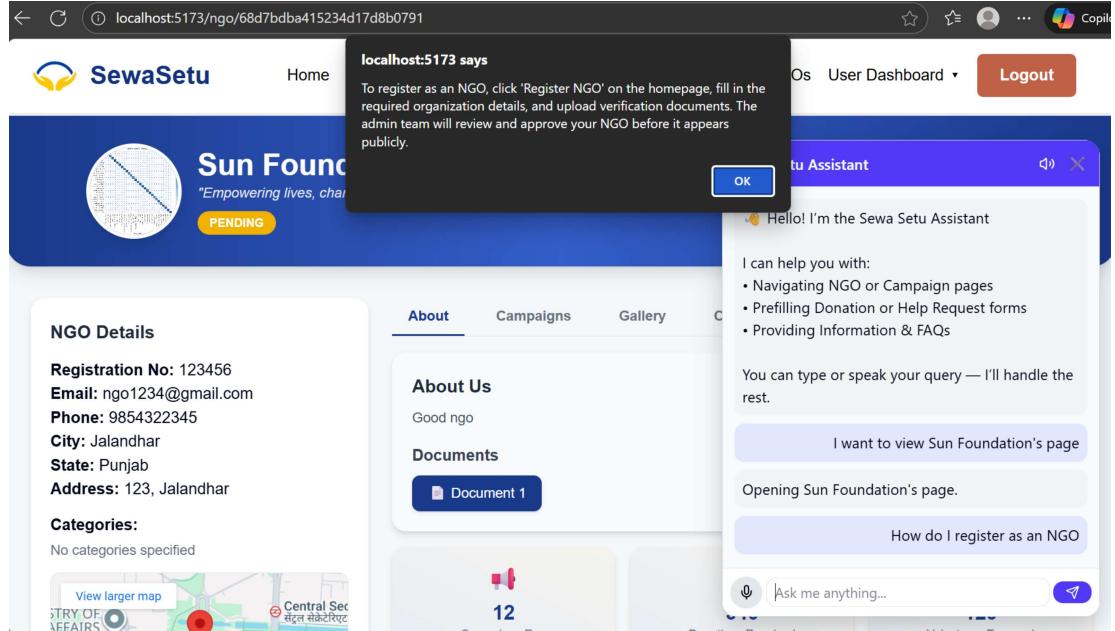


Figure 36: AI Assisstant Navigation

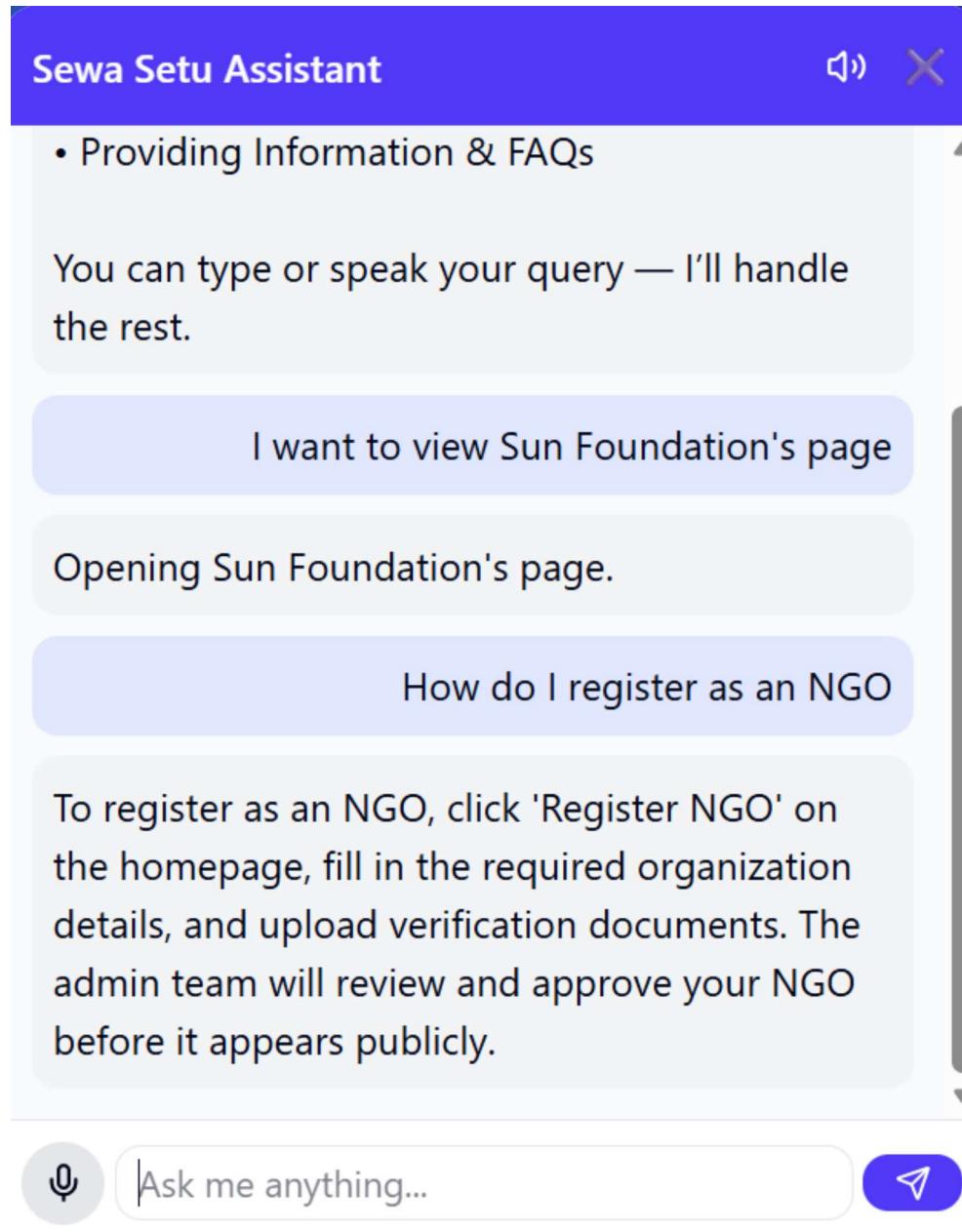


Figure 37: AI Assisstant Query Handling

Community and Awareness Module Screens: The **Community and Awareness Module** is designed to promote engagement, collaboration, and social awareness among users and NGOs on the platform. It enables NGOs to share impactful stories, updates, and posts that highlight their ongoing activities and achievements. Users can interact with these posts, fostering a sense of community participation and transparency in charitable initiatives.

As shown in Figure 40, users can easily create and publish posts through a clean and intuitive interface. Figure 31a illustrates how posts appear on the feed, ensuring visibility

and accessibility to all users. The story view feature allows users to explore NGO activities in a more interactive and narrative-driven manner, as depicted in the second subfigure.



Figure 38: Creating a Post

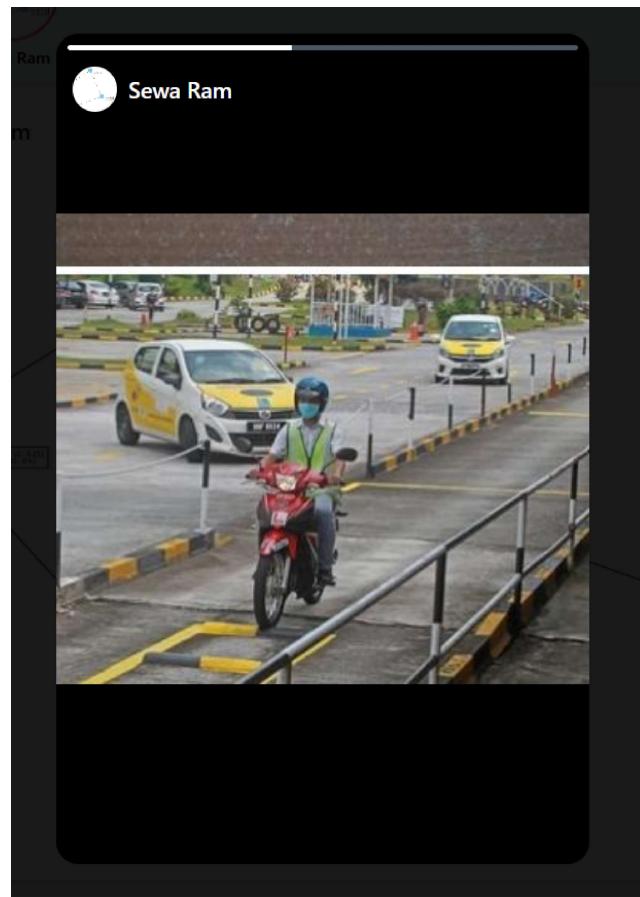


Figure 39: View Story

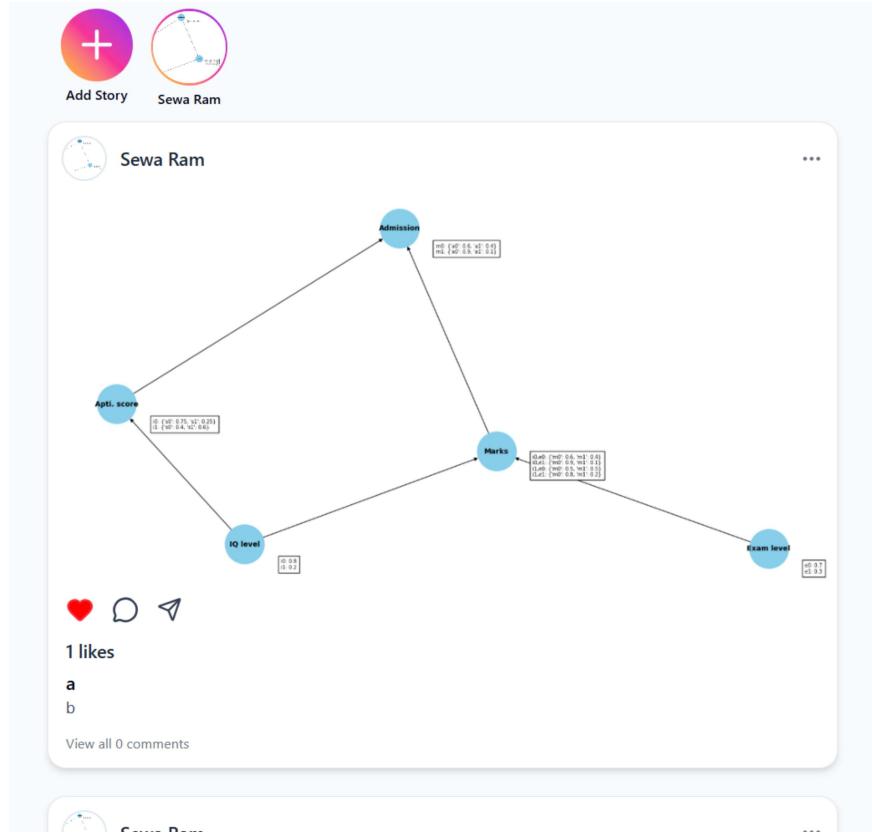


Figure 40: Posts on Feed Screen

Analytics and Dashboard Screens: The **Analytics and Dashboard Module** provides administrators and NGOs with insightful data visualization tools to monitor performance, assess engagement, and evaluate impact across campaigns and donations. It consolidates various analytics components, including summary cards, dashboards, and visual charts, to offer an at-a-glance understanding of platform activity and growth trends.

As illustrated in the following figures, the analytics section includes several key visual elements:

- **Analytics Cards:** Display quick statistics such as total donations, number of active campaigns, volunteer participation, and verified NGOs.
- **Analytics Dashboard:** Provides an integrated overview of system metrics and trends for administrators.
- **Dashboard Charts Screen:** Visualizes donor engagement, campaign reach, and category-wise distribution through interactive charts.

- **Line Chart:** Depicts donation trends or campaign growth over a period for better time-based analysis.

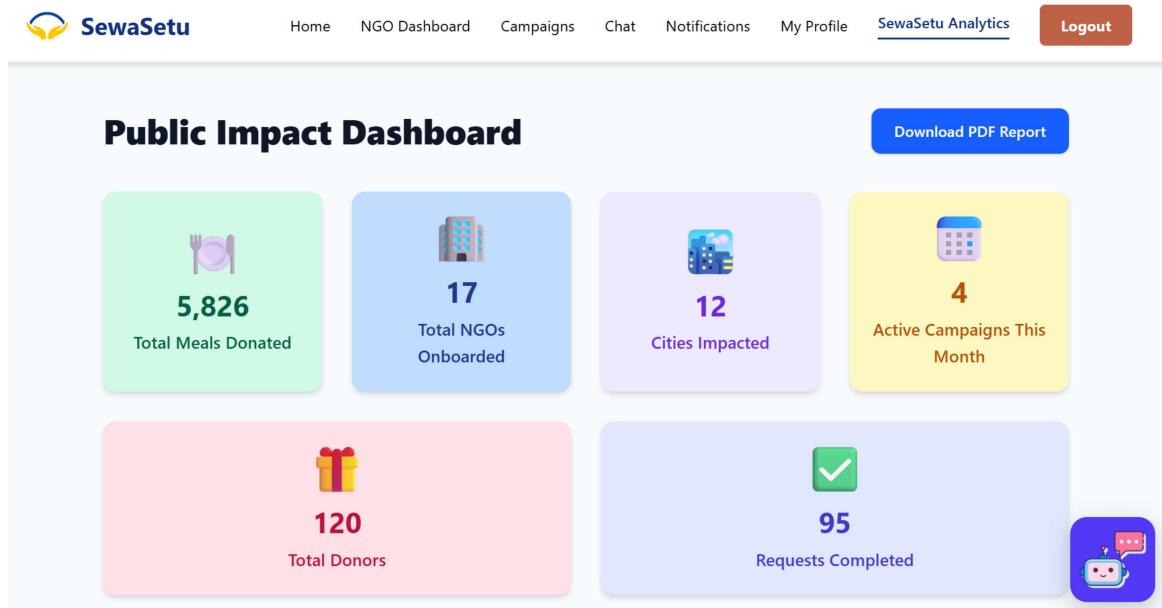


Figure 41: Analytics Cards Display

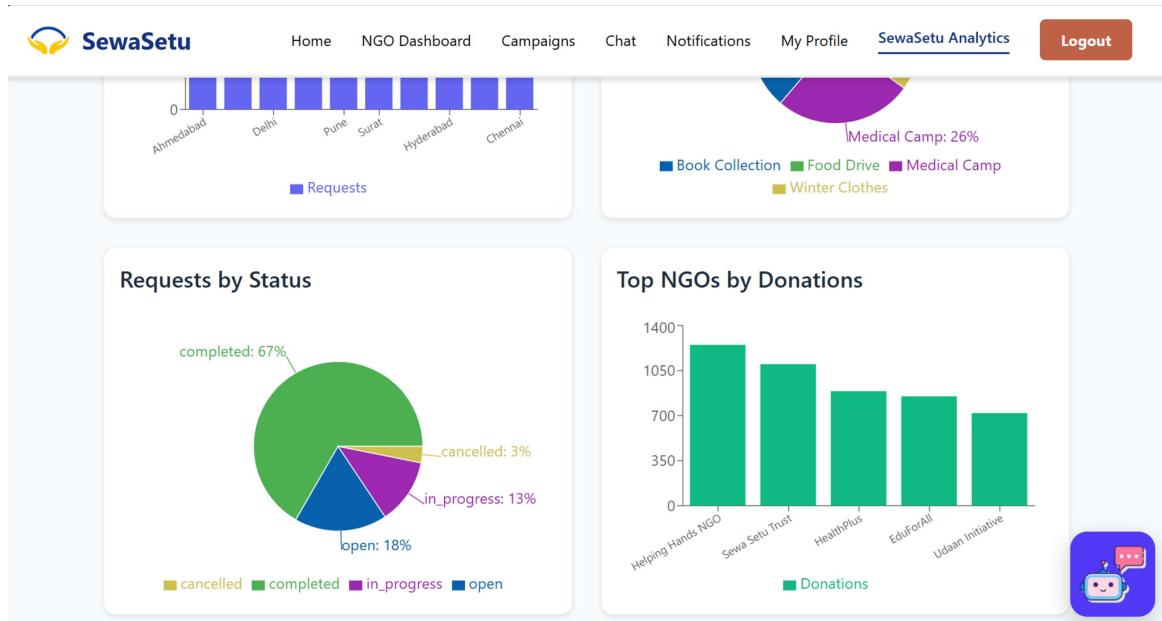


Figure 42: Analytics Dashboard Overview



Figure 43: Dashboard Charts Screen

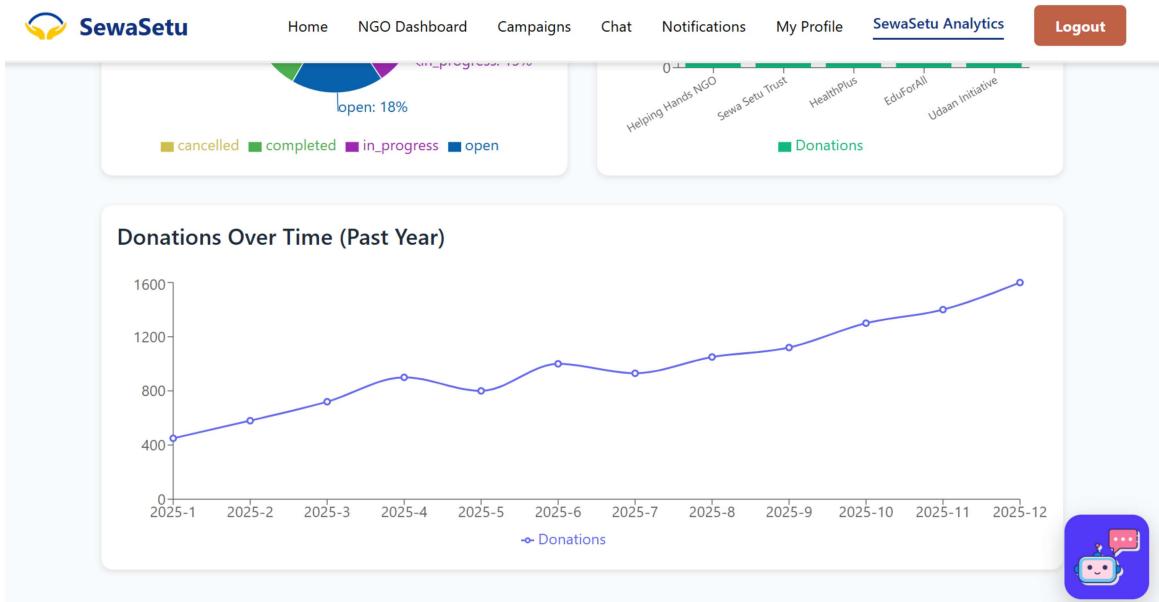


Figure 44: Line Chart Display for Donation Trends

5.2 Back-End Representation (Database)

5.2.1 Database Design Overview

The backend of the system is powered by **MongoDB**, a NoSQL document-oriented database, chosen for its flexibility, scalability, and ability to handle large volumes of semi-structured

data efficiently. MongoDB's schema-less structure and JSON-like documents make it ideal for the dynamic requirements of a web application like *Sewa Setu – Your Bridge to Serve*, where data entities such as users, NGOs, and campaigns may evolve over time with additional attributes or relationships.

The database design aims to ensure efficient data storage, retrieval, and management while maintaining the integrity and security of user and NGO-related information. Each collection within MongoDB represents a key functional entity of the platform, facilitating modularity and clarity in system operations. The design follows the principles of normalization where required while also leveraging MongoDB's embedded documents for optimizing read operations and minimizing the need for joins.

The backend structure is built to support **real-time synchronization, high concurrency, and scalability**. It interacts seamlessly with the Node.js server layer through the **Mongoose ODM (Object Data Modeling)** library, which provides schema validation, query building, and middleware functionalities. This approach ensures that the data remains consistent, validated, and synchronized across all modules, even under concurrent usage by multiple users.

To maintain system reliability, collections are interlinked logically through references (similar to foreign keys in relational databases). For example, each donation record is linked to a donor (from the `users` collection) and an NGO (from the `ngos` collection). Similarly, conversations, messages, and notifications are tied to specific users or campaigns, ensuring contextual relevance and traceability of data.

The project also implements secure handling of sensitive data, including user credentials and payment information, using hashing and token-based authentication mechanisms. Regular backups and data validation checks are performed to preserve integrity and prevent data loss or corruption.

The database schema was designed with scalability in mind, allowing new modules—such as AI recommendation systems, automated report analytics, or government-linked NGO verification—to be integrated with minimal structural changes. The modular collection-based design allows future updates without disrupting existing functionalities.

The following collections (tables) were created as part of the system's backend: Each of these collections is interconnected logically to maintain data consistency and sup-

Table 5: List of Database Collections and Their Descriptions

S.No.	Collection Name	Description / Purpose
1	assistancerequests	Stores details of help or assistance requests raised by beneficiaries or NGOs.
2	campaigns	Contains information about ongoing or completed campaigns initiated by NGOs or users.
3	comments	Keeps records of user comments made on posts or campaigns to promote interaction.
4	conversations	Manages user-to-user or user-to-NGO conversation metadata for chat sessions.
5	donations	Records all donation transactions, including donor details, amount, and associated campaign.
6	funds	Tracks the total funds collected, utilized, and remaining for transparency and analytics.
7	likes	Maintains data about user likes or reactions on posts and campaign updates.
8	messages	Stores the actual message content exchanged within each conversation.
9	ngos	Contains verified information about registered NGOs, including credentials and contact details.
10	notifications	Handles system and user notifications related to campaigns, donations, and assistance requests.
11	posts	Stores awareness posts, updates, or announcements shared by NGOs or users.
12	requesthandlings	Tracks the status and progress of assistance requests being managed by NGOs or volunteers.
13	userdonationhandlings	Maintains records of user-specific donation tracking, acknowledgments, and receipts.
14	users	Contains authentication details and profile information of all registered users and volunteers.

port operations like campaign tracking, donation analytics, and real-time communication. The modular schema design further ensures that the system can easily integrate additional features, such as AI-based donor recommendations and community insights, in the future.

5.3 Discussion

The developed system, *Sewa Setu – Your Bridge to Serve*, effectively fulfills its core objectives of creating a unified and transparent digital ecosystem that connects NGOs, donors, volunteers, and beneficiaries on a single platform. The integration of multiple modules—such as donation tracking, campaign management, assistance requests, and real-time communication—has enabled the system to address major limitations of traditional social welfare platforms, including lack of transparency, poor coordination, and limited outreach.

The use of the MERN stack (MongoDB, Express.js, React.js, Node.js) has significantly enhanced the system's scalability, modularity, and performance. Each layer operates independently yet interacts seamlessly through well-defined APIs, allowing real-time synchronization of data between users and NGOs. The backend ensures robust data handling through structured collections, while the frontend provides a responsive and intuitive interface for users across devices. The choice of MongoDB supports dynamic schema management, enabling future modifications or additions to be integrated without restructuring the database.

The inclusion of AI-powered components—such as content moderation and the chatbot module—adds a layer of automation and intelligence to the platform. The moderation system ensures a safe and inclusive environment by filtering inappropriate or harmful content, while the chatbot (planned for full deployment in the next phase) aims to improve accessibility and user support. Together, these features enhance operational efficiency and promote a positive user experience.

Gamification elements, including leaderboards, points, and achievement badges, play a vital role in sustaining user engagement and encouraging long-term participation. This design choice transforms community service into an interactive and rewarding experience, ultimately fostering a stronger sense of responsibility and contribution among users. The inclusion of data visualization and analytical dashboards provides real-time insights into the overall impact—such as total donations, campaigns completed, and beneficiaries served—promoting accountability and awareness.

From a development standpoint, the project demonstrates successful implementation of

RESTful APIs, modular code organization, and secure authentication mechanisms. Each functional module underwent rigorous testing to ensure reliability, accuracy, and security in data operations. The results confirmed that the system performs effectively under typical user scenarios, validating both its functional and non-functional requirements.

Looking forward, the system holds substantial potential for expansion and integration with external platforms. Future enhancements may include full-scale integration of payment gateways for seamless monetary transactions, deployment of a multilingual AI chatbot, and linking with government databases for NGO verification and regulatory compliance. Additionally, incorporating predictive analytics and AI-driven recommendations can further optimize donation matching and resource allocation.

Overall, the system has successfully demonstrated how technology can be leveraged to streamline social welfare processes, enhance transparency, and promote sustainable community engagement. With continued development and real-world deployment, *Sewa Setu* can evolve into a large-scale, data-driven ecosystem that strengthens collaboration between NGOs, donors, and the communities they serve.

6 Conclusion

The project “*Sewa Setu – Your Bridge to Serve*” has been successfully designed, developed, and implemented as a dynamic digital platform that bridges the gap between Non-Governmental Organizations (NGOs), donors, and beneficiaries. The system serves as a unified and interactive environment aimed at fostering transparency, accountability, and engagement in the domain of social welfare and charitable activities.

Through its intuitive and modular design, *Sewa Setu* streamlines the process of connecting individuals who are willing to contribute with those in need of assistance. By integrating technological innovation with social responsibility, the platform aspires to create a digital ecosystem that not only supports donation management but also builds trust, awareness, and active participation within the community.

Developed using the **MERN stack**—MongoDB, Express.js, React.js, and Node.js—the platform leverages the strengths of each component to ensure efficiency, responsiveness, and scalability. The backend handles complex operations such as authentication, authorization, and automated report generation, while the frontend ensures an engaging user interface for effortless navigation. The use of RESTful APIs facilitates seamless communication between the client and server, providing a smooth user experience and real-time data updates.

One of the standout features of this system is the integration of **AI-powered modules** that support intelligent user verification and assistive voice-based interaction. These modules enhance accessibility and help maintain authenticity within the platform. The inclusion of a **gamification and leaderboard system** further promotes participation by rewarding consistent contributors through badges, points, and rankings. This encourages long-term engagement and adds an element of motivation and recognition for users and NGOs alike.

In addition, the project incorporates a robust **data analytics and visualization module**, enabling administrators to monitor activities, analyze donation trends, and generate insights for improved decision-making. The dashboards created using Recharts and Chart.js make data interpretation easier and more transparent, thereby strengthening accountability and trust among all stakeholders.

Comprehensive testing and validation confirmed that all modules of the system func-

tion accurately and reliably under various scenarios. The system demonstrates desirable attributes such as scalability, maintainability, and fault tolerance. Security mechanisms like **JWT-based authentication**, encrypted communication, and role-based access control ensure that sensitive data remains protected at all times.

From a social perspective, *Sewa Setu* plays a vital role in fostering collaboration between NGOs and donors. The platform not only simplifies the donation process but also serves as a space for sharing stories, updates, and awareness campaigns, thereby promoting a culture of empathy and inclusivity. It empowers organizations to manage operations digitally while allowing individuals to make meaningful contributions with confidence.

In conclusion, *Sewa Setu – Your Bridge to Serve* embodies the vision of leveraging technology for social impact. By merging modern web technologies with human-centered design, the platform stands as a step forward in building a transparent, efficient, and compassionate system for service and support. Future enhancements may include the integration of blockchain for donation traceability, AI-driven recommendation systems for personalized engagement, and multilingual support to reach a wider audience.

Overall, the successful implementation of this project demonstrates how innovation, when directed towards the greater good, can make social contribution more organized, accessible, and impactful in the digital age.

7 Future Scope

While the current version of *Sewa Setu – Your Bridge to Serve* successfully delivers an integrated and efficient system for connecting NGOs, donors, and beneficiaries, there remains substantial potential for enhancement and expansion. Future development efforts can focus on refining the platform's intelligence, security, scalability, and inclusivity to make it even more impactful and sustainable. Some of the major areas for future improvement include:

- **AI Optimization and Personalization:** The existing AI modules can be expanded to include smart recommendation engines that suggest relevant NGOs, campaigns, or volunteering opportunities to users based on their interests, donation history, and engagement patterns. Machine learning models could also predict donation trends and help NGOs forecast campaign outcomes.
- **Advanced Impact Analytics and Visualization:** Future iterations can integrate predictive analytics and advanced visualization dashboards to provide NGOs and administrators with actionable insights. These tools can help evaluate campaign performance, identify underrepresented causes, measure social impact in real time, and optimize fundraising strategies through data-driven decision-making.
- **Enhanced Security and Verification Mechanisms:** With the growing emphasis on data privacy and user trust, implementing advanced security features such as multi-factor authentication (MFA), biometric verification, and blockchain-based transaction logging would further strengthen system integrity. AI-powered anomaly detection can also help identify fraudulent activities or suspicious transactions efficiently.
- **Integration with External APIs and Services:** The platform can be extended by integrating with external APIs such as geolocation-based volunteer mapping systems, CSR (Corporate Social Responsibility) networks, payment gateways, or government welfare databases. Such integrations can widen the platform's utility, enabling cross-platform collaboration and expanding its reach and credibility.
- **Scalability for Nationwide or Global Deployment:** As the platform gains traction

tion, architectural enhancements like cloud-based microservices, containerization, and load balancing could be implemented to support large-scale deployment. This would enable seamless performance even under heavy traffic, making the system suitable for state-level, national, or even international adoption.

- **Sustainability and Community Expansion:** Beyond technological improvements, the long-term success of *Sewa Setu* depends on fostering a self-sustaining community. Future efforts can include forming strategic partnerships with local NGOs, educational institutions, and corporations to promote community-driven initiatives and long-term engagement. Introducing awareness drives and recognition programs can also help maintain user motivation and loyalty.
- **Mobile Application and Multilingual Support:** Developing a dedicated mobile application and incorporating multilingual capabilities would ensure accessibility for users across different regions and linguistic backgrounds. This would enhance inclusivity and bring the benefits of the platform to a broader audience, including rural and less digitally literate communities.

In essence, the future evolution of *Sewa Setu* lies in combining technological advancement with social inclusivity. By embracing AI-driven personalization, stronger security, large-scale scalability, and community empowerment, the platform can continue to grow as a reliable and transformative tool for social service in the digital era.

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