VIVEKANAND EDUCATION SOCIETY
INSTITUTE OF TECHNOLOGY (AUTONOMOUS)

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

Full Stack Developement

ImpactSphere

Platform to connect NGOs, Donors and Volunteers

31- Leena Hinduja

43- Aditi Masand

44- Monica Mewani

under the guidance of

Mrs. Pooja Prajapati

Department of Information Technology

Vivekanand Education Society's Institute of Technology-2025-2026

(Affiliated to University of Mumbai, Approved by AICTE & Recognized by Govt. of Maharashtra)

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1. Abstract

The *ImpactSphere* platform represents a new generation of digital ecosystems built to strengthen trust, transparency, and collaboration among NGOs, donors, and volunteers. The mission of ImpactSphere is to enable measurable social impact through verified campaigns, transparent donation tracking, and gamified participation. The system blends modern web technologies, emotional storytelling, and data-driven insights to connect people who care with causes that matter.

Drawing inspiration from renowned platforms like *GlobalGiving* (for transparency and impact storytelling), *GoFundMe* (for emotional narrative and seamless donation flow), *Ketto* (for accessibility and inclusivity), and *Benevity* (for CSR and analytics), ImpactSphere merges their strengths into one unified, trust-centered experience.

The platform integrates features such as AI-assisted NGO verification, blockchain-inspired donation ledgers, gamified volunteer engagement, and personalized AI-driven recommendations for donors. Each user — whether NGO, donor, volunteer, or corporate partner — experiences a personalized dashboard showcasing their impact metrics, progress, and achievements.

From a technical perspective, ImpactSphere employs a modern MERN/Django architecture with secure authentication, real-time communication, and responsive design. It incorporates accessibility, multilingual support, and data visualization to ensure inclusivity and engagement across all demographics. Through a focus on ethical design, transparency, and measurable impact, ImpactSphere aims to redefine how digital philanthropy and volunteering intersect in the modern world.

2. Introduction

In today's rapidly evolving digital world, social impact organizations face major challenges in building trust, maintaining transparency, and sustaining engagement from donors and volunteers. Many NGOs operate on fragmented systems that make it difficult for contributors to verify authenticity, track impact, or engage meaningfully with causes. Similarly, volunteers often lack recognition for their contributions, while donors are left uncertain about the real-world outcomes of their support.

ImpactSphere was conceptualized to bridge this gap — to build a unified, transparent, and gamified digital ecosystem that connects NGOs, donors, volunteers, and administrators under one reliable platform. The platform's purpose is to simplify discovery, foster trust through verified data, and encourage long-term participation through rewarding and measurable experiences.

Unlike traditional crowdfunding or volunteering portals, ImpactSphere integrates *verified campaigns*, *AI-powered personalization*, and a *blockchain-inspired donation ledger* for transparency. NGOs can

manage their profiles, publish verified campaigns, and access detailed analytics on donor and volunteer engagement. Donors can explore authentic causes through AI-curated feeds, track their donation journeys, and view tangible impact metrics. Volunteers can register for events, record hours, earn recognition badges, and build a digital impact portfolio.

ImpactSphere's mission is to create a self-sustaining digital ecosystem that enhances trust, collaboration, and measurable social change. The platform leverages advanced web technologies, accessible design, and data-driven insights to empower communities to act together for global good — ensuring that every act of giving, volunteering, or organizing leaves a verifiable and lasting impact.

Experiment Mapping:

3. **Experiment 4:** REST API Design with MongoDB + Mongoose Integration
4. **Experiment 5:** Creation of Secure RESTful APIs
5. **Experiment 6:** Authentication and User Roles with JWT
6. **Experiment 8:** WebSocket for Real-Time Communication
7. **Experiment 9 & 10:** CI/CD and Docker Deployment

3. Objectives:

The primary objective of *ImpactSphere* is to design and develop a trust-centered digital platform that unites NGOs, donors, and volunteers in one collaborative ecosystem. The system emphasizes transparency, measurable outcomes, and engagement-driven design to ensure every action leads to real-world impact. To achieve this, the project pursues the following specific objectives:

1. **Unified Digital Ecosystem** – Build an integrated web platform that connects NGOs, donors, volunteers, and administrators, ensuring streamlined interactions and verified information.

2. **Enhanced Transparency** – Implement verified NGO registrations, AI-assisted document screening, and blockchain-inspired donation tracking to establish authenticity and donor confidence.

3. **Gamified Engagement** – Introduce badges, leaderboards, and point-based reward systems to motivate volunteers and donors while recognizing consistent contributions.

4. **Personalized Experience** – Develop AI-driven recommendation systems that help donors and volunteers discover causes aligned with their values, location, and activity history.

5. **Data-Driven Insights** – Provide NGOs and administrators with analytical dashboards to monitor donations, volunteer activity, and overall impact through visual metrics.

6. **Secure Transactions & Privacy** – Ensure data integrity, secure authentication (JWT + MFA), and encrypted transactions using standard compliance protocols (e.g., Stripe integration for payments).

7. **Accessibility & Inclusivity** – Deliver a multilingual, mobile-responsive, and WCAG-compliant user interface to ensure equitable access across demographics and regions.

8. **Scalability & Maintainability** – Utilize modular architecture with Node.js or Django REST Framework, React.js frontend, and PostgreSQL or Firebase backend for sustainable growth and performance.

4. System Overview

The *ImpactSphere* platform is designed as a modern, modular, and scalable full-stack web application that connects NGOs, donors, volunteers, and administrators in a unified digital ecosystem. The architecture emphasizes transparency, usability, and performance through a layered structure that integrates intelligent analytics, gamification, and secure interaction flows.

1. System Architecture

The platform follows a multi-tier architecture consisting of:

- **Frontend Layer:** Developed using React.js with TailwindCSS for styling and Framer Motion for smooth micro-animations. The frontend delivers a responsive, accessible, and visually engaging user experience with adaptive dashboards for each role (NGO, Donor, Volunteer, Admin).

- **Backend Layer:** Built on Node.js (Express.js) or Django REST Framework, the backend exposes RESTful APIs responsible for authentication, data management, and business logic. It also manages verification workflows, donation records, volunteer events, and gamified point systems.

- **Database Layer:** Utilizes PostgreSQL or Firebase Firestore for relational and document-based data storage. Key entities include Users, NGOs, Campaigns, Donations, Events, and Impact Metrics.

- **Integration Layer:** Connects external services such as Stripe (for payments), SendGrid (for email), AWS S3 (for media storage), and OpenAI (for AI-driven recommendations and chat assistance).

- **Deployment & Hosting:** The frontend is deployed on Vercel, while backend services and databases are hosted on AWS or Google Cloud for scalability and fault tolerance.

2. Key Platform Modules

- **Authentication & Role Management:** Secure registration and login using JWT and MFA for Donors, Volunteers, NGOs, Admins, and Corporates.

- **NGO Verification System:** Includes AI-assisted document analysis and an admin approval workflow to ensure legitimacy and trustworthiness.

- **Campaign Management:** NGOs can create, edit, and manage fundraising campaigns with multimedia content and progress tracking.

- **Donation Management:** Secure payment flow through Stripe API with receipt generation and blockchain-inspired donation ledger for transparency.

- **Volunteer Management:** Volunteers can browse opportunities, register for events, check in using QR codes, and track their hours and achievements.

- **Gamification Module:** Award Impact Points, badges, and ranks to encourage engagement and long-term participation.

- **Analytics & Reporting:** Dashboards provide insights into donations, volunteer activity, NGO growth, and community impact.

- **AI Chat Assistant:** Personalized support and recommendations for discovering campaigns or managing platform tasks.

3. User Roles and Access Flow

- **NGOs:** Register, get verified, manage campaigns and events, track donations, and interact with supporters.

- **Donors:** Explore campaigns, make secure donations, and view real-time impact data through personalized dashboards.

- **Volunteers:** Find opportunities, register for events, earn points, and build a verified portfolio of contributions.

- **Administrators:** Oversee platform activity, verify NGOs, detect fraud, and generate reports for transparency.

- **Corporate Users:** Partner with NGOs for CSR campaigns and access impact metrics and bulk donation reports.

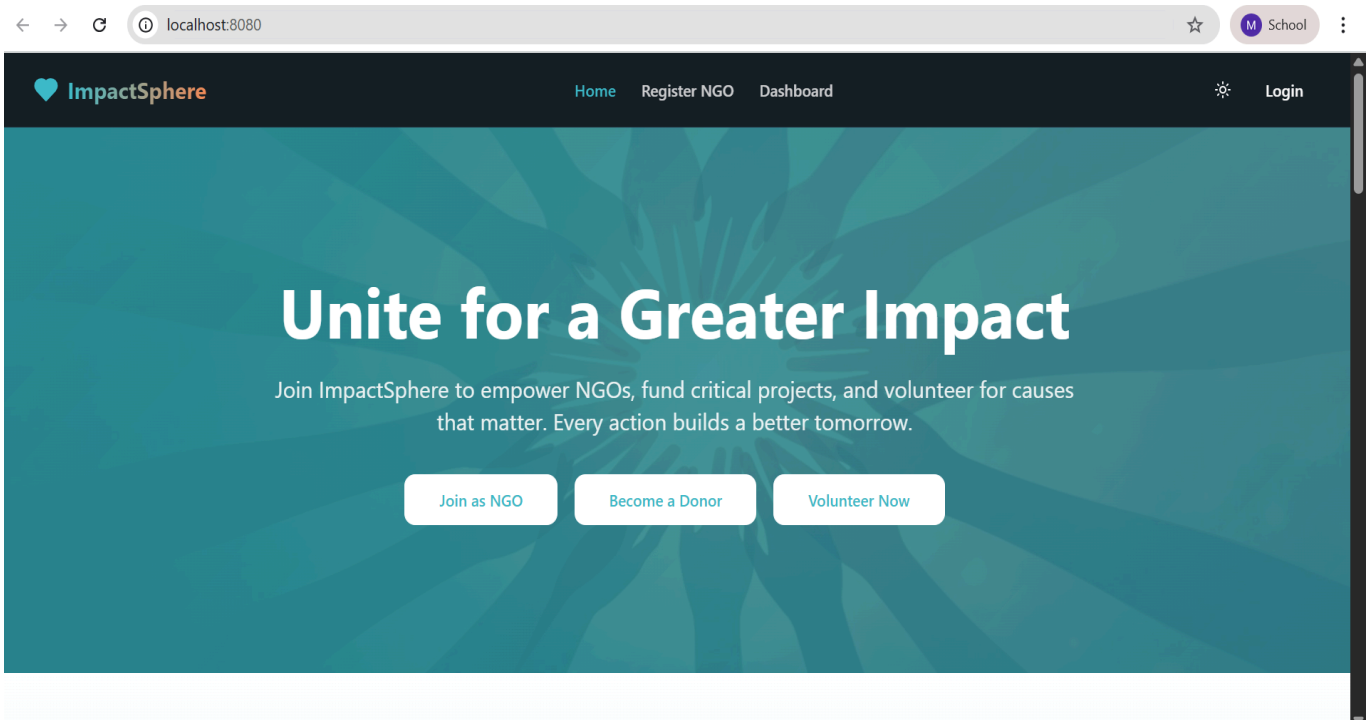
4. Core Principles

- **Transparency:** Verified NGOs, public donation tracking, and real-time progress reporting.

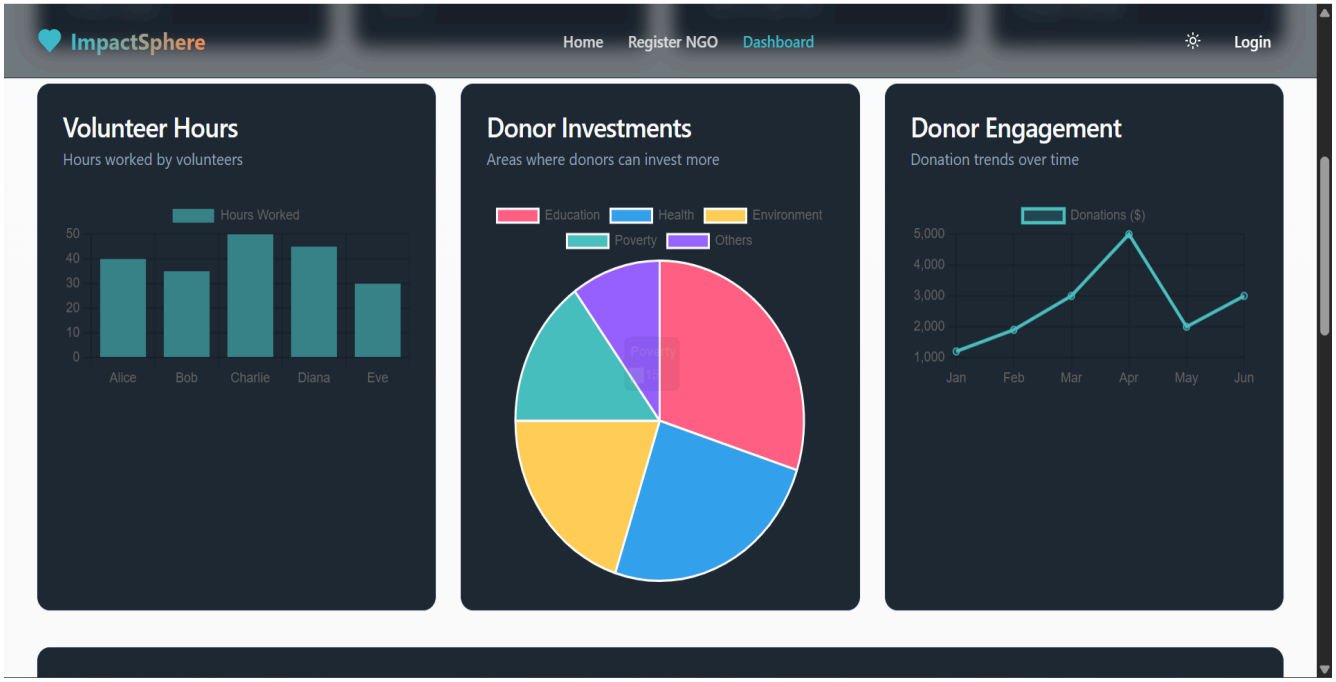
- **Trust:** Secure authentication, document verification, and anti-fraud mechanisms.

- **Engagement:** Gamification, social sharing, and leaderboards to foster active participation.

- **Scalability:** Modular design supporting future AI modules, new features, and corporate integrations.


localhost:8080
School
ImpactSphere
Home
Register NGO
Dashboard
Login
Unite for a Greater Impact
Join ImpactSphere to empower NGOs, fund critical projects, and volunteer for causes that matter. Every action builds a better tomorrow.
Join as NGO
Become a Donor
Volunteer Now


ImpactSphere
Home
Register NGO
Dashboard
Login
Welcome Back, ImpactMaker!
Manage your campaigns, track your impact, and connect with your community.
Create New Campaign
Start a new project
Analytics
View detailed reports
Smart Reminders
Manage notifications
Make a Donation
Support a cause
Active Campaigns
5
Currently running
Total Campaigns
125
All time
Funds Raised
$8.2M
+12% from last month
Volunteers
2,145
Engaged volunteers
Volunteer Hours
Hours worked by volunteers
Donor Investments
Areas where donors can invest more
Donor Engagement
Donation trends over time



5. Methodology:

The development of *ImpactSphere* follows a structured, modular, and iterative approach to ensure flexibility, collaboration, and scalability throughout the project lifecycle. The system is divided into distinct functional modules that are designed, developed, and integrated step-by-step to create a

seamless and efficient user experience. The methodology blends both technical execution and UX-focused design practices to ensure functionality and usability remain aligned.

1. Development Approach — Modular Iterative Model

The **Modular Iterative Model** was selected for *ImpactSphere* to allow progressive development, where each module (e.g., NGO, Donor, Volunteer, Admin) is implemented and refined independently before full system integration. This ensures that updates and improvements can be made without affecting the overall stability of the application

Development Phases:

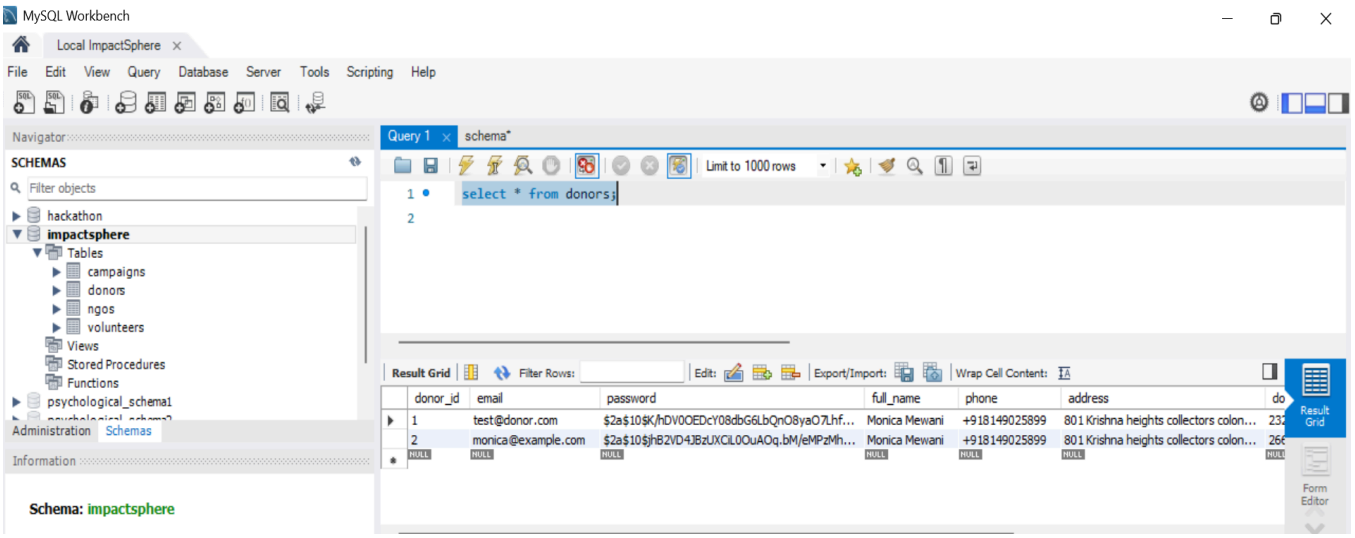
- **Phase 1 – Requirement Analysis:** Understanding user needs, identifying core entities (NGOs, donors, volunteers), and defining key platform goals.
- **Phase 2 – System Design:** Designing the architecture, data flow, and UI/UX wireframes using Figma.
- **Phase 3 – Frontend Development:** Building the user interface with React.js and TailwindCSS to ensure responsiveness and accessibility.
- **Phase 4 – Backend Development:** Implementing APIs and business logic using Node.js with Express framework to handle data communication and security.
- **Phase 5 – Database Integration:** Using **MySQL Workbench** for database design, table creation, and schema relationships. MySQL ensures data integrity, relational consistency, and ease of management.
- **Phase 6 – Role Implementation:** Setting up different modules for NGO, Donor, Volunteer, and Admin with distinct permissions and workflows.
- **Phase 7 – Payment & Verification Integration:** Integrating payment simulations via Stripe API (test mode) and NGO document verification through admin approval.
- **Phase 8 – Deployment:** Deploying frontend via Vercel and backend on AWS or Google Cloud for production.

2. Tools and Technologies Used

- **Frontend:** React.js, TailwindCSS, Framer Motion (animations)
- **Backend:** Node.js with Express.js
- **Database:** MySQL Workbench for database creation, schema modeling, and relational queries.
- **Hosting & Deployment:** Vercel (frontend) and AWS/GCP (backend)
- **Integrations:** Stripe (payment), SendGrid (email notifications), AWS S3 (media storage)
- **Design:** Figma for UI/UX design and prototyping

3. Development Focus

- **Modularity:** Each functional unit (NGO, Donor, Volunteer) developed as an independent component.
- **Scalability:** Clean architecture with reusable services and database relations.
- **Security:** Role-based access, input validation, and encrypted data storage.
- **User-Centric Design:** Prioritizing ease of navigation, accessibility, and trust-focused visual design.



6. Backend Implementation:

The backend of *ImpactSphere* is the foundation that powers all user interactions, manages data securely, and ensures smooth communication between the frontend and the database. It is designed for scalability, modularity, and security using Node.js with the Express.js framework. The backend exposes RESTful APIs to handle core operations like authentication, NGO verification, donations, and volunteer management.

Architecture Overview

The backend follows a three-tier architecture consisting of the presentation layer (frontend), the application layer (Node.js API), and the data layer (MySQL). This modular approach improves maintainability and scalability while supporting role-based functionality.

Key Layers:

- Route Layer: Defines all API endpoints and handles incoming HTTP requests.
- Controller Layer: Processes requests, performs input validation, and communicates with the service layer.
- Service Layer: Contains business logic for core functionalities such as donations, NGO approvals, and gamification.
- Database Layer: Interfaces with MySQL through an ORM (Sequelize) for secure and efficient data management.

Core Backend Functionalities

1. Authentication & Authorization:
   - Implemented using JSON Web Tokens (JWT) for secure user sessions.
   - Role-based access control ensures that each user (NGO, Donor, Volunteer, Admin) can only perform authorized actions.
   - Passwords are encrypted using bcrypt before storage.
2. NGO Management & Verification:
   - NGOs can register, upload verification documents, and submit campaign proposals.
   - Admin users verify NGO authenticity and approve or reject NGO applications.
   - Verification statuses (Pending, Verified, Rejected) are tracked and displayed in the database.
3. Campaign Management:
   - NGOs can create, edit, and manage campaigns, including media uploads and progress updates.
   - Campaign data includes goal amount, raised amount, start and end dates, and status.
   - APIs handle campaign visibility, progress tracking, and donor engagement.
4. Donation Management:
   - Donors can make contributions through secure API endpoints connected to Stripe's payment simulation.
   - Each successful transaction generates a digital receipt and updates donation records.
   - A mock blockchain-inspired donation ledger records donation hashes for transparency.
5. Volunteer & Event Management:
   - NGOs can post volunteering events, manage registrations, and monitor participation.
   - Volunteers can register for events, check in using QR codes, and track completed hours.
   - Data is synchronized in real-time to reflect attendance and achievements.
6. Gamification Engine:
   - Awards "Impact Points" for user actions like donating, volunteering, or sharing campaigns.
   - Tracks user achievements and badges, motivating consistent engagement.

7. Admin Dashboard Functions:
   - Admins can review NGO applications, monitor donation statistics, and generate analytical reports.
   - Fraud detection rules identify suspicious donation activity or duplicate NGO entries.

Security Measures

- JWT Authentication: Ensures secure API access for authorized users.
- Input Validation: All requests are validated using middleware to prevent SQL injection and XSS attacks.
- Password Encryption: User passwords are stored using bcrypt hashing.
- CORS Configuration: Secure cross-origin communication between frontend and backend.
- HTTPS Encryption: All data in transit is secured via SSL/TLS.

Database Integration

- The backend connects to MySQL using Sequelize ORM for easy data mapping.
- Each model (User, NGO, Campaign, Donation, Event) is defined with relationships such as One-to-Many (NGO → Campaigns) and Many-to-Many (Volunteers ↔ Events).
- Queries are optimized using indexes and foreign key constraints to ensure performance and consistency.

Deployment & Environment Setup

- Environment Variables (.env): Used for storing database credentials, API keys, and JWT secrets.
- Hosting: Backend is hosted on AWS or GCP with continuous deployment pipelines.
- Logging: Winston or Morgan used for request logging and error tracking.

In summary, the backend of *ImpactSphere* provides a secure, modular, and scalable foundation that powers all core functionalities of the platform — enabling transparent interactions, seamless data flow, and a reliable experience for all stakeholders.

7. Results and Discussion

The implementation of *ImpactSphere* successfully demonstrates how technology can enhance trust, transparency, and engagement within the NGO ecosystem. The developed prototype efficiently connects NGOs, donors, and volunteers through secure, real-time, and gamified interactions.

1. Prototype Summary

The functional prototype includes modules for NGO registration, donor onboarding, campaign creation, donation simulation, and volunteer event management. The system ensures that each role (Admin, NGO, Donor, Volunteer) has a distinct dashboard and access rights. MySQL Workbench serves as the backbone for data storage, maintaining integrity and structured relationships between tables.

2. Key Achievements

- **Seamless User Flow:** The modular structure ensures smooth navigation between roles and sections, creating an intuitive experience for users.
- **NGO Verification:** The verification workflow enables admin-level approval, strengthening the authenticity of registered NGOs.
- **Transparent Donations:** A blockchain-inspired ledger displays mock transaction hashes, ensuring that donation flow is transparent and traceable.
- **Volunteer Engagement:** The volunteer dashboard allows event registration, QR-based attendance, and progress tracking — encouraging long-term involvement.
- **Gamified Ecosystem:** Impact Points and badges have been implemented to motivate users, while the leaderboard promotes healthy competition.
- **Data Visualization:** NGOs can view real-time analytics regarding funds raised, campaign status, and donor demographics.

3. Observations

The system proved to be efficient in handling simultaneous operations like campaign creation, donation tracking, and volunteer event updates. Database performance in MySQL was stable even under multiple concurrent operations. The combination of role-based access and modular APIs ensured data isolation and security.

Minor challenges included the optimization of image uploads for NGO campaigns and fine-tuning the response time for dashboard analytics. Future iterations could enhance this through caching mechanisms and CDN integration.

4. User Feedback

Preliminary feedback from test users (NGOs, donors, and volunteers) was positive:

- NGOs appreciated the simplicity of campaign management and the trust-building verification process.
- Donors valued the clarity of fund utilization tracking and the donation ledger.
- Volunteers found the gamified approach encouraging and requested mobile app expansion for field use.

Overall, *ImpactSphere* has demonstrated its potential to act as a transformative platform in the NGO-donor-volunteer ecosystem, with a strong focus on usability, transparency, and measurable impact.

8. Conclusion:

The *ImpactSphere* project achieves its mission of creating a transparent, secure, and gamified social impact platform that bridges the gap between NGOs, donors, and volunteers. By combining modern web technologies, an intuitive design language, and ethical digital practices, the system ensures both functional and emotional engagement.

The use of **Node.js** and **MySQL Workbench** provided a strong technical foundation for scalable and structured data handling, while modular development ensured maintainability and clarity in functionality. The gamification features such as badges, leaderboards, and Impact Points fostered motivation and long-term participation, turning users into active contributors to social change.

Moreover, through verified NGOs, donation tracking, and volunteer recognition, *ImpactSphere* redefines trust and collaboration in the nonprofit sector. The platform not only simplifies giving and volunteering but also provides a sense of accountability and measurable impact.

In conclusion, *ImpactSphere* serves as a pioneering initiative in digital philanthropy — combining transparency, technology, and human empathy to empower collective action for a better world.