

Volunteer Activity Platform for Vinit Abhedya Foundation

Mayuresh Kahar¹; Dr. Swati Ghule²

¹MCA Department, P.E.S Modern College of Engineering, Pune, Maharashtra, India

²MCA Department, P.E.S Modern College of Engineering, Pune, Maharashtra, India

Publication Date: 2026/10/08

Abstract: Managing volunteer activities remains a significant challenge for many non-profit organizations due to disjointed coordination methods and manual record-keeping. This paper presents the design and deployment of a Volunteer Activity Platform tailored for the Vinit Abhedya Foundation, an NGO located in Chhatrapati Sambhajnagar, Maharashtra. The platform streamlines volunteer-related processes by digitizing key functions such as role assignment, event coordination, registration, onboarding, and attendance tracking. The backend was built using NestJS and Node.js, while React.js powered the frontend. PostgreSQL served as the relational database, with Prisma ORM simplifying database management. For enhanced security and to prevent fraudulent attendance, the system incorporated JWT-based authentication and token-driven attendance verification. As a result, the platform successfully managed 3,500 volunteers, organized 124 drives, and monitored the collection of 4,200 kg of waste.

Keywords: Volunteer Management, PostgreSQL, Prisma ORM, NestJS, React.js, JWT Authentication, Role-Based Access Control, Token-Based Attendance, and NGO Platform.

How to Cite: Mayuresh Kahar; Dr. Swati Ghule (2026) Volunteer Activity Platform for Vinit Abhedya Foundation. *International Journal of Innovative Science and Research Technology*, 11(5), 4675-4680. <https://doi.org/10.38124/ijisrt/26may1960>

I. INTRODUCTION

Volunteer coordination is crucial to the operations of grassroots non-governmental organisations. Nonetheless, many of these grassroots NGOs still operate with extremely simple organisational structures, where volunteers sign paper registers, data is manually entered, spreadsheet files are maintained, and text messages are used for communication. Duplicate data, erroneous attendance monitoring, and excessive time spent on administrative duties rather than participating in the actual activity are some of the inefficiencies introduced by such approaches.

The Vinit Abhedya Foundation was established in Chhatrapati in 2021. Sambhajnagar organizes a number of community literacy initiatives, public sanitation campaigns, environmental conservation campaigns, and menstrual awareness campaigns.. With the growth in the number of volunteers involved in such activities, the necessity for an effective platform to manage all those aspects grew evident.

In response to this problem, the Volunteer Activity Platform designed in this research project allows volunteers to register and perform activities, allows administrators to organize and supervise activities, and enables super administrators to control the whole system from one platform.

II. LITERATURE SURVEY

The growing adoption of web technologies in the non-profit sector has prompted both researchers and organizations to investigate scalable digital alternatives to conventional volunteer coordination practices. A review of existing work reveals notable progress in this space, yet several functional and security-related gaps continue to persist across current implementations.

Saravana Kumar N. et al. [1] developed a system called “Volunteer Connect,” which combined a volunteer coordination interface with a Retrieval-Augmented Generation (RAG) powered conversational assistant. The integration of AI-driven communication into volunteer platforms represents a meaningful step forward in improving accessibility and query resolution for users. However, the scope of the study remained narrowly focused on chatbot performance, with insufficient attention given to backend security infrastructure, structured administrative hierarchies, and reliable attendance verification — all of which are critical for sustained real-world deployment.

Another platform, “NGO Connect” [2], was designed to bring volunteer engagement and organizational coordination under a single interface. The system showed measurable improvement in participant communication and event participation workflows. Nevertheless, the platform fell short in areas demanding robust security design. The absence of

token-based authentication, clearly defined role permissions, and validated attendance mechanisms limited its suitability for environments where data accuracy and access governance are non-negotiable requirements.

Beyond academic research, several active organizations illustrate both the potential and the current boundaries of digitally supported volunteer management. AROH [3] leverages internet-based outreach to coordinate community welfare and social development efforts at scale. Kalpavriksh [4] channels volunteer participation toward environmental advocacy and public education through structured campaign models. Paani Foundation [5] has demonstrated how technology-assisted planning can mobilize large volunteer groups for rural water conservation with measurable impact. Robin Hood Army [6] operates city-wide food distribution networks by coordinating volunteers through digital communication channels. While these organizations reflect practical applications of technology in the NGO space, their approaches are often tailored to specific domains and do not offer a generalized, secure, and centralized management framework.

Across both research-based and organization-driven implementations, a consistent set of shortcomings can be observed. Attendance tracking remains vulnerable to manual errors and duplicate submissions. Administrative control is often distributed unevenly, with little structure governing who can access or modify sensitive records. Centralized monitoring and real-time reporting features are either absent or inadequately developed. These recurring deficiencies point to a clear need for a purpose-built platform that treats security, transparency, and operational coherence as foundational requirements rather than optional additions.

The Volunteer Activity Platform developed in this work is positioned as a direct response to these identified gaps. By unifying role-based access control, token-driven attendance verification, structured volunteer lifecycle management, and live operational tracking within a single web-based environment, the system aims to deliver the security and administrative depth that existing solutions have consistently failed to provide.

➤ *Research Gap*

Existing volunteer management platforms mainly focus on basic functionalities such as event coordination, volunteer registration, and attendance management. However, many of these systems still lack important features related to security, centralized administration, and accurate participation tracking.

Several platforms continue to rely on partially manual workflows for attendance handling and volunteer coordination, which increases the possibility of duplicate records, inaccurate data, and operational inefficiencies. In many cases, proper role-based access control mechanisms are either limited or not implemented effectively, making administrative management more difficult.

Another major limitation observed in existing systems

is the lack of secure and real-time attendance verification mechanisms. Most platforms do not provide token-based or automated validation methods, which can affect the reliability and transparency of participation records.

In addition, advanced features such as centralized monitoring, operational analytics, automated reporting, and scalable volunteer management are often missing or only partially supported in many currently available solutions.

These limitations highlight the need for a secure, centralized, and scalable volunteer management platform capable of integrating attendance verification, role-based access control, volunteer coordination, and real-time operational management within a single system.

➤ *Problem Statement*

Volunteer-run organizations keep running into the same old problems, and their current tools just aren't cutting it. When they stick with manual processes for things like signing up volunteers, organizing drives, or keeping track of attendance, everything slows down. The work drags on for hours when, honestly, it shouldn't take more than a few minutes. Mistakes pile up—people enter attendance twice, records don't match, and it's almost impossible to trace where things went wrong.

Sure, some groups have switched to simple software, but these tools only help a little. They miss the basics—like security and structure. With weak or missing authentication, anyone can poke around and see private volunteer info. And if you can't separate admin access from regular users, it's hard to draw boundaries or hold anyone accountable.

The Volunteer Activity Platform fixes these issues head-on. It uses JWT-based authentication, detailed role-based access, and a token system for verifying attendance. That way, organizations move past clunky, mistake-filled workflows. Instead, they get a secure, clear, and efficient way to manage volunteers—powered by solid technology that actually works.

III. RESEARCH METHODOLOGY

The Volunteer Activity Platform was developed using a methodical process that comprised requirement analysis, system design, deployment, testing, and implementation.

In order to comprehend the difficulties encountered in volunteer administration, attendance tracking, communication, and activity coordination, the first stage entailed conversations with Vinit Abhedya Foundation members. These exchanges assisted in determining the essential characteristics and requirements for the system.

ER diagrams, UML diagrams, and module specifications were used to create the overall system architecture and database structure based on the collected requirements. React.js was used to create the application's frontend, while NestJS and Node.js were used to implement the backend services. PostgreSQL was utilized as the

relational database, and Prisma ORM was used to streamline database administration and operations.

To ensure secure access, JWT-based authentication and role-based access control mechanisms were implemented for Volunteers, Admins, and Super Admins. In addition, a token-based attendance verification system was developed to improve attendance accuracy and reduce duplicate or invalid entries.

After development, the platform underwent functional testing and validation to verify different modules such as authentication, attendance management, dashboard operations, and volunteer coordination features. Finally, the system was deployed and evaluated in a real NGO environment to analyze its usability, reliability, and operational effectiveness.

IV. RESULTS AND DISCUSSION

Vinit Abhedya Foundation rolled out the platform and put it through its paces. The admin dashboard pulled in real-time stats, and here's what stuck out: They ran 124 drives, all successfully tracked. The system handled 3,500 active volunteers, making registration and management a breeze. Across all drives, volunteers logged 850 hours. And on the

environmental side, they collected and tracked 4,200 kg of waste.

These numbers show the system kept up with everything thrown at it. Role-based access worked — volunteers, admins, super admins, everyone stayed in their lane, and nobody snuck into places they shouldn't be.

Attendance was always a headache in the past, with duplicate entries messing up manual records. The token system fixed that. Attendance only happened when someone showed up, and tokens expired after each drive. No more repeats.

On the data side, Prisma ORM held steady. There were zero reports of data corruption or integrity problems. The React.js frontend got thumbs-up for being responsive, so whether folks were on desktop or mobile, they could check drives, submit attendance, and look at dashboards without any hassle.

In short, the platform did what it promised: it brought everything under one roof, made access secure, logged accurate attendance, and gave clear reports on impact. All the main goals? Checked off.

➤ The following Figures Represent the System Interface and Architecture of the Proposed Volunteer Activity Platform.

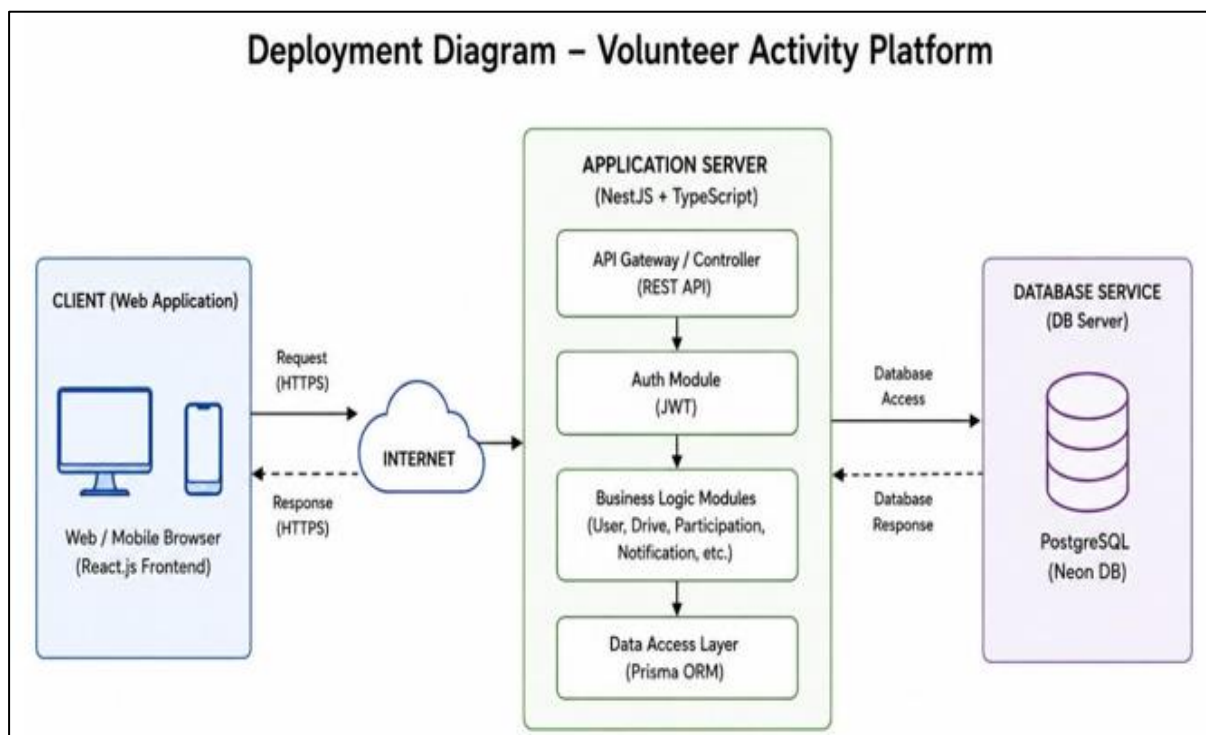


Fig 1 Deployment Diagram



Fig 2 Home Screen



Fig 3 Initiative Home Screen

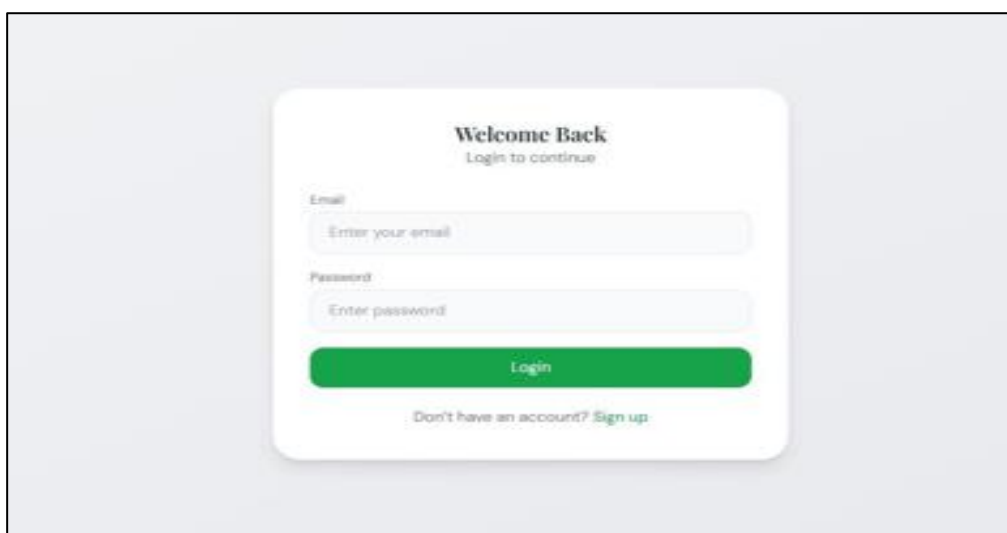
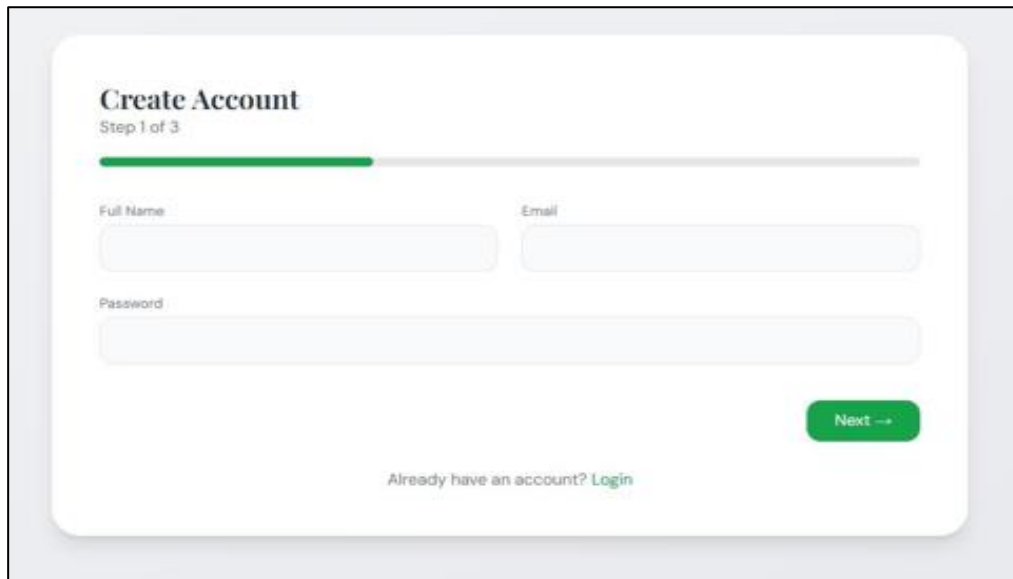


Fig 4 Login Interface



The image shows a 'Create Account' registration form, labeled 'Step 1 of 3'. It features a progress bar at the top. The form includes input fields for 'Full Name', 'Email', and 'Password'. A green 'Next' button is positioned at the bottom right. Below the button, there is a link that says 'Already have an account? Login'.

Fig 5 Registration Interface

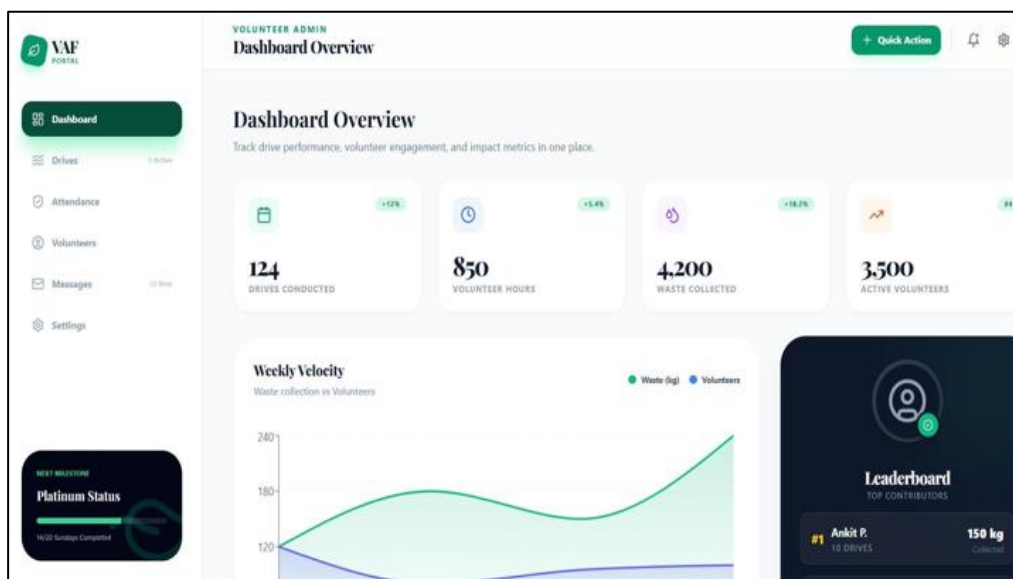


Fig 6 Admin Dashboard

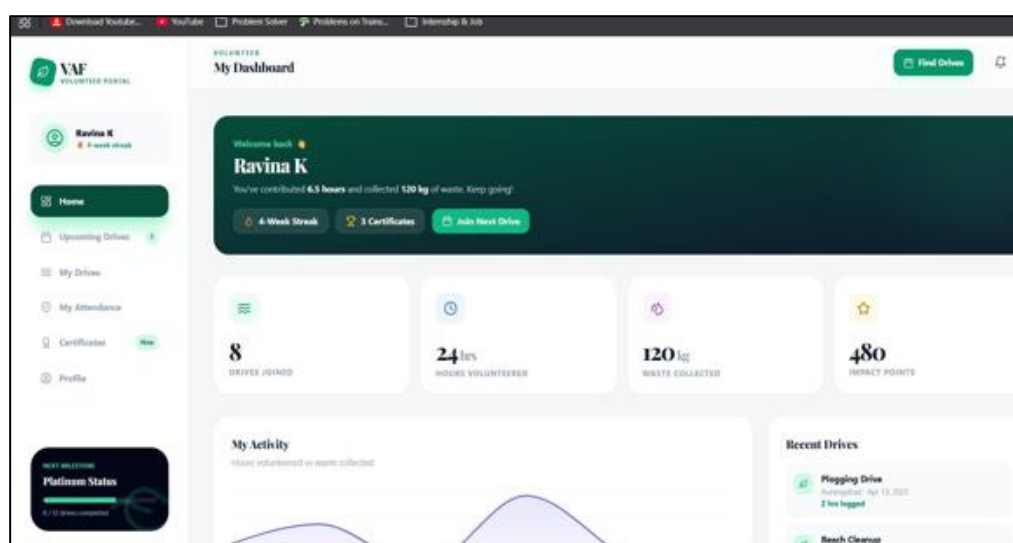


Fig 7 User Dashboard

V. CONCLUSION

We built a Volunteer Activity Platform for the Vinit Abhedya Foundation, using a modern full-stack web setup. The old way of handling volunteers was pretty scattered and manual, so this platform fixes that. It's got secure logins, clear roles, and reliable attendance tracking. After launch, the numbers were solid—over 124 drives and more than 3,500 volunteers managed right through the system. We used JWT authentication, token-based attendance, and Prisma ORM, so the platform stayed secure and the data was always clean. It's not just for this foundation, either. Any NGO focused on community work can use this as a blueprint to improve how they manage volunteers.

FUTURE SCOPE

Based on the present implementation, there will be many enhancements that will be introduced in the coming iterations. The first one involves using a QR-code to authenticate attendance to prevent any form of fraud compared to the current approach that relies on text tokens. There will also be a need to add background jobs using Redis and BullMQ to enhance asynchronous emails and certificate generation.

Another idea involves creating a certificate automation feature where the system auto-generates customized participation certificates and sends the certificates to volunteers at the end of the drives. With regard to the engagement strategy, there will be a need to add a gamification aspect in the project where scores will help promote individuals.

From the analysis perspective, there will be dashboards with the visualization of trends so that the administrators can determine participation trends, periods, and impactful people. Additionally, there will be a need to develop a multi-organizations support feature in addition to developing a mobile application.

ACKNOWLEDGEMENTS

The authors express sincere gratitude to the project guide and faculty members of the MCA Department, P.E.S Modern College of Engineering, Pune, for their guidance throughout this work. Special thanks are also due to the team at Vinit Abhedya Foundation for their cooperation during the system's development and deployment.

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