

Beach Warriors - Tech for CSR

Executive Summary

Project Title:

Beach Warriors – AI/GenAI-powered Beach Cleanup Platform

Team:

- **Akhilesh Patidar** - 3rd year Computer Engineering student
- **Aditya Bharti** - 3rd year Computer Engineering student

Institute:

Army Institute of Technology, Pune

Submitted To:

KakushIN – Nomura Services, India

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Executive Summary

Beach Warriors - Tech for CSR

About Us

We are two passionate technologists dedicated to building solutions that drive environmental and social impact.

- **Akhilesh Patidar**

Third-year Computer Engineering student, Army Institute of Technology, Pune. Skilled in MERN stack, React Native, and AI/GenAI integration. Architect of scalable platforms with strong hackathon experience in building real-time, data-driven solutions.

- **Aditya Bharti**

Third-year Computer Engineering student, Army Institute of Technology, Pune. Skilled in Flutter, REST API, API integration, Handling databases, building robust backend and familiarity with web and mobile application building softwares.

Understanding the Problem

Mumbai's beach cleanup operations face various challenges like:

- Disjointed communication tools (WhatsApp, spreadsheets) lead to **poor logistics**, **volunteer no-shows**, and **equipment mismatch**.
- No unified waste tracking or impact reporting and lack of analytics
- High manual workload creating reports/posts
- Lack of **volunteer incentives** and **progress tracking** reduces retention.
- People like Rohan feel **disconnected**, **under-informed**, and **uninspired**.

There is a need for an **AI/GenAI-powered, data-driven platform** that streamlines beach cleanups and builds a **self-sustaining ecosystem of change agents**.

Proposed Solution

We propose **Beach Warriors**, core components:

- **Web Application (Organizers):** A responsive, cross-browser platform designed for NGO administrators and staff to manage and organize beach cleanup events.
- **Mobile Application (Volunteers):** A React Native application compatible with both Android and iOS, facilitating volunteer participation and engagement.

Key Features:

For Volunteers (Mobile App):

- Browse upcoming beach cleanup events filtered by date, location, and types.
- Efficient event management with digital waivers, personalized confirmations, QR

- code check-ins, accurate attendance tracking, and geofencing alerts for volunteers.
- Earn badges for participation and waste collection, track your impact with a scorecard showing waste reduction, and compete on leaderboards.
- Use an interactive AI chatbot for immediate help with waste sorting, recycling, FAQs.
- Get push notifications for events, schedule changes, and reminders to boost volunteer engagement.

For Organizers (Web App):

- Cleanup scheduling and volunteer allocation will be optimized using AI heuristics, First-Order Logic (FOL), Backtracking, and Constraint Satisfaction Problem (CSP) methodologies.
- Utilize AI-assisted prediction of equipment needs.
- Capture waste data and access real-time analytics dashboards.
- Leverage a GenAI Co-pilot for automated generation of flyers, social media content, and impact reports.
- Export impact metrics for Corporate Social Responsibility (CSR) and partner reporting.

Leveraging AI & GenAI:

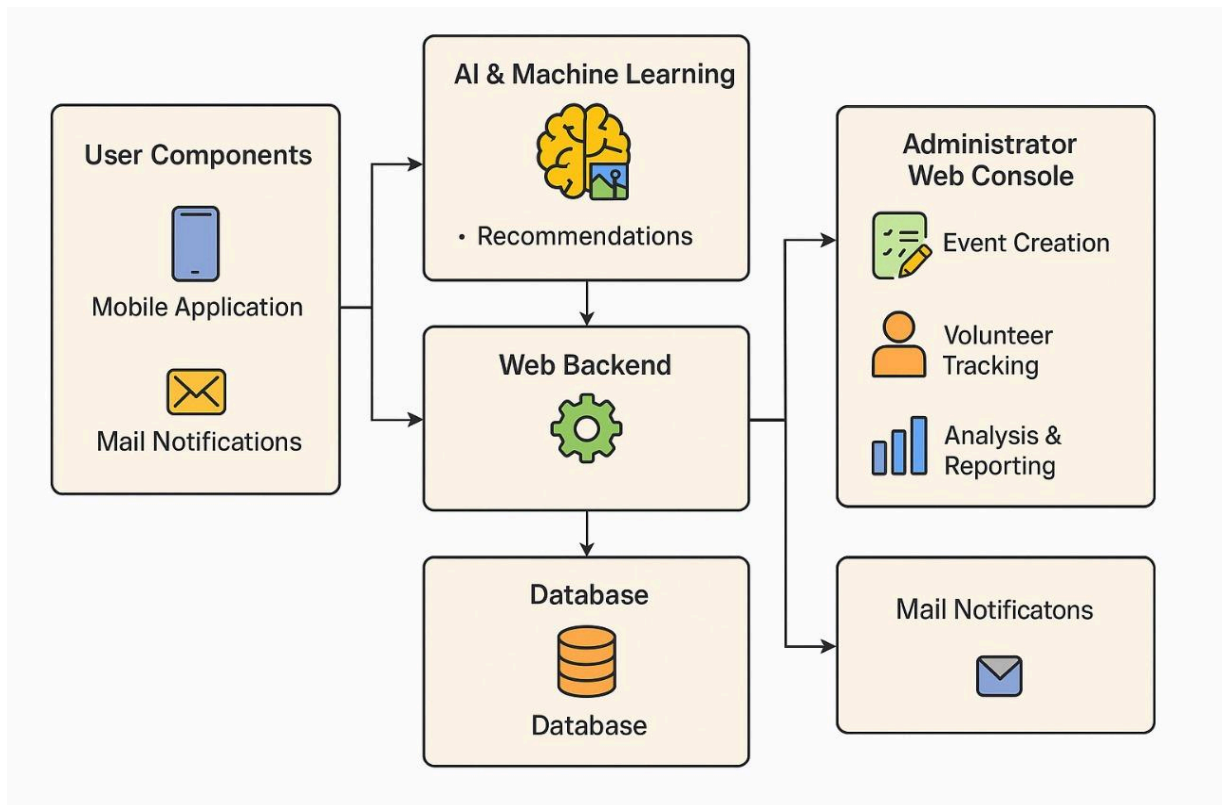
- **Generative AI (GenAI):** Provides a content co-pilot for generating reports, social media posts, and event flyers.
- **Artificial Intelligence (AI):** Enables prediction of attendance patterns, optimization of volunteer allocation, and analysis of waste type trends.

⚙️ Software Tools and Version

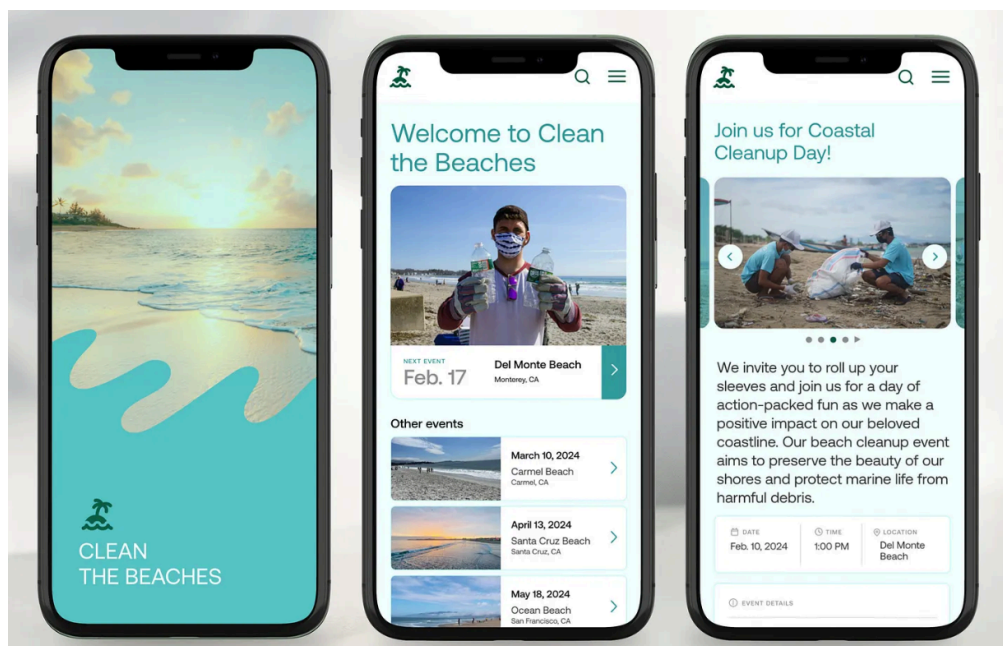
Component	Technology	Version
Frontend (Web) ▾	React	19.1.0
Frontend (Mobile) ▾	React Native	0.79
Backend ▾	Node.js (Express)	21.0.0
Database ▾	MongoDB	8.0
Data Visualization ▾	Chart JS	V3
AI/GenAI APIs ▾	Gemini API	Gemini 1.5 pro
AI/GenAI APIs ▾	HuggingFace Transformers	4.41.2
Authentication ▾	Firebase Auth	5.6.0
Mapping/Geo ▾	Google Maps API	v3
DevOps ▾	Docker	4.41
Analytics ▾	Power BI	2.144.679.0

Appendix

- Architecture diagram



- Mockup UI samples



Mobile App UI Prototype

Registration


Join us in keeping our beaches clean and beautiful by signing up for our upcoming beach cleaning event!


First Name

Last Name

E-Mail

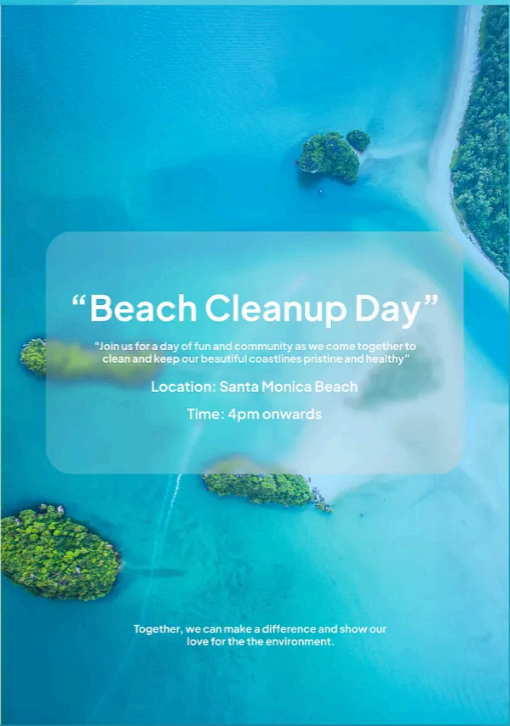
or register with





Join the cleanup crew

Note: Further details about the event, including meeting location and instructions, will be provided through email after your registration.



"Beach Cleanup Day"

"Join us for a day of fun and community as we come together to clean and keep our beautiful coastlines pristine and healthy!"

Location: Santa Monica Beach

Time: 4pm onwards

Together, we can make a difference and show our love for the environment.

Web UI Prototype

