TERRALENS: Measuring what Matters, Cleaning what Counts

Prepared For:

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About Us

We are a team of two final-year students pursuing a Bachelor of Engineering in Artificial Intelligence and Data Science from Fr. Conceicao Rodrigues College of Engineering.

- **Kevin Rozario** specializes in full-stack development, cloud services, and the integration of machine learning models into scalable web applications.
- **Sarah Ger** brings strong expertise in frontend development and UI/UX design, with a passion for building interactive and accessible user experiences.

Together, we merge creativity with technical depth to craft innovative, user-centric solutions that drive real-world social impact.

Understanding of the Problem Statement

The aim is to develop an AI-powered **Event Management System (EMS)** that transforms how beach clean-up drives are planned, executed, and evaluated. The platform will cater to both volunteers and organizers, focusing on usability, efficiency, and measurable environmental impact. The core features of the system include:

1. **Impact Metrics Dashboard** to track waste collected, volunteer participation, and long-term environmental outcomes.
2. **Event & Volunteer Management** with attendance tracking and personalized contribution summaries.
3. **Waste Analytics** for real-time insights on waste type and volume.
4. **AI Tools** for generating reports, email content, and impact stories.
5. **Notification System** to keep volunteers informed about upcoming events.
6. **Dynamic Volunteer Deployment** using AI to allocate volunteers based on beach location, crowd density, and past data.

Proposed Solution: Terra Lens

It is a web-based AI-powered EMS designed to streamline the organization and monitoring of beach clean-up activities. The platform connects volunteers and admins with data-driven insights, intelligent features, and an intuitive user interface.

1. **Event Management**
   Admins can create, update, and categorize events. Volunteers register for events and provide post-event feedback to improve future planning.
2. **Admin Dashboard**
   A unified dashboard to monitor participation, visualize event metrics, and export impact reports (waste collected, hours contributed, and reach).
3. **Smart Volunteer Deployment**
   Auto-assign volunteers to a beach based on geo-location, beach crowd density, and participation history to optimize distribution.

4. **QR-Based Attendance Tracking**
   Volunteers check in via QR code to mark attendance, ensuring accountability and reducing manual errors.
5. **Waste Analytics**
   Captures waste data by type and weight, with real-time dashboards and comparative visualizations to measure ecological progress.
6. **AI Utilities**
   Auto-generate event summaries, email drafts, and social media stories using language models, minimizing admin overhead.
7. **Notification System**
   Delivers timely updates and reminders via SMS/email to maximize volunteer engagement and reduce dropouts.
8. **Gamification**
   A dynamic leaderboard ranks volunteers based on performance, promoting consistency through healthy competition.
9. **Awareness & Education**
   Embedded resources highlight topics such as ocean conservation, sustainable living, and recycling practices.

Required Technologies

Tool / Library	Version	Tool / Library	Version
PostgreSQL	17.5	Axios	1.9.0
React	19.1.0	Leaflet	1.9
Next.js	15.3.3	Prisma	6.9.0
Clerk (@clerk/clerk-js)	5.68.0	ImageKit	7
Clerk (@clerk/nextjs)	6.21.0	Zod	4.24
Redis	7.2.9	Tailwind CSS	3.3
ShadCN UI	2.5.0	TypeScript	5.9
Framer Motion	12.17.3	Font Awesome	6.4
NextAuth	4.24.11	Nodemailer	7.0.3
Hero UI	2.7.10	React Hook Form	7.45
Zustand	5.0.5	Supabase	2.50.0
LangChain	1.35	OS	MacOS Sequoia / Ubuntu 24.04.2