Smart Ghat - Intelligent Monitoring & Preservation of Heritage Riverfronts

Calcutta Hacks 2025 | *Theme: Heritage x Smart City x Sustainability*

Problem Statement

Kolkata's historic ghats are cultural icons, yet face pollution, poor maintenance, and lack of real-time monitoring. Manual inspections are rare and data-driven insight is missing.

Solution Overview

Smart Ghat is an IoT-powered platform that tracks water quality, lighting, and cleanliness at heritage ghats. It provides a live dashboard, alert system, and citizen report features to ensure clean, sustainable, and safe ghats while engaging communities.

Features

- Real-time monitoring of water pH, turbidity, and lighting levels.
- Live dashboard visualization with alert colors.
- Citizen issue reporting (photo, location, and notes).
- Gamified badge system for active participants.
- Historical data charts for analysis.

Tech Stack

Frontend: React.js / Next.js + Tailwind CSS

Backend: Node.js / Flask

Database: Firebase / MongoDB

IoT Simulation: ESP32 / Python script (MQTT/REST)

Visualization: Chart.js / Recharts

Hosting: Vercel / Firebase Hosting

Team Roles

Frontend Developer - Dashboard, forms, visualization

Backend Developer - APIs, database, alert logic

IoT Developer - Sensor integration or simulation

Designer/Presenter - UI, storytelling, video pitch

Why It Stands Out

- Perfect alignment with hackathon theme (heritage + sustainability).
- Technically implementable MVP in 24 hours.
- Engages both technology and community aspects.
- Strong storytelling potential for judges.

Future Expansion

- Add AI-based litter detection from CCTV images.
- Predictive alerts for water pollution.
- Partnerships with KMC and Ganga Action Plan.
- Public leaderboard for cleanest ghats.

Pitch Summary

Smart Ghat reimagines Kolkata's heritage riverfronts with technology. It combines IoT sensors, data analytics, and civic participation to maintain clean, bright, and sustainable ghats - preserving the city's spirit for generations.