CTRL – AQUATRACK

AQUATRACK – Adaptive QUAntum-inspired Water Tracking and Conservation Kit

Team Introduction

Team Name: CTRL

Expansion: Catalysts for Technology, Resilience, and Life

Project Name: AQUATRACK – Adaptive QUAntum-inspired Water Tracking and Conservation Kit

Tagline: Real-time water intelligence for communities that can't afford to waste a drop.

Team Members & Roles

- Dhritishree Baruah– Full-stack developer (core functionality + APIs)
- Shruti Mishra – Frontend developer (React/Next.js + visualization), Backend developer (Firebase/Supabase + auth)
- Pranavasree Sunke – UI/UX designer (design polish + accessibility)

Problem Statement & Proposed Solution

Problem Statement:

- 1.7 billion people use unsafe drinking water (WHO)
- Water wastage through leaks and overuse is rarely detected in real-time
- Communities lack affordable tools to monitor and conserve water

Proposed Solution:

- Real-time monitoring dashboard for water usage and quality
- Simulated IoT sensors streaming data to Firebase/Supabase
- Alerts for anomalies like leaks or contamination
- Weather and location APIs provide contextual data
- Mock blockchain ledger for transparency
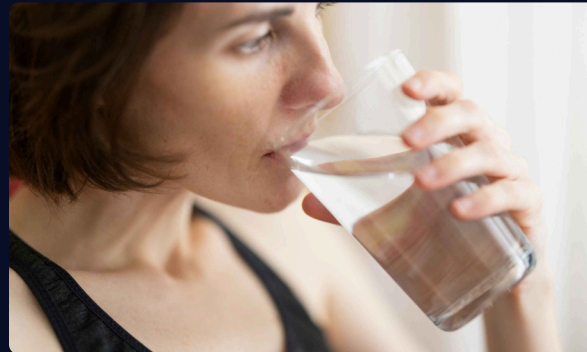
Expected Impact & Benefits

- Reduce water waste with early leak detection
- Empower communities with transparent data
- Support farmers and rural households with actionable insights
- Scalable across geographies: rural, urban, and global

Resource Requirements & Theme Alignment

Resource Requirements:

- Developer laptops and internet access
- Firebase/Supabase setup
- APIs: OpenWeatherMap, Mapbox/Google Maps
- Open-source libraries: Next.js, Recharts/Chart.js

Alignment with Theme: Shaping new frontiers – Data, Intelligence, and Quantum

- Data: Real-time water usage and quality streams
- Intelligence: Smart alerts and threshold-based anomaly detection
- Quantum-inspired: Resource optimization for sustainability
- Social Impact: Equitable access to clean water and conservation tools

User Need Validation

- Water insecurity affects billions globally

- Farmers and low-income communities need affordable monitoring

- Existing solutions are too expensive or limited to smart cities/homes

- AQUATRACK fills the gap with open, community-first technology

Competitors & Differentiation

Competitors: Smart city water meters, industrial IoT water systems

Closest Product: Smart home leak detectors like Phyn and Moen

Differentiation: Open-source, affordable, API-integrated, and socially impactful

Technologies Used

- Frontend: Next.js (React + TypeScript)

- Backend/Database: Firebase/Supabase

- Visualization: Recharts / Chart.js

- APIs: OpenWeatherMap and Mapbox

- Blockchain (mocked): Immutable water logs

- Other: CSS animations, WCAG compliance, Google Analytics

Made with GAMMA

Architecture Overview

Conceptual Flow: Sensors → Database → Dashboard → Alerts

Logical Layers:

- Data Layer: Firebase/Supabase
- API Layer: Weather and Maps
- Frontend: React/Next.js with Recharts
- Authentication: Firebase Auth

Components: Login & Onboarding, Real-time Dashboard, Alerts & Thresholds, Blockchain Logger (mocked)

The Last Word

- CTRL's AQUATRACK tackles water insecurity head-on

- Built with modern, open-source, scalable technology

- Balanced for hackathon demo: polished visuals and clear impact

- Intuitive user flow designed to wow judges in under 3 minutes

- We don't just track water. We empower communities to protect it.