

Team Aqua Guardians

- Team Members:
- • V. Durgaprasad — Embedded & IoT Developer
 - - ESP32, Arduino, Embedded C
 - - Sensor Interfacing, Firmware Development
 - - IoT Prototyping

Problem Statement

- • Households and small buildings face undetected water contamination.
- • Pipe leakage causes major water loss and increased water bills.
- • Existing solutions are expensive and complex.
- • Need for a low-cost, real-time monitoring device with alerts.

Proposed Solution

- • ESP32-based device measuring TDS, pH, temperature, flow & pressure.
- • Detects contamination and leakage using rule-based logic.
- • Sends real-time alerts via Wi-Fi.
- • Cloud dashboard for monitoring trends.

How the System Works

- • Sensors read TDS, pH, temperature, flow rate & pressure.
- • Rule engine:
 - - High TDS or abnormal pH → Quality Alert
 - - Low pressure + high flow → Leak Detected
- • ESP32 sends data to MQTT/HTTP cloud.
- • Dashboard displays live and historical data.

Tech Stack & Components

- Hardware:
 - ESP32, TDS Sensor, pH Sensor, Flow Sensor (YF-S201), Pressure Sensor, DS18B20.
- Software:
 - Arduino (ESP32 core), MQTT/HTTP, Node-RED/Blynk dashboard.

Prototype & Feasibility

- • Prototype with PVC pipe + sensors.
- • Demo: contamination simulation + leak simulation.
- • Instant dashboard/mobile alerts.
- • Cost: ₹1500–₹2500.
- • Easy to convert into compact PCB.

Impact & Future Scope

- Impact:
 - Prevents contamination & water wastage.
 - Useful for homes, apartments, schools, industries.
- Future Scope:
 - Multi-node building monitoring.
 - Battery/solar power.
 - Automatic valve shut-off.