

ABSTRACT

Title: Jalandhi — A Smart Water Supply and Management Platform with IoT and AI Enhancements

Reliable and efficient water supply management is a critical requirement for local communities, yet current methods are plagued by manual processes, lack of transparency, and delayed complaint resolution. Citizens often lack timely updates about water supply schedules, supervisors rely on physical verification of connections and complaints, and administrators struggle to maintain records of consumption, leaks, and illegal usage.

Jalandhi is a ward-based smart water supply and complaint management platform that ensures transparency, accountability, and citizen engagement. Citizens can apply for new connections, track bills and complaints, receive notifications, while supervisors can verify connections, perform QR check-ins, monitor service quality, and track tank levels in real time. With its intuitive design and IoT + AI integration, Jalandhi transforms traditional water supply management into a modern, efficient, and citizen-centric solution.

Mini Project Phase – Core Functionalities

Citizens: Secure registration & ward-based login; apply for water connections with required details; receive 15-minute pre-supply notifications; submit geo-tagged photo complaints (leaks, illegal taps, low pressure, pipeline damage); view & pay monthly water bills; track complaint status and view supply history.

Supervisors: Approve new connections with geo-tagged tap & meter images; verify reported illegal connections; mark complaints resolved with before/after proof photos; perform QR-based meter check-ins to enter readings for billing; monitor real-time tank water levels and receive low-level alerts to prevent dry runs.

Admins: Upload ward-level water schedules & send maintenance/outage notifications; monitor complaints and resolution status; review billing and connection approvals.

Platform: Flutter apps for citizens & supervisors; React.js admin dashboard; Firebase Authentication, Firestore, Cloud Storage & Messaging for real-time notifications and secure data.

Main Project Phase – Smart Upgrades

IoT Water Level Sensor (ESP32): Real-time tank level data visible to admin and citizens; low-level alerts to prevent motor damage.

Water Pressure / Flow Sensors: Core functionality to detect leaks and pressure drops in real time.

AI Complaint Categorization: Uploaded images are auto-classified as leakage, low pressure, illegal taps, or pipeline damage for faster resolution.

Predictive Analytics: Identifies recurring issues and suggests proactive maintenance.

Optional – Flow Sensors at Checkpoints: Detect and pinpoint exact leak locations for rapid repair.

Why Jalanidhi is Better

Ward-based, scalable, and designed for local water distribution networks. Geo-tagged records and QR check-ins prevent illegal connections and improve accountability. Real-time IoT monitoring minimizes water wastage and protects pumping equipment. AI-driven complaint handling ensures faster, prioritized resolution. Predictive analytics and leak detection help prevent major water losses. Citizen-centric, multilingual, and future-ready, making it an impactful and sustainable smart water management solution.