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(57) Abstract :

The present invention relates to an IoT-based system for detecting water leaks and performing fixture-level shut-off in shared facilities. The system comprises a Very Low-Rate (VLR) flow sensor for detecting minute water flows, an acoustic/vibration sensor for capturing leak-indicative signals, and a microcontroller unit (MCU) executing a multi-modal confirmation protocol (MMCP) that validates leaks only when sensor outputs exceed predetermined thresholds for a set duration. Upon confirmation, the MCU actuates a motorized valve actuator to isolate water flow and triggers a wireless transceiver module to transmit real-time alerts to remote facility management, ensuring prompt intervention. An initial baseline calibration and optional local alarm further enhance leak detection accuracy and facility safety.

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