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Noise Control IoT System

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Abstract: *Maintaining an optimal noise level in hospital environments is essential for ensuring patient comfort, promoting faster recovery, and supporting effective healthcare delivery. Excessive noise generated from conversations, medical equipment, alarms, and visitor movement can disturb patients and increase stress levels. Traditional methods such as warning signs and manual supervision are not sufficient for continuous monitoring and control of sound levels. To address this issue, a Noise Control IoT System is proposed to automatically detect and manage ambient noise in healthcare facilities.*

The system is developed using an ESP32 microcontroller and a KY-038 sound sensor to measure real-time sound intensity. Based on predefined threshold values, the system categorizes noise into acceptable, moderate, and critical levels. Visual indicators using green, yellow, and red LEDs provide immediate feedback, while a buzzer alert is activated when the noise exceeds permissible limits. In addition, real-time data is transmitted to a mobile application through an IoT platform, enabling remote monitoring and instant notifications to authorized hospital staff. The proposed solution is cost-effective, energy-efficient, and easy to deploy. Experimental testing confirms reliable performance, quick response time, and stable wireless communication, making the system suitable for maintaining a calm and controlled hospital environment.

Keywords: IoT, ESP32, Sound Sensor, Noise Monitoring, Hospital Automation, Embedded Systems, Real-Time Alert System

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