Utilization of Internet of Things (IoT) in Air Quality Monitoring Systems: A Contemporary Literature Review in Malaysia and Indonesia

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Abstract

Air quality monitoring has become increasingly important due to the rising levels of pollution caused by rapid urbanization and industrial activities. The Internet of Things (IoT) offers an innovative solution through real-time, cost-effective, and scalable environmental monitoring systems. This literature review examines recent studies from 2018 to 2024 on the application of IoT in air quality monitoring in Malaysia and Indonesia. Findings show that both countries have implemented IoT-based sensor networks to monitor pollutants such as PM2.5, CO, and NO_2 in real time, using platforms like LoRaWAN, MQTT, and ESP-Now. Projects in Malaysia (Hawari et al., 2023; Rozali et al., 2021; Alrubaye et al., 2025) emphasize low-power wide-area networks, while Indonesian initiatives (Irawan et al., 2021; Budiawan et al., 2024; Pratomo et al., 2025) focus on low-cost open-source systems. However, challenges remain in sensor accuracy, data standardization, and network coverage. The study concludes that strong policy frameworks and multi-sector collaboration are essential for sustainable and reliable IoT-based air quality monitoring.

Keywords: Internet of Things; Air pollution; Environmental monitoring; Malaysia; Indonesia.