Pembuatan Environment *Monitoring* System Untuk Ruang Server Universitas Telkom Surabaya

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Abstract

The server room is a crucial data operation center for PUTI Telkom University Surabaya, and environmental conditions such as temperature, humidity, gas concentration, and distance greatly affect hardware performance. This study develops a real-time environmental monitoring system with DHT22, MQ-2, HC-SR04, and RC522 sensors, integrated with an ESP32 microcontroller and Telegram notification system, to monitor temperature, humidity, gas concentration, and distance and provide early warning if dangerous conditions are detected. The methodology involves designing hardware with six ESP32 NodeMCUs that collect data from various sensors, which are then sent and processed on a Flask server in Microsoft Azure App Service, and stored in Azure Cosmos Database for web visualization and notification via Telegram. Test results show high accuracy of the sensors, with the DHT22 sensor having an average error of 2.0% for temperature and 5.9% for humidity, the HC-SR04 sensor with very low error, the MQ-2 sensor detecting dangerous gases well, and the RC522 sensor being effective in RFID detection. This system is expected to improve the security and operational reliability of the server room through responsive monitoring and early notification.

Keywords: *Server Room, Monitoring, Sensor, Real-Time*