IOT-BASED FIRE MONITORING AND EARLY WARNING SYSTEM WITH NODE-RED DASHBOARD INTEGRATION AND TELEGRAM NOTIFICATIONS

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ABSTRACT

Fire is a disaster that can occur at any time and often causes significant losses, both materially and morally. Fire management in Indonesia still relies on manual reports from the public, which are often late and inaccurate. This research aims to design an Internet of Things (IoT)-based fire detection and rapid response system that can operate automatically without the need for manual reports. It integrates a monitoring dashboard and real-time notifications via Telegram to expedite the response of firefighters. This research used a quantitative approach, with stages including problem identification, literature review, system design, prototyping, testing, and evaluation. The system was designed using an MQ-7 sensor to detect carbon monoxide gas and a DHT22 sensor to monitor temperature, along with a Node-RED dashboard that displays data in real time and sends automatic notifications to Telegram. Test results showed that the sensors performed accurately with an average error of 2.88%, and the system was able to detect potential fires responsively in seven simulation scenarios with a 100% success rate.

Keywords*: Fire detection, MQ-7 sensor, DHT22 sensor, Node-RED*