



UWHS

**SIMULASI ALAT PENDETEKSI ASAP DAN
NYALA API PADA RUANGAN MRI BERBASIS
IoT (*Internet of Things*)**

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JUDUL : SIMULASI ALAT PENDETEKSI ASAP DAN NYALA API PADA
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Semarang, 04 September 2025

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PERNYATAAN PERSETUJUAN

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ABSTRAK

Kebakaran merupakan bencana yang dapat menimbulkan kerugian besar, baik material maupun korban jiwa. Oleh karena itu, deteksi asap dan nyala api menjadi hal yang sangat penting. Yang mana penelitian ini bertujuan merancang simulasi alat pendeteksi asap dan nyala api berbasis IoT yang bisa memberikan peringatan lebih dini melalui peringatan yang dikirim di aplikasi Blynk IoT. Sistem ini diharapkan menjadi prototipe sederhana, murah, dan mudah di implementasikan khususnya di ruang rumah sakit seperti ruang MRI yang rawan korsleting listrik.

Alat simulasi menggunakan *Sensor MQ-2* untuk mendeteksi asap dan *Flame Sensor* untuk mendeteksi nyala api. Dengan menggunakan mikrokontroler ESP32 sebagai pusat kendali dan sebagai pengirim data secara nirkabel melalui *WiFi* ke aplikasi Blynk IoT. Informasi kemudian ditampilkan pada LCD dan disertai *Buzzer* sebagai alarm. Pengujian ini dilakukan di dalam kotak akrilik berukuran 40x30x30 cm, dengan hasil alat mampu mendeteksi asap dan api pada jarak hingga 25 cm secara real-time.

Hasil pengujian menunjukkan alat bekerja sesuai rancangan dan dapat mengirimkan notifikasi cepat kepada pengguna. Dengan keakurasian alat 100% dapat mendeteksi asap dan api secara baik. Dengan desain yang sederhana dan biaya rendah, prototipe ini memiliki potensi untuk meningkatkan keamanan ruang rumah sakit maupun lingkungan lain yang beresiko kebakaran.

Kata Kunci: *Kebakaran, IoT, ESP32, Sensor MQ-2, Flame Sensor, Blynk IoT.*



ABSTRACT

Fire is a disaster that can cause enormous losses, both material and human casualties. Therefore, smoke and fire detection is very important. This study aims to design a simulation of an IoT-based smoke and fire detection device that can provide early warnings through alerts sent to the Blynk IoT application. This system is expected to be a simple, inexpensive, and easy-to-implement prototype, especially in hospital rooms such as MRI rooms, which are prone to electrical short circuits.

The simulation tool uses an MQ-2 sensor to detect smoke and a flame sensor to detect fire. It uses an ESP32 microcontroller as a control center and to send data wirelessly via WiFi to the Blynk IoT application. The information is then displayed on an LCD screen and accompanied by a buzzer as an alarm. This test was conducted inside an acrylic box measuring 40x30x30 cm, with the device capable of detecting smoke and fire at a distance of up to 25 cm in real-time.

Test results show that the device works as designed and can send notifications to users quickly. With 100% accuracy, the device can detect smoke and fire effectively. With its simple design and low cost, this prototype has the potential to improve safety in hospitals and other environments at risk of fire.

Keywords: Fire, IoT, ESP32, MQ-2 Sensor, Flame Sensor, Blynk IoT.

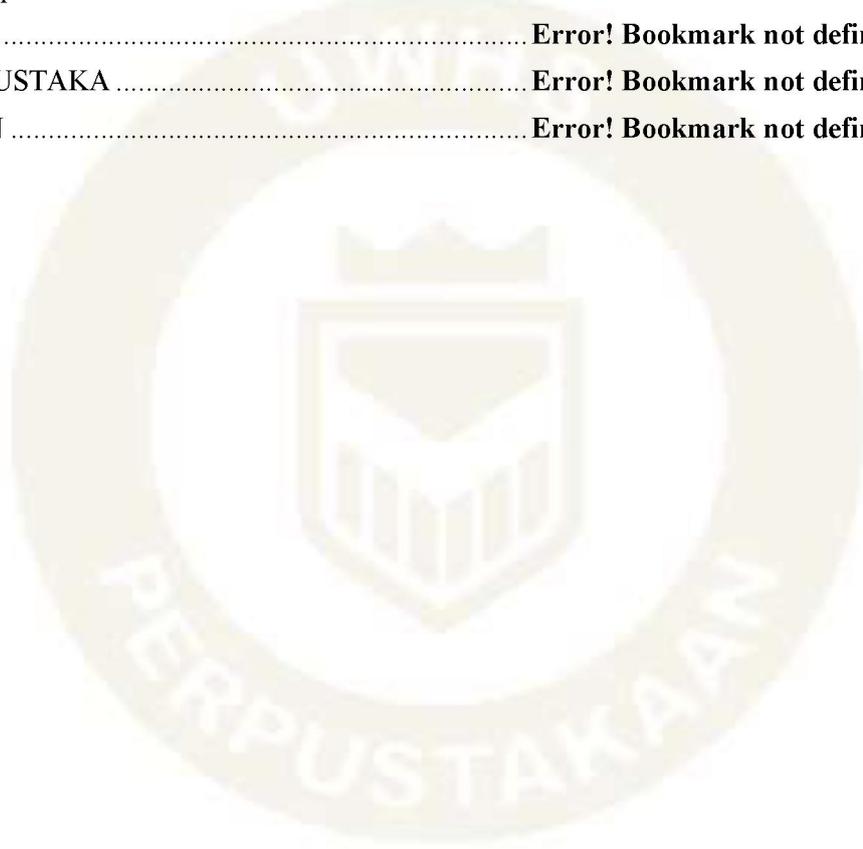


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