

ABSTRAK

SMART FLOOD CONTROL : ALAT DETEKSI BANJIR OTOMATIS TERINTEGRASI DENGAN POMPA BERBASIS *INTERNET OF THINGS* (IOT)

(2025: 67 Halaman + 24 Gambar + 6 Tabel + Daftar Pustaka + Lampiran)

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JURUSAN TEKNIK ELEKTRO

**PROGRAM STUDI DIII TEKNIK ELEKTRONIKA POLITEKNIK
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Banjir merupakan salah satu bencana yang sering terjadi di lingkungan permukiman dan menimbulkan kerugian materil maupun nonmateril. Oleh karena itu, dibutuhkan sistem deteksi dan mitigasi banjir yang bekerja secara otomatis dan real-time. Pada penelitian ini, dirancang dan diuji sistem pendeteksi banjir otomatis berbasis mikrokontroler ESP32 yang terintegrasi dengan sensor ultrasonik JSN-SR04T, pompa air AC 90 watt, dan platform *Internet of Things* (IoT) menggunakan aplikasi Blynk. Hasil pengujian menunjukkan bahwa sistem mampu membaca ketinggian air dengan akurat dan mengaktifkan pompa saat ambang batas tercapai. Sensor memberikan data konsisten, dengan waktu aktif pompa sebanding dengan waktu respon sensor, misalnya 28 detik pada ketinggian 10 cm dan 91 detik pada 25 cm. Debit air yang dipompa meningkat proporsional, dari 18,5 liter (10 cm) hingga 52,5 liter (25 cm). Aplikasi Blynk berhasil menampilkan status air secara real-time dan mengirimkan notifikasi sesuai klasifikasi level banjir. Dengan implementasi sistem kontrol loop tertutup dan integrasi IoT, alat ini terbukti mampu merespons kondisi banjir ringan secara otomatis, efisien, dan dapat diandalkan untuk aplikasi skala rumah tangga. Sistem ini juga membuka peluang pengembangan lebih lanjut dalam pemantauan bencana berbasis teknologi cerdas.

Kata Kunci: Banjir, IoT, ESP32, JSN-SR04T, Pompa Otomatis, Blynk.

ABSTRACT

SMART FLOOD CONTROL: AN AUTOMATIC FLOOD DETECTION DEVICE INTEGRATED WITH A PUMP BASED ON THE INTERNET OF THINGS (IOT)

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Flooding is a common disaster in residential areas that causes both material and non-material losses. To address this issue, an automatic and real-time flood detection and mitigation system is needed. This study presents the design and testing of a smart flood control system based on the ESP32 microcontroller, integrated with the JSN-SR04T ultrasonic sensor, a 90-watt AC water pump, and an Internet of Things (IoT) platform using the Blynk application. The test results show that the system can accurately detect water levels and automatically activate the pump when the threshold is reached. The sensor provided consistent readings, with the pump activation time matching the sensor response time—for instance, 28 seconds at a 10 cm water level and 91 seconds at 25 cm. The pumped water volume increased proportionally, from 18.5 liters at 10 cm to 52.5 liters at 25 cm. The Blynk application successfully displayed real-time water level status and sent notifications based on pre-defined flood levels. By implementing a closed-loop control system and IoT integration, the device is proven to respond effectively to minor flooding conditions in an automatic, efficient, and reliable manner. This system demonstrates its potential for household-scale flood monitoring and opens opportunities for further development in smart disaster management technologies.

Keywords: *Flood, IoT, ESP32, JSN-SR04T, Automatic Pump, Blynk.*