

ABSTRAK

Muhammad Alif Kasyafi. 2025. Skripsi. Sistem Pemantauan Banjir Berbasis IoT untuk Perlindungan Listrik Rumah Tangga. Program Studi Pendidikan Teknik Elektro, Universitas PGRI Madiun. Pembimbing (I) Umi Kholifah, M.Pd. Pembimbing (II) Pramudiya Ardi, M.Pd.

Banjir merupakan salah satu bencana alam paling umum di Indonesia, terutama di daerah dengan curah hujan tinggi. Selain kerusakan fisik, banjir juga menimbulkan risiko tersembunyi seperti korsleting listrik akibat instalasi yang terendam air. Masalah ini semakin parah karena pemadaman listrik masih bergantung pada tindakan manual oleh warga, yang berisiko jika dilakukan terlalu terlambat. Penelitian ini bertujuan untuk mengembangkan sistem pemantauan banjir berbasis Internet of Things (IoT) yang dapat mendeteksi tingkat air secara real-time, memberikan peringatan dini melalui alarm dan indikator visual, mematikan listrik secara otomatis, serta mengirimkan notifikasi melalui WhatsApp kepada pemilik rumah dan pihak terkait.

Sistem ini dibangun menggunakan mikrokontroler NodeMCU ESP8266, sensor ultrasonik HC-SR04, relé otomatis, buzzer, dan layanan API CallMeBot. Pengembangan sistem mengikuti model ADDIE, yang mencakup tahap analisis, desain, pengembangan, implementasi, dan evaluasi. Pengujian dilakukan menggunakan simulasi pipa air pada empat tingkat banjir: normal, peringatan 1, peringatan 2, dan bahaya. Hasil pengujian menunjukkan bahwa sistem berfungsi secara konsisten dalam mendeteksi tingkat air dan merespons secara otomatis sesuai parameter. Validasi oleh tiga ahli menghasilkan skor kelayakan rata-rata 86,67% (kategori “Layak”), sementara uji respons lima responden komunitas memperoleh skor 91,24% (kategori “Sangat Layak”). Hasil ini menunjukkan bahwa sistem dapat menjadi solusi efektif dalam meminimalkan risiko korsleting listrik selama banjir, serta mendukung peningkatan kesiapsiagaan masyarakat terhadap bencana.

Kata kunci: *Banjir, IoT, Pemantauan Banjir, Perlindungan Listrik, WhatsApp*

ABSTRACT

Muhammad Alif Kasyafi. 2025. Thesis. IoT-based flood monitoring system for home electrical protection. Electrical Engineering Education Study Program, PGRI University Madiun. Advisor (I) Umi Kholifah, M.Pd. Advisor (II) Pramudiya Ardi, M.Pd.

Flooding is one of the most common natural disasters in Indonesia, especially in areas with high rainfall. In addition to physical damage, flooding also poses hidden risks such as electrical short circuits due to submerged installations. This problem is exacerbated by the fact that power cuts still depend on manual action by residents, which is risky if done too late. This research aims to develop an Internet of Things (IoT)-based flood monitoring system that can detect water levels in real time, provide early warnings through alarms and visual indicators, automatically cut off electricity, and send notifications via WhatsApp to homeowners and relevant parties.

This system was built using a NodeMCU ESP8266 microcontroller, HC-SR04 ultrasonic sensor, automatic relay, buzzer, and CallMeBot API service. The system development followed the ADDIE model, which includes the stages of analysis, design, development, implementation, and evaluation. Testing was conducted using a water tube simulation at four flood levels: normal, alert 1, alert 2, and danger. The test results showed that the system worked consistently in detecting water levels and responding automatically according to the parameters. Validation by three experts resulted in an average feasibility score of 86.67% (category “Feasible”), while a response test of five community respondents obtained a score of 91.24% (category “Highly Feasible”). These results indicate that the system can be an effective solution in minimizing the risk of electrical short circuits during floods, as well as supporting increased community preparedness for disasters.

Keywords: *Flood, IoT, Flood Monitoring, Electrical Protection, WhatsApp*