

ABSTRAK

RANCANG BANGUN PEMANTAUAN KONDISI JALAN PIPA DI KAWASAN RAWA TERINTEGRASI *IoT* DI KECAMATAN PLAJU

(2025 : 68 Halaman, 33 Gambar + 14 Tabel + Daftar Pustaka + Lampiran)

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Jalan Pipa di kawasan rawa di Kecamatan Plaju, Palembang, rawan genangan air karena kontur tanahnya rendah dan dekat dengan rawa. Luapan air dari sungai dan curah hujan yang tinggi sering mempengaruhi wilayah ini setiap musim hujan. Genangan air yang melanda wilayah seperti Rawa Pipa berdampak besar pada transportasi. Penyebab utama genangan di daerah ini adalah kondisi geografis yang buruk dan sistem drainase yang tidak ideal. Selain memperlambat arus lalu lintas, jalan yang tergenang meningkatkan risiko kecelakaan dan kerusakan kendaraan. Karena kendaraan harus memperlambat laju agar tidak merusak kendaraan atau mengganggu pengendara lain, banjir di jalan dapat menyebabkan kemacetan lalu lintas dan kerusakan kendaraan.

Alat ini mampu mengklasifikasikan sistem pemantauan kondisi jalan pipa di kawasan rawa Kecamatan Plaju berbasis Internet of Things (IoT) dengan memanfaatkan tiga sensor utama, yaitu sensor kelembaban tanah (YL-69), sensor hujan (YL-83), dan sensor ultrasonik (HC-SR04), serta menggunakan mikrokontroler ESP32 sebagai unit pemrosesan data dan pengiriman informasi secara real-time. Sistem diujikan selama 10 hari, menghasilkan data utama berikut: nilai soil sensor berkisar antara 3680–3750 untuk kondisi "Aman (Kering)", turun menjadi 1400 pada kondisi tanah lembab (status "Waspada"), sementara rain sensor menunjukkan nilai 3100–3650 saat tidak hujan dan menurun drastis hingga 1250 saat hujan ringan terjadi, serta jarak air yang terukur tetap stabil pada 16–18 cm, menandakan tidak ada genangan. Seluruh data sensor diolah dan dikirimkan secara otomatis ke aplikasi WhatsApp melalui layanan Twilio, sehingga status jalan dapat dimonitor dari jarak jauh secara akurat dan cepat.

Kata Kunci: Rawa, Internet of Things, Soil Moisture YL-69, Ultrasonic HC-SR04, Rain Sensor YL-83, Keselamatan Berkendara.

ABSTRACT

DESIGN AND DEVELOPMENT OF AN INTEGRATED IOT-BASED ROAD CONDITION MONITORING SYSTEM FOR PIPA ROAD IN THE SWAMP AREA OF PLAJU DISTRICT"

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Pipa road in the Rawa Area in Plaju Subdistrict, Palembang, is prone to inundation due to its low land contour and proximity to swamps. Overflowing water from rivers and heavy rainfall often affect this area every rainy season. Waterlogging in areas such as Rawa Pipa has a major impact on transportation. The main causes of inundation in this area are poor geographical conditions and non-ideal drainage systems. In addition to slowing down the flow of traffic, flooded roads increase the risk of accidents and vehicle damage. Since vehicles have to slow down so as not to damage the vehicle or disturb other motorists, flooding on roads can cause traffic jams and vehicle damage.

This tool is able to classify the system of monitoring the condition of pipeline roads in the swamp area of Plaju District based on the Internet of Things (IoT) by utilizing three main sensors, namely soil moisture sensor (YL-69), rain sensor (YL-83), and ultrasonic sensor (HC-SR04), as well as using ESP32 microcontroller as data processing unit and sending information in real-time. The system was tested for 10 days, resulting in the following main data: soil sensor values ranged from 3680-3750 for "Safe (Dry)" conditions, dropping to 1400 in moist soil conditions ("Alert" status), while the rain sensor showed values of 3100-3650 when there was no rain and dropped dramatically to 1250 when light rain occurred, and the measured water

distance remained stable at 16-18 cm, indicating no inundation. All sensor data is processed and sent automatically to the WhatsApp application through the Twilio service, so that road status can be monitored remotely accurately and quickly.

Keywords: *Swamp, Internet of Things, Soil Moisture YL-69, Ultrasonic HC-SR04, Rain Sensor YL-83, Driving Safety..*