ABSTRAK

PERANCANGAN PERANGKAT LUNAK SISTEM *MONITORING* TRANSPORTASI AIR DI SUNGAI MUSI UNTUK MENINGKATKAN KEAMANAN BERBASIS *INTERNET OF THINGS* SECARA *REAL-TIME*

(2025 : xxi + 119 HALAMAN + 125 GAMBAR + 10 TABEL + 12 LAMPIRAN)

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Sungai Musi merupakan jalur transportasi vital di Kota Palembang yang memiliki peran penting dalam kegiatan ekonomi, sosial, dan pariwisata. Namun, tingginya aktivitas transportasi air di dermaga seperti Ilir 16 dan 7 Ulu menimbulkan tantangan serius dalam aspek keamanan dan pendataan kapal. Penelitian ini bertujuan untuk merancang sistem monitoring transportasi air berbasis Internet of Things (IoT) secara real-time guna meningkatkan keamanan dan efisiensi pengelolaan dermaga. Perancangan sistem dilakukan dengan mengintegrasikan Raspberry Pi 5, kamera, dan aplikasi Telegram untuk mendeteksi keberadaan kapal, mengirimkan notifikasi, serta mencatat aktivitas kapal secara otomatis. Sistem ini memanfaatkan algoritma object detection YOLOv5 dan pengelolaan dataset melalui platform Roboflow dan Kaggle. Metode penelitian meliputi studi literatur, perancangan perangkat keras dan lunak, pengujian sistem, hingga analisis hasil. Hasil pengujian menunjukkan bahwa sistem mampu melakukan deteksi kapal secara akurat, mengirim data secara real-time, serta memberikan notifikasi kepada pihak berwenang melalui Telegram. Dengan demikian, sistem ini diharapkan dapat membantu Balai Pengelola Transportasi Darat (BPTD) Wilayah VII Sumatera Selatan dalam meningkatkan keamanan, efisiensi, dan akurasi pendataan transportasi air di Sungai Musi.

Kata Kunci: Transportasi Air, Internet of Things (IoT), Real-Time Monitoring, Raspberry Pi, Sungai Musi, YOLO, Telegram.

ABSTRACT

SOFTWARE DESIGN OF A WATER TRANSPORTATION MONITORING SYSTEM ON THE MUSI RIVER TO ENHANCE SECURITY BASED ON INTERNET OF THINGS IN REAL-TIME

(2025 : xxi + 119 *PAGES* + 125 *PICTURES* + 10 *TABLE* + 12 *ATTACHMENTS*)

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The Musi River serves as a vital water transportation route in Palembang City, playing an essential role in the region's economic, social, and tourism activities. However, the high volume of transportation activity at ports such as Ilir 16 and 7 Ulu presents serious challenges in terms of security and vessel data management. This study aims to design a real-time Internet of Things (IoT)-based monitoring system to improve safety and efficiency at river ports. The system integrates Raspberry Pi 5, a camera, and the Telegram application to detect vessels, send notifications, and automatically record vessel activity. Object detection is carried out using the YOLOv5 algorithm, with dataset management handled through Roboflow and Kaggle platforms. The research methodology includes literature review, hardware and software design, system testing, and result analysis. Test results show that the system is capable of accurately detecting vessels, transmitting data in real-time, and notifying authorities via Telegram. Therefore, this system is expected to support the Land Transportation Management Agency (BPTD) of Region VII South Sumatra in enhancing security, operational efficiency, and the accuracy of water transportation data management in the Musi River.

Keywords: *Water Transportation, Internet of Things (IoT), Real-Time Monitoring, Raspberry Pi, Musi River, YOLO, Telegram.*