

ABSTRAK

MENINGKATKAN KINERJA SISTEM MONITORING AKTIVITAS MEMBUANG SAMPAH SECARA *REAL TIME* MENGGUNAKAN KECERDASAN BUATAN

Karya tulis ilmiah berupa Tugas Akhir, 24 Juli, 2025

Deden lasmana; dibimbing oleh Nyayu Latifah Husni dan RD. Kusumanto

XIV + 86 Halaman + 43 Gambar + 20 Tabel + Daftar Pustaka + Lampiran.

Pembuangan sampah ke Sungai Sekanak masih menjadi permasalahan lingkungan yang berdampak besar, seperti pencemaran air, penyumbatan aliran, dan peningkatan risiko banjir. Untuk mengatasi hal tersebut, penelitian ini mengembangkan sistem monitoring berbasis kecerdasan buatan (AI) yang mampu mendeteksi aktivitas membuang sampah secara otomatis dan real time. Sistem ini menggunakan algoritma YOLO (You Only Look Once) untuk mendeteksi objek manusia dan sampah melalui rekaman CCTV, serta didukung metode Euclidean Distance dan Skipping Frame untuk meningkatkan efisiensi dan akurasi deteksi. Selain itu, sistem dilengkapi sensor lingkungan untuk memantau parameter seperti ketinggian air, suhu, kelembapan, tekanan udara, dan curah hujan, yang divisualisasikan secara real time melalui platform SCADA Smartics. Dengan total dataset sebanyak 7.065 gambar, hasil pengujian menunjukkan bahwa sistem mencapai precision rata-rata sebesar 97,8% pada siang hari dan 83,8% pada malam hari. Sistem ini diharapkan dapat mendukung pemantauan otomatis dari jarak jauh serta mendorong peningkatan kesadaran masyarakat dalam menjaga kebersihan dan kelestarian lingkungan sungai.

Kata kunci : YOLO, Deteksi Sampah, SCADA, *Euclidean Distance*, *Skipping Frame*, monitoring real time, Sungai Sekanak

ABSTRACT

IMPROVING THE PERFORMANCE OF REAL-TIME WASTE DISPOSAL ACTIVITY MONITORING SYSTEMS USING ARTIFICIAL INTELLIGENCE

Scientific Paper in the form of Final Project, 24 July, 2025

Deden lasmana; guided by Nyayu Latifah Husni and RD. Kusumanto

XIV + 86 Pages + 43 Pictures + 20 Table + Bibliography + Attachment.

The disposal of waste into the Sekanak River remains a significant environmental issue, causing problems such as water pollution, blocked waterways, and increased flood risk. To address this issue, this study developed an artificial intelligence (AI)-based monitoring system capable of automatically detecting waste disposal activities in real time. The system uses the YOLO (You Only Look Once) algorithm to detect human objects and waste through CCTV recordings, supported by the Euclidean Distance and Skipping Frame methods to enhance detection efficiency and accuracy. Additionally, the system is equipped with environmental sensors to monitor parameters such as water level, temperature, humidity, air pressure, and rainfall, which are visualized in real time through the SCADA Smartics platform. With a total dataset of 7,065 images, the test results show that the system achieves an average precision of 97.8% during the day and 83.8% at night. This system is expected to support remote automatic monitoring and encourage increased public awareness in maintaining the cleanliness and sustainability of the river environment.

Keywords: YOLO, Waste Detection, SCADA, Euclidean Distance, Skipping Frame, real-time monitoring, Sekanak River