KOMPARASI PERFORMA YOLO V5, V6, V7, DAN V8 PADA SISTEM KLASIFIKASI KENDARAAN *OVER DIMENSION*

(*Performance Comparison of Yolo V5, V6, V7, and V8 On Over Dimension Vehicle Classification System*)

Aji Seto Arifianto S. ST, M.T, as a counsellor

Wildan Asyrof Dewayana
Study Program of Informatics Engineering
Majoring of Information Technology
Program Studi Teknologi Informasi
Jurusan Teknik Informatika

ABSTRACT

Road Infrastructure have an important role in supporting Indonesia's economy by facilitating human movement as well as distribution and logistics activities. Currently, only 42% of the 480,000 kilometers of district or city roads are in decent condition. One of the main causes of road damage is ODOL (over-dimension overload) trucks, which are also a significant contributor to the number of traffic accidents. This research develops a computer vision application for truck and over dimension detection using the YOLO (You Only Look Once) method and compares the performance of several YOLO versions (v5, v6, v7, and v8). Comparisons were made based on computational speed, accuracy, and device resource usage. The results show that YOLOv8 is able to detect trucks in real-time with a computational speed of 0.23 seconds per frame, followed by YOLOv5 (0.33 seconds), YOLOv6 (0.35 seconds), and YOLOv7 (0.76 seconds). All four versions of YOLO can classify normal and over dimension trucks after training with 400 epochs. YOLOv8 has the highest mean average precision (mAP50) value of 0.908, but with the largest resource consumption (80.02% RAM and 96.96% CPU). YOLOv7 has an mAP50 of 0.893 with high resource usage, while YOLOv5 shows the best balance between accuracy (mAP50 0.875) and resource efficiency. YOLOv6 has a mAP50 of 0.856 with higher RAM and CPU utilization than YOLOv5.

Keywords: Computer Vision, Truck Over Dimension, YOLO, You Only Look Once, Digital Image Processing.