Zebra Cross Violation Detection with YOLOv9: A Novel Approach for Traffic Regulation in Indonesia

Muhammad Najmi Kamil[1], Gamma Kosala[2]

[1,2]Fakultas Informatika, Universitas Telkom, Bandung
[1]najmikamil@students.telkomuniversity.ac.id,
[2]gammakosala@telkomuniversity.ac.id,

Abstract

Technological advancements in zebra cross-violation detection are necessary to address traffic rule violations in Indonesia, especially zebra cross violations. The You Only Look Once (YOLO) algorithm has been effective for detecting objects in various situations. The objective of this research is to focus on detecting zebra cross violation using YOLOv9, the improved accuracy and efficiency from earlier versions of YOLO. Consisting of two models to detect violations of the zebra crossing. The first model, a segmentation model YOLO, is used for zebra cross localization, while the second model is pretrained YOLO detects the vehicles. The results of these two models are used for calculations in considering violations by drivers. Two datasets were used in this research. One of the datasets has 1100 images of zebra crosses, while the other comprises 100 surveillance videos from CCTV in Yogyakarta, Indonesia, for testing. The findings from this study indicate that the approach enables effective and efficient detection and classification of zebra crossing violations with an accuracy of 93%. This research demonstrating the approach's enhanced ability to handle real-world scenarios with diverse camera angles and varying traffic conditions. Additionally, it underscores the potential for practical applications in automated traffic monitoring and enforcement.

Keywords: object detection, object segmentation, traffic violation, YOLO, zebra cross.