

# ***VEHICLE TYPE DETECTION AND CLASSIFICATION USING THE YOLOv8 ALGORITHM***

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## ***ABSTRACT***

*The increasing volume of vehicles in traffic has led to a high complexity of road conditions that have the potential to increase the risk of accidents. One effort to support improved traffic safety is to implement an automatic vehicle detection system using computer vision technology. This study aims to develop a vehicle type detection system using the YOLOv8 algorithm, which has advantages in speed and accuracy of object detection. Research data was obtained from traffic video recordings converted into digital images. The dataset used was grouped into four vehicle categories: motorcycles, cars, buses, and trucks. The data was processed through several stages, including annotation, preprocessing, and data augmentation to increase the amount of data and the model's generalization ability. The model training process was carried out using a GPU-based application to obtain optimal performance. Test results show that the YOLOv8 model is able to detect vehicle types with good performance. Model evaluation produced high precision and recall values for each vehicle class, with a mean average precision (mAP50) value of 96.4%. These results indicate that the model has a good level of accuracy in distinguishing various vehicle types in dense traffic conditions. Based on these results, the developed vehicle type detection system can be used as an aid in traffic monitoring and analysis.*

**Keywords:** *YOLOv8, Object Detection, Vehicle, Deep Learning, Computer Vision.*