

Real-Time Vehicle Type Recognition Using Deep Learning Techniques

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Modern intelligent transportation systems heavily rely on vehicle type classification technology. Deep learning-based vehicle type classification techniques have sparked a growing concern as Image Processing, Pattern recognition, and Deep Learning have all advanced. Convolutional neural network, particularly You Only Look Once (YOLO), has demonstrated significant benefits in image classification and object detection during the past few years. Due to its ability to forecast objects in real time, this algorithm increases detection speed. High accuracy: The YOLO prediction method yields precise results with few background mistakes. Additionally, YOLO is aware of generalized object representation. This method, which ranks among the best for object detection, performs significantly better than R-CNN techniques. In this paper, YOLOv5 is used to demonstrate vehicle type detection; the YOLOv5 m model was chosen since it suits mobile deployments. The model was trained with a dataset of 9200 images, where 2300 images were allocated for each class with a variety of vehicles. Experimental results for 100 epochs with a batch size of 16 show mAP@.5 at 78.1% and mAP@.5:.95 at 71.7% trained and tested on four vehicle classes.

Keywords: *You Only Look Once (YOLO), deep learning, Convolutional Neural Networks (CNN), Single Shot Detector (SSD), vehicle recognition*