Vehicle Detection Using YOLOv8 Deep Learning Approach for Low-Resolution Images

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Abstract:

Vehicle detection in low-resolution images is a major challenge as the loss of important visual features makes accurate detection harder. The study presents a novel solution, which utilizes YOLOv8, a cutting-edge object detection model, to reliably detect vehicles under degraded visual environments. An image matching method has been utilized as a pre- processing method to improve the quality of the image before object detection, thereby helping to increase feature extraction and reduce model complexity. By applying this technique, YOLOv8 could tackle the challenge of detecting objects of different scales more effectively, subsequently boosting accuracy. Experimental results prove the aforementioned model provide even higher than 98% accuracy with low-resolution images. This approach is highly applicable to real life scenarios including traffic monitoring, autonomous driving, and surveillance

Keywords:

Vehicle Detection, YOLOv8, Deep Learning, Image Matching Method, Intelligent Transport Systems.