PROJECT REPORT

COMPARATIVE STUDY OF PARKING SLOT USING YOLOV8S AND YOLOV8M

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ABSTRACT (ABSTRACT TITLE)

Urban areas are increasingly burdened by traffic congestion due to the growing number of vehicles and limited parking availability. This study aims to address the issue by developing a computer vision-based system that detects occupied and unoccupied parking slots using object detection. A comparative analysis is conducted between two YOLOv8 variants—YOLOv8s and YOLOv8m—to evaluate their effectiveness. A custom dataset comprising 994 labeled images from a university parking lot was utilized, with pre-processing and augmentation techniques applied to improve model performance. Both models were assessed using key metrics such as precision, recall, F1-score, and mean Average Precision (mAP). YOLOv8m of 90.91%, recall of 100%, and F1-score of 95.24%, achieved a precision while YOLOv8s slightly outperformed it with a precision of of 92.44%, recall of 100%, and F1-score of 96.07%,. Both models attained an excellent mAP@50 of 0.995. These results indicate that both models are highly effective, with YOLOv8s offering slightly better accuracy at the cost of higher computational demands. This study highlights the potential of YOLOv8-based object detection for real-time smart parking systems. Future work could focus on real-time video stream integration, broader dataset collection, and deployment in IoT-based smart city applications.

Keyword: Parking Detection, YOLOv8, Computer Vision, Object Detection, Smart Parking, Deep Learning, Image Processing