

ABSTRACT

Finding an empty parking spot in an open area can often be a challenge, especially in busy shopping centers. This study aims to design a system for detecting the availability of parking spots in real time using the YOLOv8 algorithm implemented on mobile devices. YOLOv8 was chosen for its fast and accurate object detection capabilities. The dataset consists of 131 images of outdoor parking areas, annotated into two classes: empty and cars. Model training was conducted with various hyperparameter configurations to evaluate performance based on precision, recall, and the mAP@50 metric. The best results were obtained with the Adam optimizer configuration, yielding 96.74% precision, 99.06% recall, and 99.17% mAP@50. These results were also integrated into a React Native-based mobile application where the results are displayed in real-time as detection occurs. Testing results confirm that the system accurately provides information about available parking slots in a responsive manner during daytime conditions. However, detection accuracy in nighttime conditions decreases slightly due to low lighting levels, necessitating improvements through enhanced data and augmentation specific to dark conditions. This study demonstrates that YOLOv8-based object detection technology can effectively address the challenge of finding parking spaces in open areas.

Keywords : *Computer Vision, Parking Detection, Mobile Devices, Real-Time, YOLOv8*