ABSTRACT

Potholes are one of the main causes of traffic accidents and vehicle damage in Indonesia, mainly due to the lack of an effective early warning system. This study develops a pothole detection system using the You Only Look Once (YOLO) method, combined with spatial position classification and voice notification to help improve driver awareness. The system is designed to detect potholes in road images and classify their positions into three horizontal zones: left, center, or right. The dataset used in this research includes primary data from field image collection and secondary data from Roboflow, which were annotated and augmented to improve variation in training. The model was trained using YOLOv11 architecture with data augmentation techniques to improve robustness in real-world conditions. Experimental results show that the augmented model performs better than the baseline, with a mAP of 85,1%, Precision 87,6%, Recall 81,4%, and F1-Score of 84.4%. System validation shows that the pothole detection accuracy reaches 71%, while spatial classification accuracy is 68%. The system also successfully provides automatic voice notifications. In the future, the system can be developed with pothole width and distance measurement, integration into dashcams, and multi-platform support to increase user benefits and accessibility.

Keywords — **YOLOv11, *pothole* detection, voice notification, spatial classification, data augmentation, road safety.**