ABSTRACT

Roads are one of the public facilities that are expected to provide comfort, accessibility, and safety for people with disabilities and the elderly. However, many roads have potholes, cracks, or other damage that can endanger road users. Through the application of computer vision-based technology, identification of road damage can be a necessity to facilitate road users, especially road users who use wheelchairs. By applying computer vision, this research aims to take an effective approach in identifying road defects in detail down to the pixel level and explore techniques to increase the variety of limited road condition data. To achieve these goals, techniques to augment limited data are conducted through dataset fusion approaches and data augmentation exploration. In addition, a comparison of several models such as YOLOv8, YOLOv9, and YOLOv11 is also explored to find an effective and optimal model for road defect segmentation. The results show YOLOv8m as the best model with a mAP value of 67.5 on the box and 69.8 on the mask. The findings provide a detailed comparison of augmentation techniques and models in identifying road defects. This research is expected to make important contributions in expanding the understanding and establishment of road defect identification models so that they can be implemented in future wheelchair automation systems.

Keywords: *instance segmentation, road damage identification, YOLOv8, YOLOv9, YOLOv11*