ABSTRACT

The classification of Rupiah banknotes with high accuracy is essential to assist visually impaired individuals in quickly and efficiently recognizing the denomination of currency. This research aims to develop a real-time detection system using the You Only Look Once version 8 (YOLOv8) method for classifying Rupiah banknotes from the 2022 series. YOLOv8 was chosen for its advantages in speed and object detection accuracy compared to previous versions. The dataset used in this study is secondary data sourced from Kaggle, consisting of 980 images of Rupiah banknotes with seven denominations: Rp 1,000, Rp 2,000, Rp 5,000, Rp 10,000, Rp 20,000, Rp 50,000, and Rp 100,000. The model training process involved deep learning techniques, including data labeling, preprocessing, and evaluation using metrics such as *precision*, *recall*, and mean Average *Precision* (mAP). The results show that the YOLOv8 small variant achieved a *precision* of 98.5%, *recall* of 1, mAP50 of 98.8%, and mAP50-95 of 95.9%. In real-time testing, the YOLOv8s model was able to detect banknote denominations with an mAP of 92%, outperforming the previous method (YOLOv5m), which only achieved an accuracy of 82%. The implementation of this system is expected to assist visually impaired individuals in recognizing Rupiah banknotes more quickly and accurately, without the need to rely on blind code.

Keywords: Object Detection, YOLOv8, Banknote Classification, Real-time Detection, Visually Impaired, Deep Learning.