ABSTRACT

The crime rate in Indonesia is significantly high, with 3,335 individuals recorded as homicide victims between 2019 and 2022. Despite surveillance efforts, many incidents go undetected due to the limitations of human vision, particularly in continuous monitoring situations. To reduce crime rates involving weapons, weapon detection using artificial intelligence has become crucial for public safety. To address this issue, a system capable of automatic weapon detection is required. This study focuses on developing an object detection system using the You Only Look Once (YOLO) method, selected for its speed and accuracy in detection. The research involved testing YOLOv5s with various parameter configurations to identify the best-performing model for object detection.

Testing was conducted using predetermined parameter scenarios. On the (ARI-DaSCI) dataset, scenario 7 achieved the highest performance, with a Precision of 0.923, Recall of 0.901, F1 score of 0.912, and mAP of 0.947. On the (SNEHIL SANYAL) dataset, scenario 4 yielded the best results, with a Precision of 0.902, Recall of 0.837, F1 score of 0.868, and mAP of 0.897. These findings suggest that the number of parameters significantly impacts the performance of the YOLOv5s model in weapon detection tasks.

Keywords: Object Detection, Artificial Intelligence, Firearms, Sharp Weapon, YOLO.