ABSTRACT

Workplace safety in the construction sector has become a major concern due to the high number of work-related accidents each year, most of which are caused by low compliance with the use of Personal Protective Equipment (PPE). The main issue in manual supervision lies in its inefficiency and susceptibility to human error. To address this issue, this study proposed a solution in the form of an automatic detection model for PPE usage based on the You Only Look Once version 8 (YOLOv8) algorithm. The model was trained using the Roboflow-100 dataset and optimized through hyperparameter tuning with the grid search method to identify the best configuration. Evaluation metrics such as mean Average Precision (mAP), precision, and recall indicate that YOLOv8 effectively detects PPE objects, achieving a recall of 82% on test data. This model was expected to enhance the effectiveness and efficiency of workplace safety supervision in the construction sector.

Keywords : YOLOv8, Personal Protective Equipment, object detection, occupational safety, deep learning, grid search.