ABSTRACT

The increasing volume of traffic presents challenges in effective traffic management. Conventional systems often do not provide information regarding current traffic congestion conditions. This study develops a traffic congestion classification system based on deep learning using a hybrid model: YOLOX for vehicle detection and SegFormer for road area segmentation. Both models are integrated using a Fusion Layer approach, which combines the inference results to calculate the ratio of road area covered by vehicles. The system is implemented as a web-based application that receives input directly from a webcam and displays traffic congestion information both visually and numerically. Evaluation results show that the combined model achieves a classification accuracy of 80%, which is higher compared to using each model individually. This research successfully develops a traffic congestion classification system and provides ease of access to information, both visually and numerically, regarding traffic density based on real-time input from a webcam.

Keywords: *Deep Learning, YOLOX, SegFormer, Traffic Density Classification, Segmentation and Detection.*