ABSTRACT

The shoulder of the toll road is the left side of the toll road which is useful for vehicles experiencing an emergency. However, there are still many vehicles that use the shoulder of the toll road unwisely, such as using it to overtake other vehicles or stop or rest for a long time. This can cause an accident as well as a commotion.

Based on these problems, the Cascade R-CNN algorithm is applied which can be used as an algorithm to detect violations on toll road shoulders. Cascade R-CNN has multistage detection which can reduce overfitting due to lack of datasets. Cascade R-CNN has multistage detection which consists of three stages. The results of the detection train at the first stage will be trained again at the second stage, and so on until the results of the third stage. This multistage detection makes Cascade R-CNN called a high-quality algorithm in detecting objects.

Testing the Cascade R-CNN Algorithm was carried out using three hyperparameters, namely epoch, batch size, and learning rate. This hyperparameter test aims to get the best model for making predictions. The best model is obtained for hyperparameters at epoch 12, batch size 16, learning rate 0.02 with Average Precision=97.1%, Average Recall=79.1%, mAP@.5=97.1%, and mAP@.5:. 95=74.8%

Keyword: *Cascade R-CNN, Highway Shoulders, Object Detection*