

ABSTRACT

Object detection is one of the sub sections of computer vision that provide solutions to help human activities. Examples of its application in this research are used to detect vehicle objects that can be applied to traffic cameras. Object detection has been investigated with a variety of methods with improved results each year. Region-based Convolutional Neural Network (R-CNN) is one algorithm that produces the best performance compared to others. Despite the good object's detection performance, it is still not clear how the effects and how each layer works.

Faster R-CNN is an object detection algorithm from a combination of Fast R-CNN and Region Proposal Network. This project using the AlexNet architecture as pre-trained CNN which has 1000 classifications, then using transfer learning into 5 classifications, which is cars, motorcycles, buses and trucks also background class as a non-object class.

The system configuration to be varied in the analysis is epoch, filter size, padding and transfer learning. The data collection process based on the observation of the researcher in the form of image and video consist of 200 training data, 100 validation data and 100 test data for each class, plus 5 video of actual traffic condition. In this study, we obtained the optimal system configuration with the filter scheme {11-3-3-3-3} and same-padding based on the mean average precision (mAP) and computational complexity parameters.

Keywords: convolutional neural network, vehicle detection, deep learning, computer vision