Object Tracking for Autonomous Vehicle Using YOLO V3

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Abstract Accuracy and performance of an object detection model have always been the main requirements for an object tracking system. In this project, the performance of machine learning based object detection using YOLO v3 technique will be investigated. Two models were provided where one model is trained using online Common Objects in Contact (COCO) dataset only, and the other model is trained with additional images from Universiti Malaysia Pahang (UMP) with several different locations dataset. The performance of the trained models were evaluated using mean Average Precision (mAP), and precision techniques. The model with highest precision was selected to be implemented on actual road test. The results show that the model 2 has the highest precision and was able to detect every class of objects. Each output box had displayed the class and the distance to the objects from the RGBD camera of the vehicle. It is observed that the first model that was trained to perform the mAP value of 90.2% and a performance of 0.484 precision. For the second model, it can be seen that the accuracy of the detections are higher than that of model 1. Therefore, model 2 has a better performance with a value of 0.596 precision.

Keywords Object tracking · Autonomous vehicle · mAP

1 Introduction

Object tracking system is one of the most important safety systems in an autonomous vehicles. Object detection is the first stage of this system, which is first to determine whether any instance of objects is in an image frame. The location of the instances found can be identified by drawing a bounding box around them which the process called object localization. Image classification involves in assigning a class label

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