

ABSTRACT

Autonomous driving is a technology with a driving automation mode in which objects are captured using sensors and cameras. The object captured by the LiDAR is converted into a point cloud that represents the shape of the detected object. However, the detection of 3D objects (3 Dimensions) in autonomous driving in real time causes the distribution of the location of the coordinate points on the bounding box to not be in accordance with the objects that have been detected. Complex You Only Look Once version 4 (YOLOv4) is a solution to overcome the mismatch between the distribution of coordinate points on the bounding box with euler and one-shot regression.

In this final project, an analysis of the use of euler regression and one-shot regression on regression parameters to improve the performance of object detection in autonomous driving. Input data is used in the form of Light Detection and Ranging (LiDAR) data obtained from KITTI Vision Benchmark. The output in this final project is a model with the right bounding box in each class of object detection results.

Analysis conducted in this final project focuses on regression parameters, namely upper factor, limit angle, and scaling. The model with the best performance was obtained in the scenario III model with mAP value of 37.7%, precision in the car category of 36.1%, recall in the car category of 90.9%, AP in the car category of 77.9%, and the value of F1-score in the car category of 51.2%.

Key Word: Autonomous driving, Object Detection, YOLOv4, Euler Regression, One Shot Regression, Mean Average Precision, Frame Per Second