ABSTRACT

Detection of 3-dimensional (3D) objects in LiDAR cannot be separated from the development of autonomous driving. The use of LiDAR technology with the Complex-YOLOv4 method in testing with the KITTI test dataset (Karlsruhe Institute of Technology and Toyota Technological Institute) is a good method for real-time 3D object detection technology. However, the detection results for the class of pedestrians and cyclists in this model are still less accurate and need to be improved. This LiDAR-based detection is a challenge for researchers to accurately predict small objects.

In this final project, analysis is carried out using the Complex-YOLOv4 method that is upsample approach including bicubic, bilinear, and nearest. The parameters used for comparison of performance are precision, recall, average precision (AP), f1-score, and mean average precision (mAP). This parameter aims to find the best upsample approach in order to produce efficient performance and still maintain high performance values.

Upsample analysis was performed on the CSPDarknet-53 backbone of the Complex-YOLOv4 model. The results of each upsample approach will be compared with the upsample expand (original upsample). From the evaluation results, the nearest upsample produces a mAP of 88,7%. The bilinear upsample gives an mAP of 88,5%. The bicubic upsample produced the best mAP and was 0.2% higher than the original upsample used in Complex-YOLOv4.

Keywords: autonomous driving, Complex-YOLOv4, LiDAR, object detection, point cloud.