ABSTRACT

Artificial intelligence (AI) technology is growing rapidly along with the times. One part of AI, namely computer vision, especially Object Detection, is a technology that continues to be developed. Object Detection can be implemented on various systems, one of which is Object Detection for Unmanned Aerial Vehicles (UAV). Implementation of object detection on UAVs can be seen in several fields such as agriculture, aerial photography, freight forwarding, security and surveillance, and search and rescue. However, the performance of object detection performance on the dataset VisDrone test is a challenge for researchers in improving performance caused by the condition of the dataset consisting of several problems such as, data imbalances, scale changes, accurate predictions, memory and computational limitations for real-time applications.

In this final project, feature exploitation of the YOLOv5 algorithm is carried out in improving the performance of UAV-based object detection. YOLOv5 is an object detection algorithm based on CNN and is included in the one-stage detector algorithm. This algorithm consists of the backbone, neck, and head. YOLOv5 adapts CSP network as backbone and PANet as the neck. The output of this research is a model exploitation of the YOLOv5 architecture with the best performance value.

Some of the analyses carried out in this final project is the effects of exploitation on the backbone, namely freeze backbone, exploitation of the concat layer and freeze backbone, exploitation by adding layers on the neck and freeze backbone, and the merge of the three exploits. The model with the best performance is found in the combination of three exploitation models with a value of mAP@.5 by 22.4%. Based on the results of the mAP, feature exploitation with freeze backbone is done and the addition of a layer on the neck as well as modifications to the concat layer can affect the performance and performance of UAV-Based object detection.

Key Word : Exploitation, Object Detection, UAV, YOLOv5