ABSTRACT

The development of technology is grown rapidly, especially in the field of Artificial Intelligent, object detection is one of them. Object detection is one of the areas of interest in the development of Deep Neural Network (DNN) in computer vision. Many algorithms are already powerful and very supportive in implementing computer vision, one of it is the You Only Look Once (YOLO) algorithm. With the development of Artificial Intelligence in the field of computer vision, human work can certainly be helped by the implementation of an object detection system using an Unmanned Aerial Vehicle (UAV) of the quadcopter type. The quadcopter was chosen because it has the ability to take off and fly vertically, so it does not require a large area for its use. However, there are still many challenges in implementing object detection on quadcopters due to limited computational capabilities.

Based on these problems, this research has designed an object detection system using the YOLOv5 Nano algorithm which will be paired with a quadcopter and the addition of a dropout regularization technique is carried out. The dropout regularization technique used is a dropout of 10%, 20%, and 30%. With the existing dataset, the data training process will be carried out first to get the best weight. After the training results are obtained, direct testing is carried out by connecting the device with the camera mounted on the quadcopter via wi-fi to the sign object.

The results of this study are that the quadcopter can recognize the given sign using the YOLOv5 Nano detector object model and find out the confidence score for each distance determined during the test. By recognizing the signs given, the quadcopter should be able to make decisions on its own when recognizing the signs correctly and maneuvering according to the instructions of the signs it sees. From this study, the mAP value of YOLOv5 Nano was 95.74%, with 10% dropout regularization technique, mAp was 96.9%, with 20% dropout regularization technique was 96.98%, and 30% dropout regularization technique was 97.22%.

Keywords: YOLO, YOLOv5, Quadcopter, Object Detection, Sign Recognition