ABSTRACT

Machine learning has developed quite rapidly. One of the developments is the evolution from Artificial Neural Network (ANN) to Deep Neural Network (DNN) with learning capabilities which can be summarized as deep learning. Deep learning has been implemented in several areas such as face tracking, visual tracking and vehicle detection. Object detection is a technology that uses the concept of deep learning. Object detection has been used in several fields, one of which is the Unmanned Aerial Vehicle (UAV).

Many types of UAVs can be used for object detection such as quadcopters. However, object detection still has problems with the quadcopter. One of them is the implementation of a deep learning model for a small quadcopter which is very difficult to do because of the limited hardware capabilities of the quadcopter. Based on these problems, in this study an object detection system was designed and implemented using the YOLOv5 method and a feature exploration was carried out on the first convolutional layer YOLOv5 method.

In this final project, the feature exploration is focused on changing the kernel size value by changing the kernel size value at the layer to 5×5, 7×7 and 8×8. The initial kernel size for the convolutional layer is 6×6. There are 4 models used in this study, namely the original size YOLOv5, kernel size 5×5, kernel size 7×7, and kernel size 8×8. From the research results obtained, the highest mAP value was obtained by kernel size 5×5 with an mAP value of 89.1% or 1.2% superior to the original size YOLOv5 which received an mAP value of 87.9%.

Keywords : Deep Learning, Object Detection, Quadcopter, YOLOv5, Kernel *Size*, mAP