ABSTRACT

The distance of the farm from the settlement causes the lack of lighting around the farm. This makes the theft of livestock vulnerable to occur at night. Computer vision systems are different from the human eyes, all objects with temperatures above zero can emit infrared radiation if recorded using a thermal camera. The object detection system by utilizing thermal images can detect the movement of pedestrians around the farm in poor lighting, so that the theft of livestock can be prevented.

In this final project, the dataset used was taken on a cloudy night before using the FLIR ONE Gen 3 thermal camera and produced an image measuring 640 x 480 pixels, the range of thermal images varied, namely 5 m, 10 m, 15 m, and 20 m. Scenarios for data collection were carried out by walking alone, walking in groups or hand in hand, and walking past each other. The test scenarios were carried out on the learning rate, optimizer, data ratio, and batch size parameters. The performance parameter to measure accuracy in this final project is Mean Average Precision (mAP).

The purpose of this final project is to create an object detection system on thermal images using the Scaled YOLOv4 architecture. By using the YOLOv4-CSP scale model, the best training results were obtained using a data ratio of 70:20:10, batch size 32, and the SGD optimizer with a learning rate of 0.01. The system's accuracy in detecting objects using the best test parameters is 79.9 %, with detection time speed up to 32 FPS *(*Frames per second). The result by using test-time augmentation (TTA) obtained 80.3% higher mAP.

Kata Kunci: YOLO, *Scaled*-YOLOv4, YOLOv4-CSP, Thermal Images, Object Detection.