ABSTRACT

Augmented Reality is a technology that combines the virtual world into the real world and visualizes it in 3D. Certain characteristics must have in AR, one of them is intractable in real-time. AR utilization divided into 2 types, there are marker-based AR and markerless-based AR. This research designed an AR system with a finger as a marker. The system can do tracking-by-detection into a marker for pointers using that can be implemented in the computer and visualize it by a projector in real time.

This research use a method named You Only Look Once (YOLO) for real time object detection. This research use YOLO9000 that has been trained with PASCAL VOC with 20 classes, and then we will use transfer learning to change it into 1 class. This research using Python and the main library named TensorFlow.

The system configuration is tested using step training, batch size, and learning rate. This research analyzes the performance parameters, there are accuration, intersection of union and precision. The dataset scheme consists of 10.800 training data images and 3.600 testing data images. In this research, there are 27 configuration variances were used. After some experimental, the best configuration is learning rate 0.00002, batch size 12 and 5K step training. We have 97,739% of accuracy, 0,724 IoU and 3,597 precision. The frame rate obtained using the best configuration is 20,1 Frame Per Second (FPS).

Keywords: *Augmented Reality,* YOLO, *Pointer, Deep Learning, Accuration.*