ABSTRACT

The development of technology is increasing rapidly. One popular technology is a technology which connected between real world and virtual in a real time that allows user to interact directly and display it in 3D. This technology is known as augmented reality (AR). This AR technology has two methods namely marker and markerless. One methode that used in marker-based AR is detection based on color. However, this methode gives suboptimal results where there is still a lot of noise in the results.

In this final project AR based on marker is designed using object detection with fingerpointer. This experiment using Single shot multibox detector (SSD) with inception v2 architecture network as pre-trained Convolutional Neural network (CNN), and then do transfer learning to minimize amount of dataset into 1 classification class, namely fingerpointer. This method uses Python software and TensorFlow library. The result of this system is the track of the finger that can be used to replace the pointer in the operation of the computer which can then be displayed through the projector.

In the analysis, this research uses dataset that consist 10800 data train and 3600 data test. The best results in this research were accuracy 79.39% and IoU 0.61 in the configuration of 25,000 training steps, batch size 24, and learning rate of 0.003. Precision parameters give the best result 1,99 in step training 25000 with batch size 8 and learning rate sebesar 0,005 The result of FPS is 30.4 seconds. So, SSD is suitable to be used as object detection algorithm in real-time for AR technology.

Keywords: Augmented reality, particle filter, single shot multibox detector, convolutional neural network, inception v2 network.