

## ABSTRACT

Augmented Reality (AR) is a technology with the concept of combining the dimensions of the real world with the virtual world in realtime. Marker-based AR is a type of AR that allows virtual objects to be displayed in the real world by using markers. The use of marker-based AR requires the object detection method used for tracking markers. In a previous study, the marker tracking process used color detection on markers so that the movement of the pointer was distracted if the marker color matched the background color around.

In this Final Project, a system is designed to detect objects in the form of fingertips with Faster Region-Based Convolutional Neural Network (Faster R-CNN) as an object detection method. Faster R-CNN is an object detection method which is a combination of the Fast R-CNN method and Region Proposal Network (RPN). The results of the detection parameters will be used for trackings such as coordinates  $x$ ,  $y$ , width, and length. The CNN pre-trained architecture used is ResNet.

System configuration used for testing is the padding scheme, stride and step training. The testing process is taken from the video that has been sampled consisting of 10.800 training data and 3.600 test data. In this Final Project, the best system configuration based on parameter priority for AR technology is obtained in the 8-2-2-1-1 stride scheme and same-padding with an accuracy value of 99.74%, IoU 0.842 and precision 3.18. The frame rate obtained using the best configuration is 7.98

Keywords: augmented reality, faster region-based convolutional neural network, region proposal network, convolutional neural network, ResNet