ABSTRACT

A printed circuit board (PCB) is a board filled with metal circuit paths and connects electronic components to each other. Every year PCB production always increases due to rapid technological developments, PCBs are used in electronics, the multimedia industry, and other fields. In the process of producing PCB chips, it is possible for defects in the circuit. For this reason, identification of defects on PCBs is an inseparable part of fabrication control because it will control the quality of production results. In order to ensure there are no defects on the PCB, a system is needed of detecting PCB defects so that the failure rate in PCB production can be minimized.

This final project proposes a PCB defect inspection system based on deep learning. Deep learning systems are able to automatically extract important features from input data and perform manual feature extraction, this makes the machine learning process more efficient and enables more complex representational learning models. In this study using MMDetection with the ResNest-101 model which was added the OHEM method with the aim of achieving a high Average Precision (mAP) value so that the system can perform good detection.

The results of this study indicate that this method can accurately detect and classify PCB defects based on their classes such as missing hole, open circuit, short, spur, spurious copper, and mouse bite. This research has also proven to be effective in increasing the value of the mean average precision (mAP) with the experimental results showing a mean average precision (mAP) of 99.3% and an average recall (AR) of 99.4%. These results are expected to have important implications for the industrial sector in improving product quality and minimizing damage to PCB functions, as well as being able to increase effectiveness in inspecting PCB defects.

Keywords : PCB, System, mean Average Precision.