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.

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