

Department of Electronics and Electrical Engineering

IIT Guwahati

EE - 625 Computer Vision Project

Development of a Novel Method for PCBs Fault Detection

|  |  |
| --- | --- |
| Name | Roll No. |
| Rahul Ghosh | 120108027 |
| Ashima Jain | 120108051 |

Contents

**Introduction**

With the boost in Electronics industry, the demand for Printed Circuit Boards (PCBs) has soared high. PCBs being cheap, reliable and easy to mount ICs become an important component of the industry. Further, with the increasing minitiaurization of the circuits, the intricacies of the PCBs also increases. In such cases, defects in the circuit boards are bound to occur. However, before they can be used in the electronic components, they must be defect free whether pseudo or true. Manual detection of such faults is tiresome and subject to errors. Hence, the need of the hour is a novel automated method for detection of such faults. There are various types of defects such as dust, oxidation, contamination, open, short, surface defect. Examples of some of these defects are shown in Figure 1. In this work, we have used samples from ok level, dust and oxidation because of unavailability of enough data of other faults. The approach includes using SIFT ......... (method in a line or two)

**Literature Review**

A number of techniques have been proposed before to automatically detect and classify faults in printed circuit boards. Sikka et al. [1] have proposed a method for detection and classification of true vs pseudo defects. PCBs with true defects such as bump, broken, short, etc. cannot be further used while the ones having pseudo defects that is, dust or rust on the metallic pasrt are temporary. In the presented approach, the authors applied discrete wavalet transform (DWT) upto two levels to segment the image. Statistical features such as mean and standard deviation are extracted from the approximation and detail sub-bands of one, two and three level decomposed images. Based on these features, an SVM with a gaussian kernel was trained to give the final classified result, ie., true or pseudo defect.

In [2], the copper and non-copper part have first been separated. Edges in the copper part were detected using canny edge detector. Hough transform was then used to find to circles from the copper edges detected earlier. The authors next trained a 1vr SVM to find the defect of copper. For the non-copper part, the 3D color histogram is made and the training and classification is done using an SVM with a polynomial kernel of degree 4. The results of the two are then logically combined to obtain the defect in the PCB.

**Proposed Methodology**

**Results**

**Conclusions**

**Bibliography**

[1] Sikka, S., Sikka, K., Bhuyan, M.K. and Iwahori, Y., 2013. Pseudo vs. True Defect Classification in Printed Circuits Boards using Wavelet Features.*arXiv preprint arXiv:1310.6654*.

[2] Kumar, S., wahori, Y., and Bhuyan, M.K., 2016, PCB Defect Classification Using Logical Combination of Segmented Copper and Non-Copper Part

[3] Inoue, H., Iwahori, Y., Kijsirikul, B. and Bhuyan, M.K., 2015. SVM Based Defect Classification of Electronic Board Using Bag of Keypoints. *ITC-CSCC 2015*, pp.31-34.

[4] Nakagawa, T., Iwahori, Y. and Bhuyan, M.K., 2014. Reduction of Defect Misclassification of Electronic Board Using Multiple SVM Classifiers.*International Journal of Software Innovation (IJSI)*, *2*(1), pp.25-36.