**CERTIFICATE**

This is to certify that the project entitled “Circuit Board Defect Detection using Image Registration” is a bonafide work of Dinkal Solanki, Vihang Patil, Shashikumar Vishwakarma and Sahil Tikke submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering in Electronics and Telecommunication Engineering.

Prof. Priya Hankare Dr. Milind Nemade

Head of Department

Dept. of Electronics and Dept. of Electronics and

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Dr. D.R. Pangavhane External Examiner

Principal

Place:

Date:

**PROJECT APPROVAL FOR B. E.**

This project report entitled Circuit Board Defect Detection using Image Registration by Dinkal Solanki, Vihang Patil, Shashikumar Vishwakarma and Sahil Tikke is approved for the Degree of Bachelor of Engineering in Electronics and Telecommunication.

Examiners

1. ---------------------------------------------

2. ---------------------------------------------

Supervisors

1. ---------------------------------------------

2. ---------------------------------------------

Date:

Place:

**Declaration**

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Dinkal Solanki

Vihang Patil

Shashikumar Vishwakarma

Sahil Tikke

Date:

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**ABSTRACT**

A printed circuit board or (PCB) is used to mechanically support and electrically connect electronic components using conductive pathways, track or signal traces etched from copper sheets laminated onto a conductive substrate. The automatic inspection of PCBs serves a purpose which is traditional in computer technology. The purpose is to relieve human inspectors of the tedious and inefficient task of looking for those defects in PCBs which could lead to electric failure. We first compare a PCB standard image with a PCB image, using a simple subtraction algorithm that can highlight the main problem-regions. We have also seen the effect of noise in a PCB image that at what level this method is suitable to detect the faulty image. Finally, defect classification operation is employed in order to identify the source for six types of defects namely, missing hole, pin hole, under etch, short-circuit, mouse bite, and open-circuit.