FSM Internship Project 2022

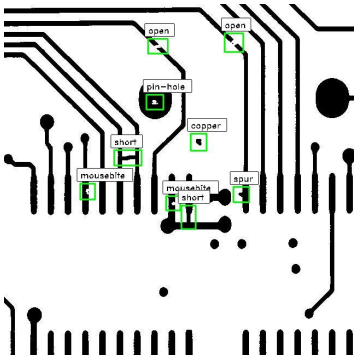
INTP2022-ML-3
Computer Vision to detect defects in PCB

Week - 2 Report

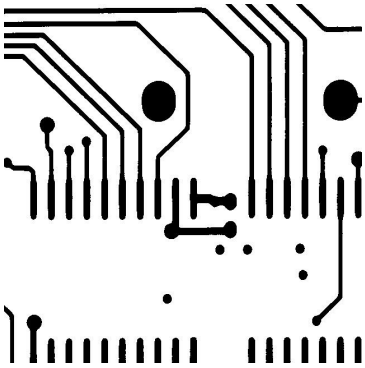
Progress made this week:

- Understanding the DeepPCB dataset:
  DeepPCB dataset contains 1500 image pairs, each of which consists of a defect-free template image and an aligned tested image with annotations including positions of 6 most common types of PCB defects: open, short, mousebite, spur, pin hole and spurious copper. The images are binarized and cropped into many sub-images with size of 640 x 640 and aligned through template matching techniques. Each defect on the tested images is annotated as the format: x1,y1,x2,y2,type , where (x1,y1) and (x2,y2) is the top left and the bottom right corner of the bounding box of the defect. type is an integer ID that follows the matches: 0-background (not used), 1-open, 2-short, 3-mousebite, 4-spur, 5-copper, 6-pin-hole.

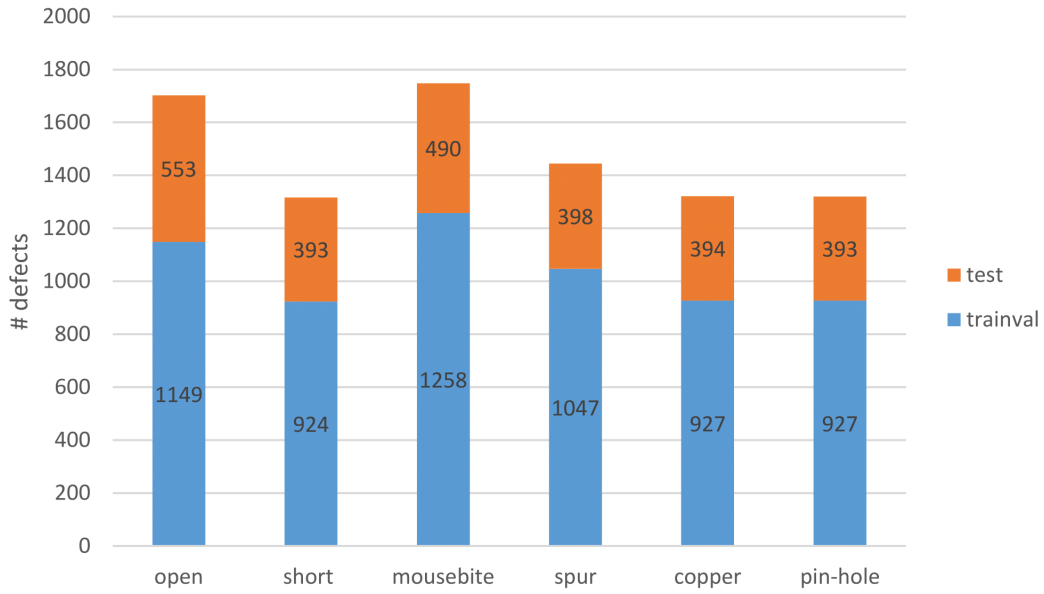
  Tested image sample:



  Template image sample:

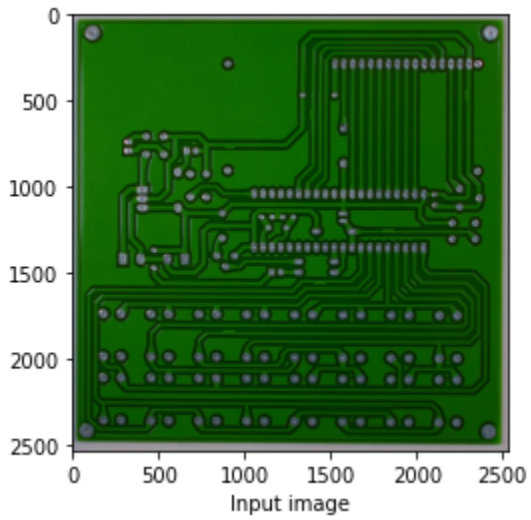


Number of training and testing samples for each defects:

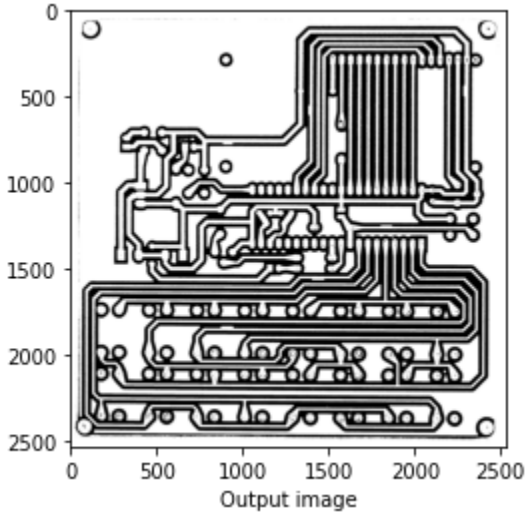


- Binarizing and cropping the query image for detection (binarization and cropping):
  Binarization is the process of converting any image into black and white based on certain thresholding. The images in the given dataset are binarized and cropped into 640x640 for training hence the query image also needs to be binarized and cropped for defect detection to work effectively.

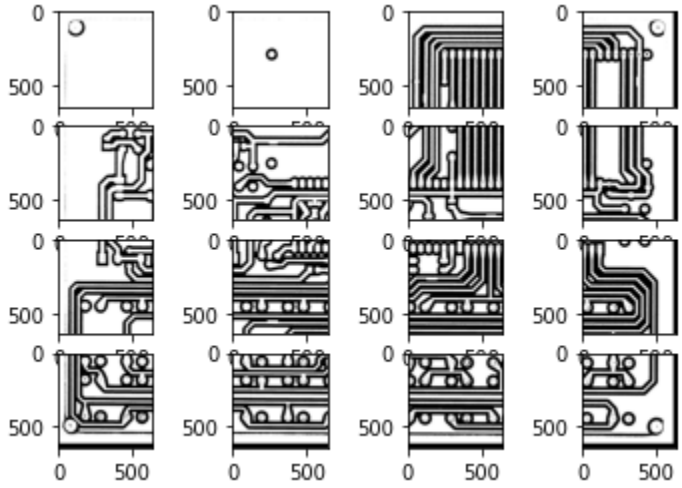
  Query image:



Binarized image:



Cropped images:



- Implementing file manipulations to process the Dataset:
  It was used to convert the given annotation format to standard annotation formats like YOLO, PascalVOC, etc in order to prepare dataset for training.

- Preparing the DeepPCB dataset for training (DeepPCB annotated in PascalVOC):
  The tested images are split into 1226 images for training and 274 images for testing. These images are present in train and test folders.