**Circuit defects Detection Using Yolo V5**

**ICRL-1001-22**

# **Introduction**

The aim of this project is to detect the defects of circuit boards.

# **Dataset**

Circuit dataset was used for the Circuit defects detection project. This dataset consists of approximately 11k images of different circuit boards.

# **Preprocessing**

The preprocessing steps of the proposed project are following:

* Annotate the Images of defects
* Annotation Criteria
  + Residue (If the portion of circuit contains some residue)
  + Short (If two portions of circuits are connected accidently)
  + Bubble (If the portion of circuit is emerged)
  + Metallization defects (If the metal of the circuit is damaged)
  + Surface defects (If the surface of the circuit is damaged)
  + Flakes (If the portion of the circuit is broken)
  + Unclassified (Any defect does not belong to above classes)

# **Model Training**

For the Circuit defects Detection, Yolo V5 model was trained with the annotated images. The details of the model training are following:

* Use 7500 Annotated Images

# **Results**

* Use 3500 Annotated Samples for Evaluation
* Calculate Mean Average Precision (MAP)
* Got 0.71 Mean Average Precision of all classes

# **AUTHOR CONTRIBUTIONS**

Umer Daraz Lodhi conceived the original idea. Hafiz Abdul Rehman developed the theory and performed the computations. Hafiz Abdul Rehman verified the analytical methods. Saad Ahmad optimize the model for deployment. All authors discussed the results and contributed to the final report.