

IVP Project: Post-Reflow Defect Detection

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Outline

- ❑ **Problem Statement**
- ❑ **Solution Proposal**
- ❑ **Experiments**
- ❑ **Future Work**

Problem Statement

- ❑ **What is post-reflow?**
- ❑ **What are post-reflow defects?**
- ❑ **Why to perform defect detection?**
- ❑ **What are the challenges?**

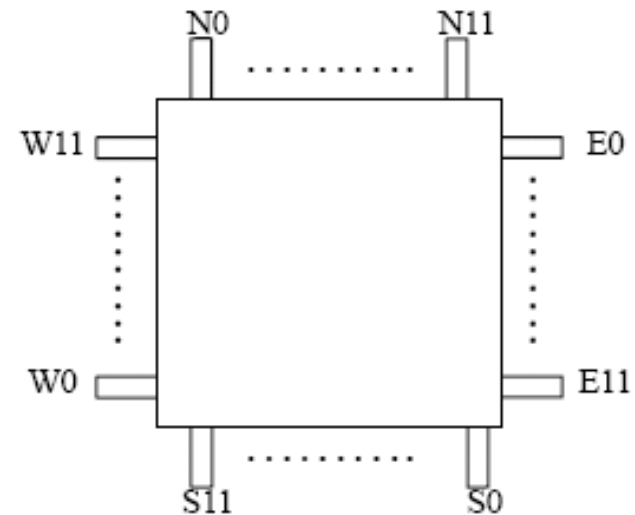


Image 1: QFP10X10P44_IVP036-1_V200-7 L1

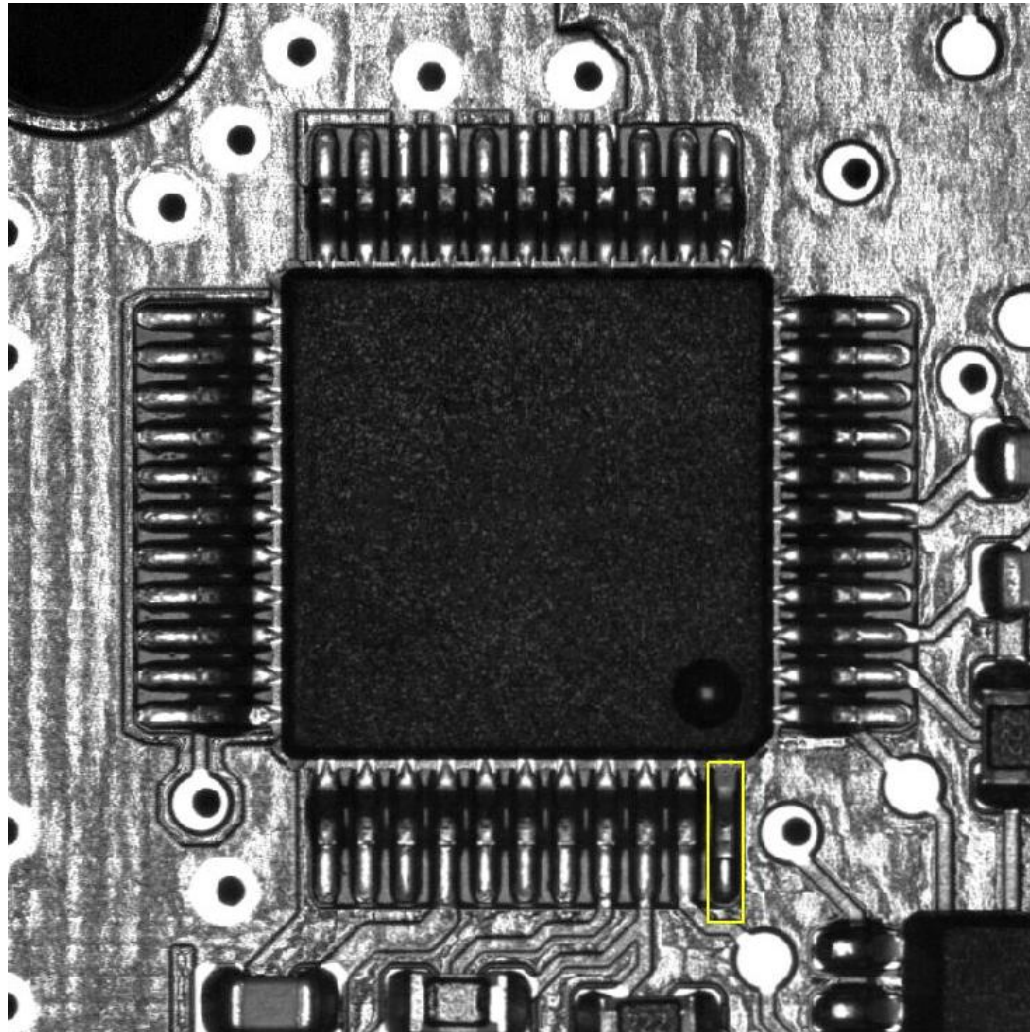


Image 1: QFP10X10P44_IVP036-1_V200-7 L2

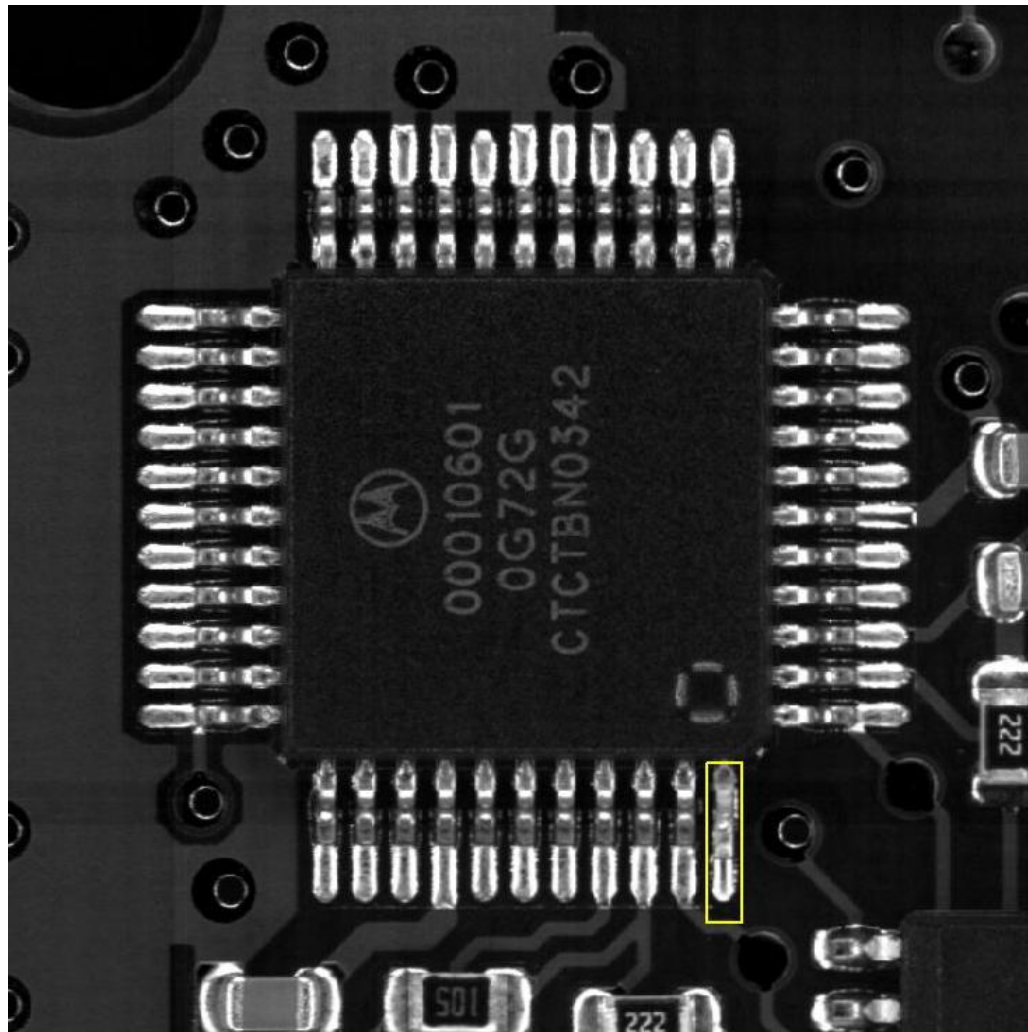


Image 1: QFP10X10P44_IVP036-1_V200-7 L3

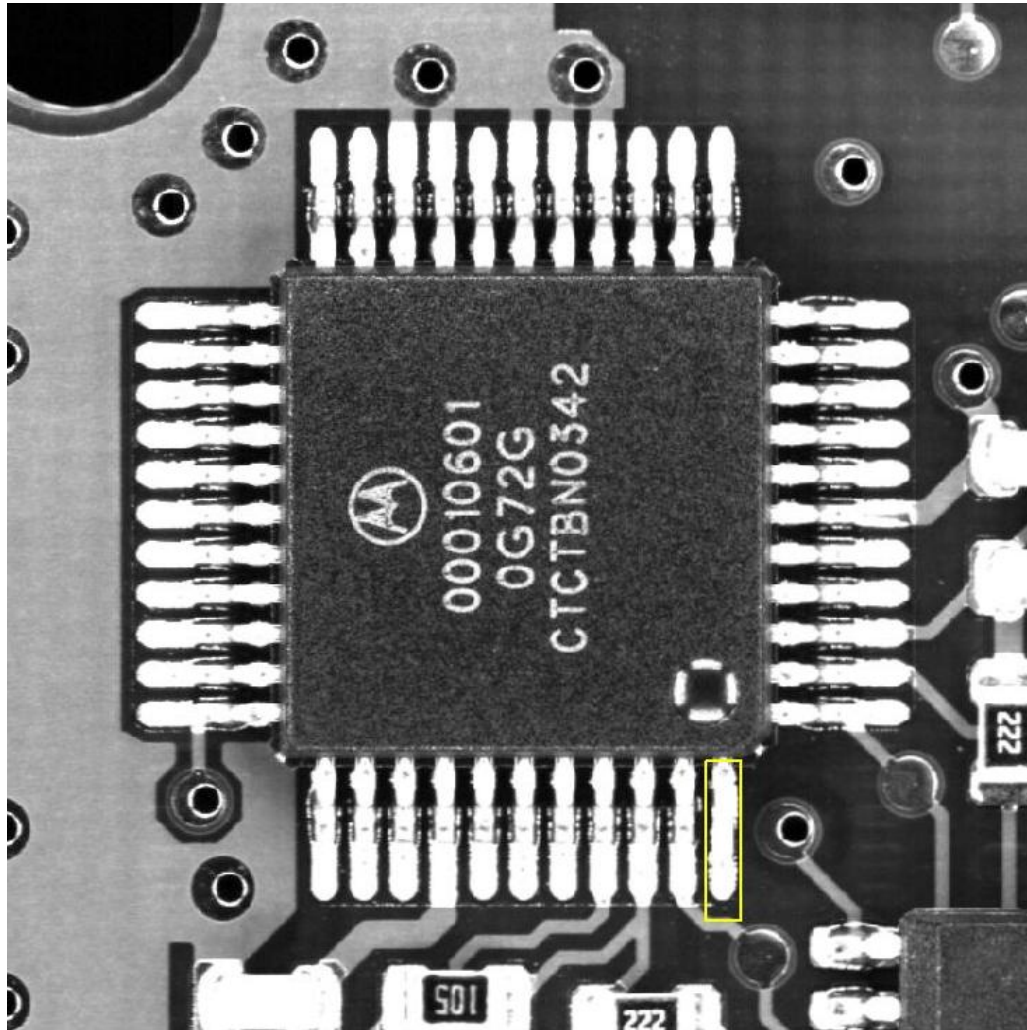


Image 1: QFP10X10P44_IVP036-1_V200-7 L4

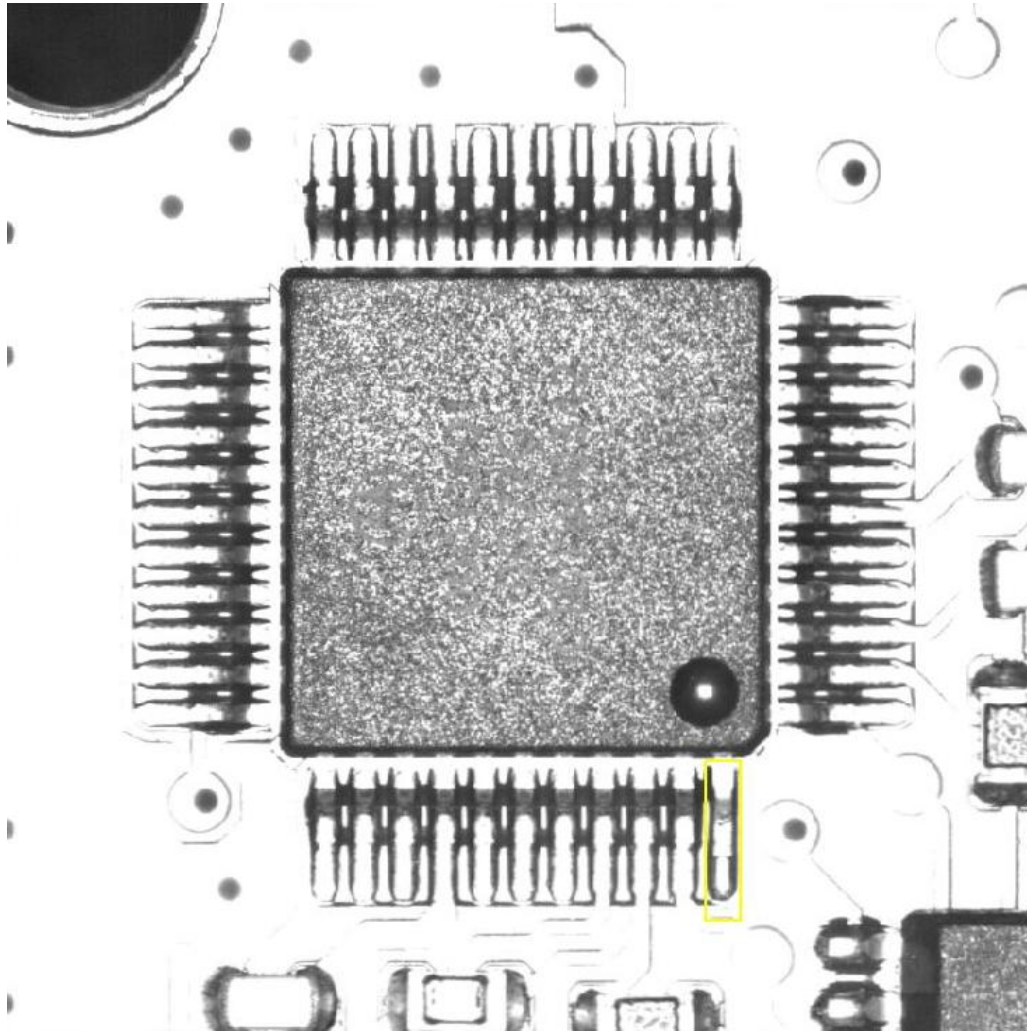


Image 1: QFP10X10P44_IVP036-1_V200-7 L5

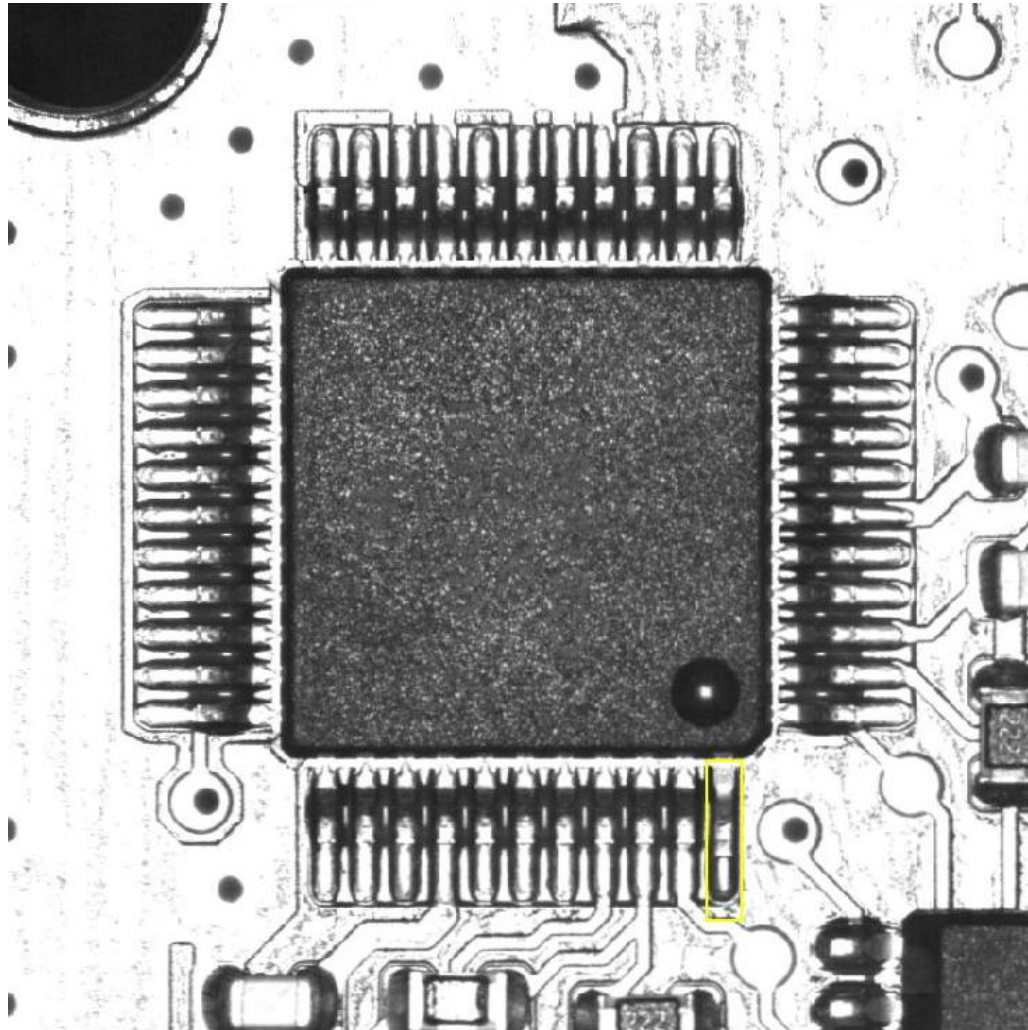


Image 2: QFP10X10P64_IVP021-1_U500-3 L1

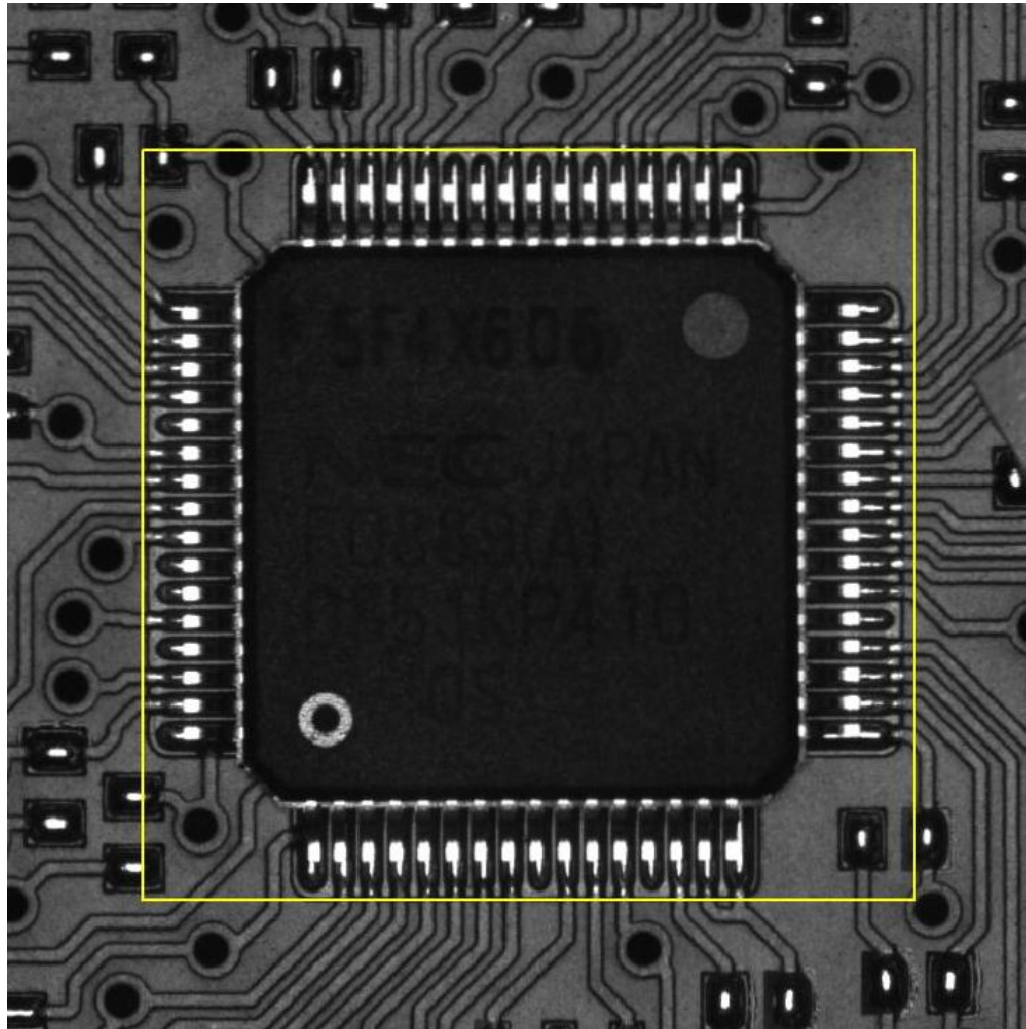


Image 2: QFP10X10P64_IVP021-1_U500-3 **L2**

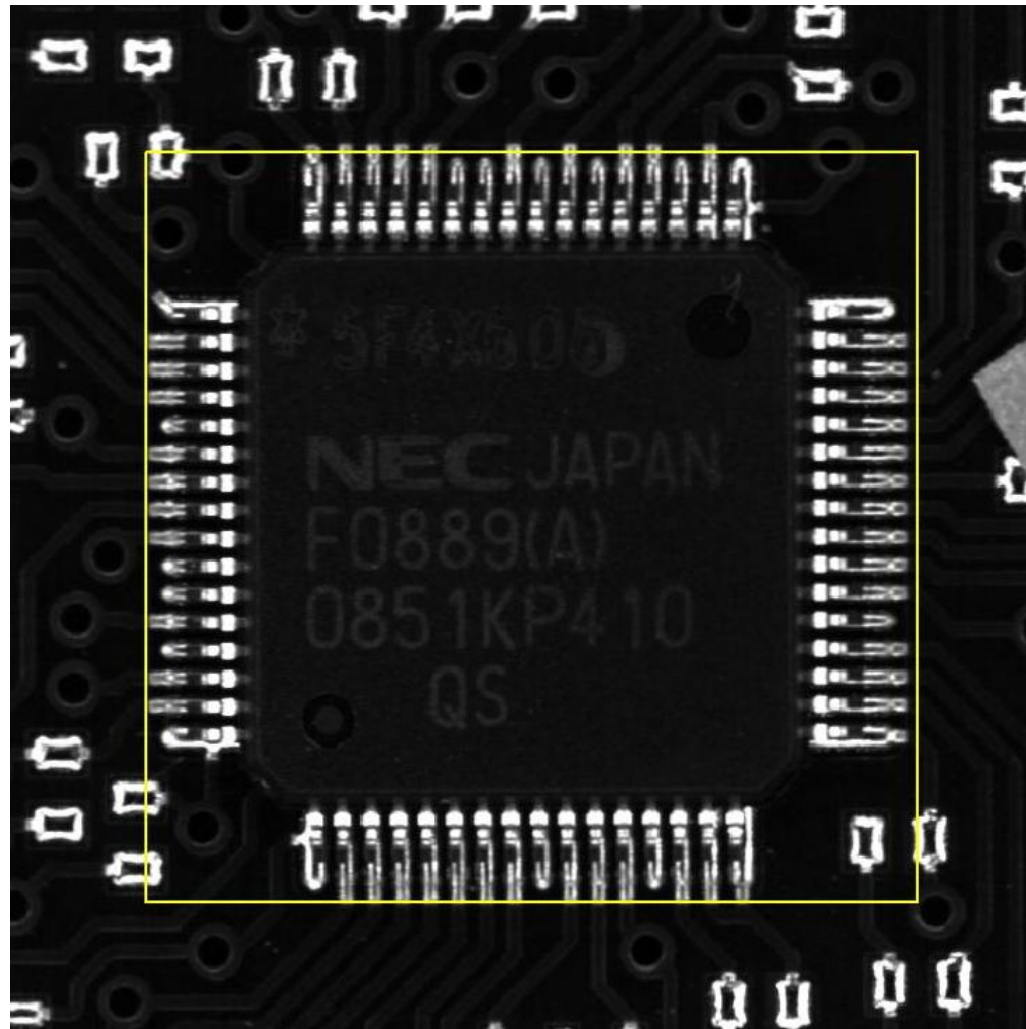


Image 2: QFP10X10P64_IVP021-1_U500-3 **L3**

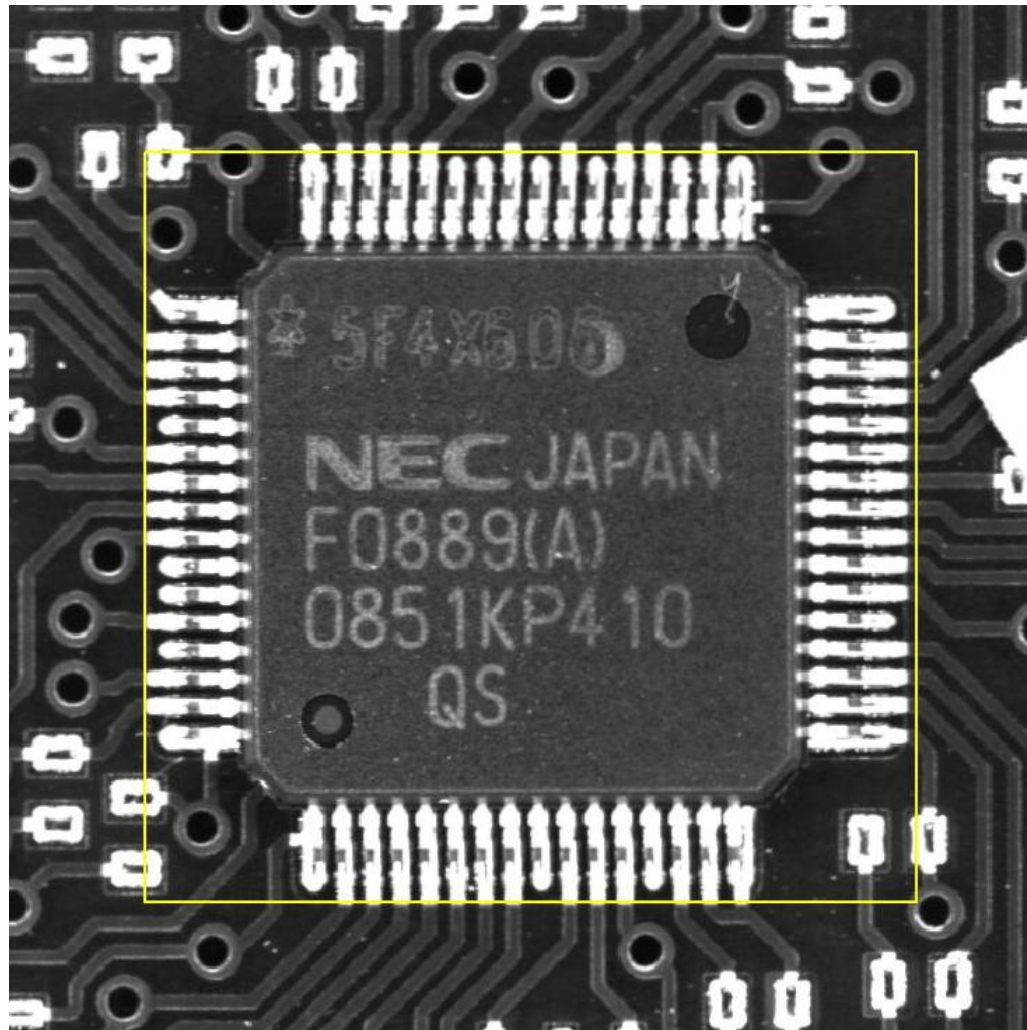


Image 2: QFP10X10P64_IVP021-1_U500-3 L4

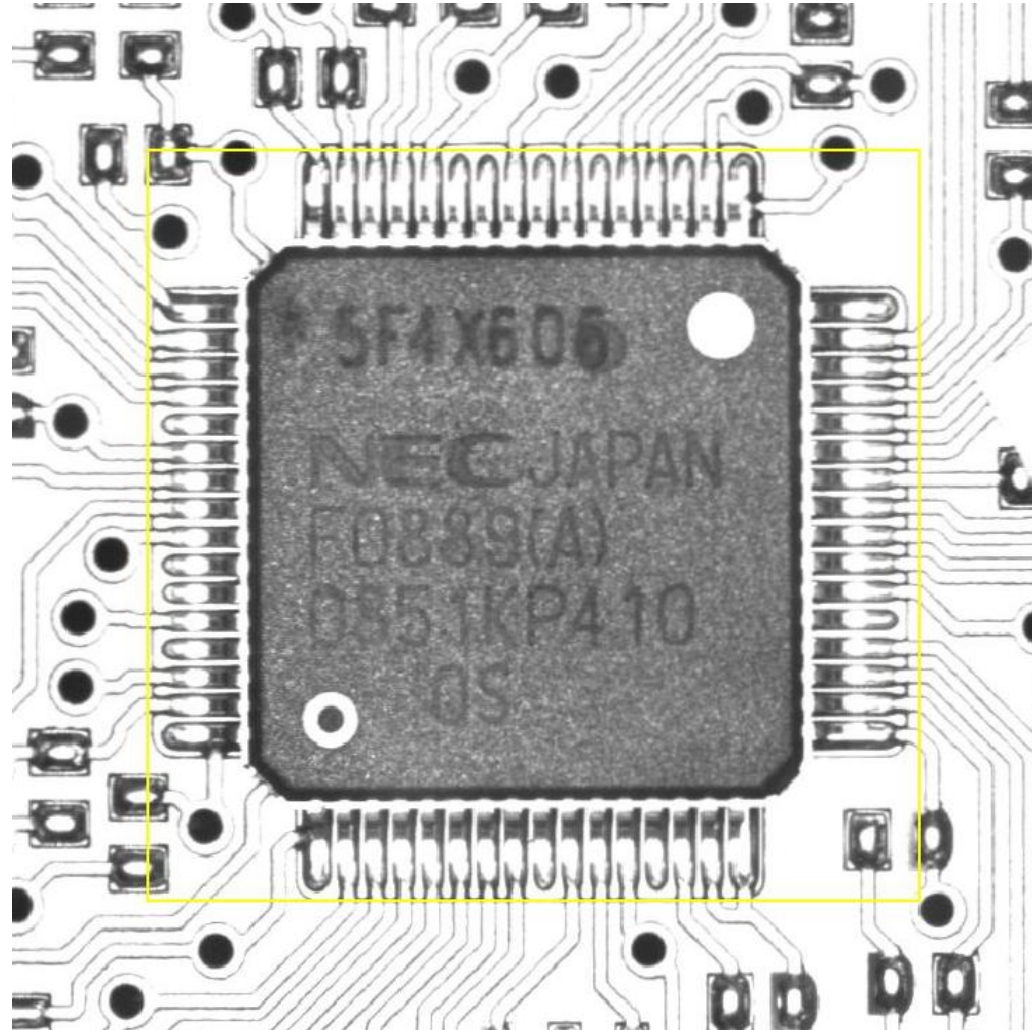
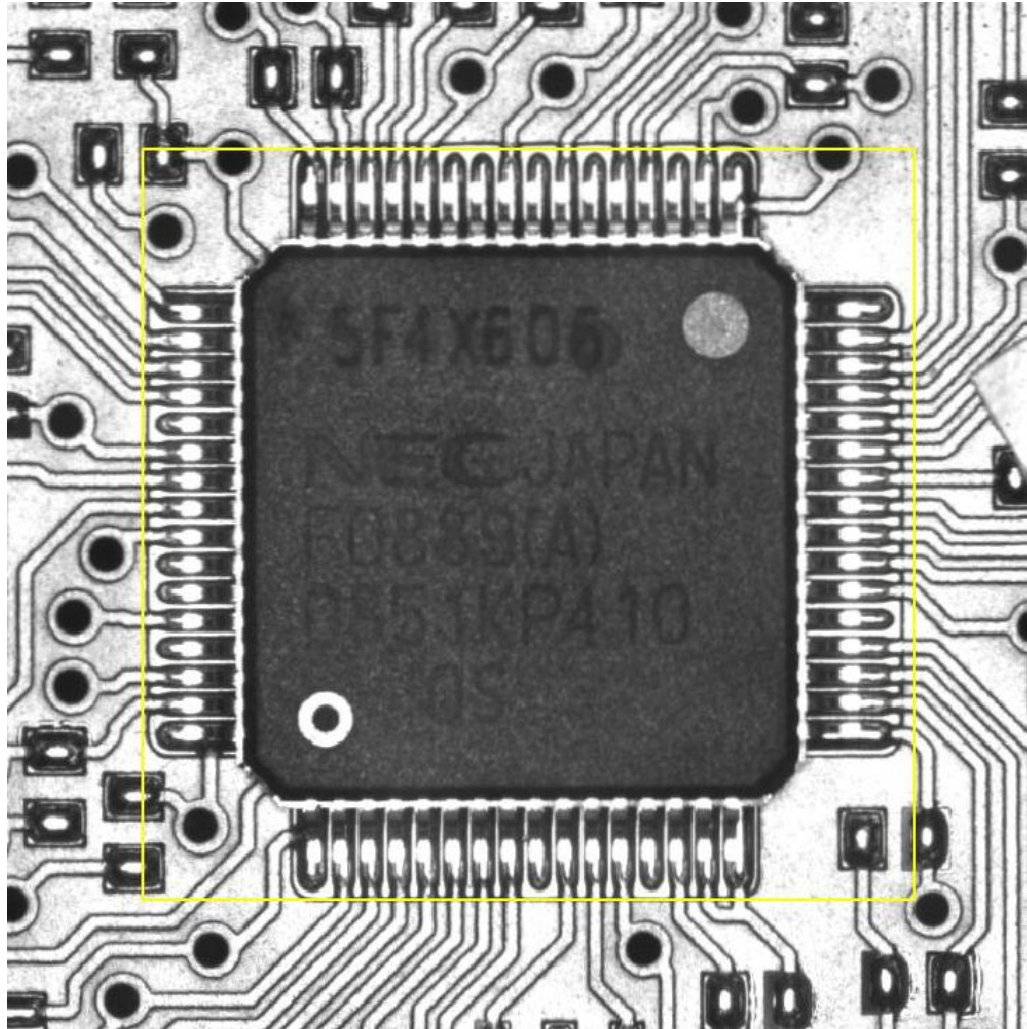


Image 2: QFP10X10P64_IVP021-1_U500-3 **L5**



Challenges

- ❑ **Incomplete and imbalanced training samples in the database**
- ❑ **Multiple images under different lighting conditions**
- ❑ **ROI extraction**
- ❑ **Image appearance variation**
- ❑ **Image size variation**
- ❑ **Spatial layout information**

Solution Proposal

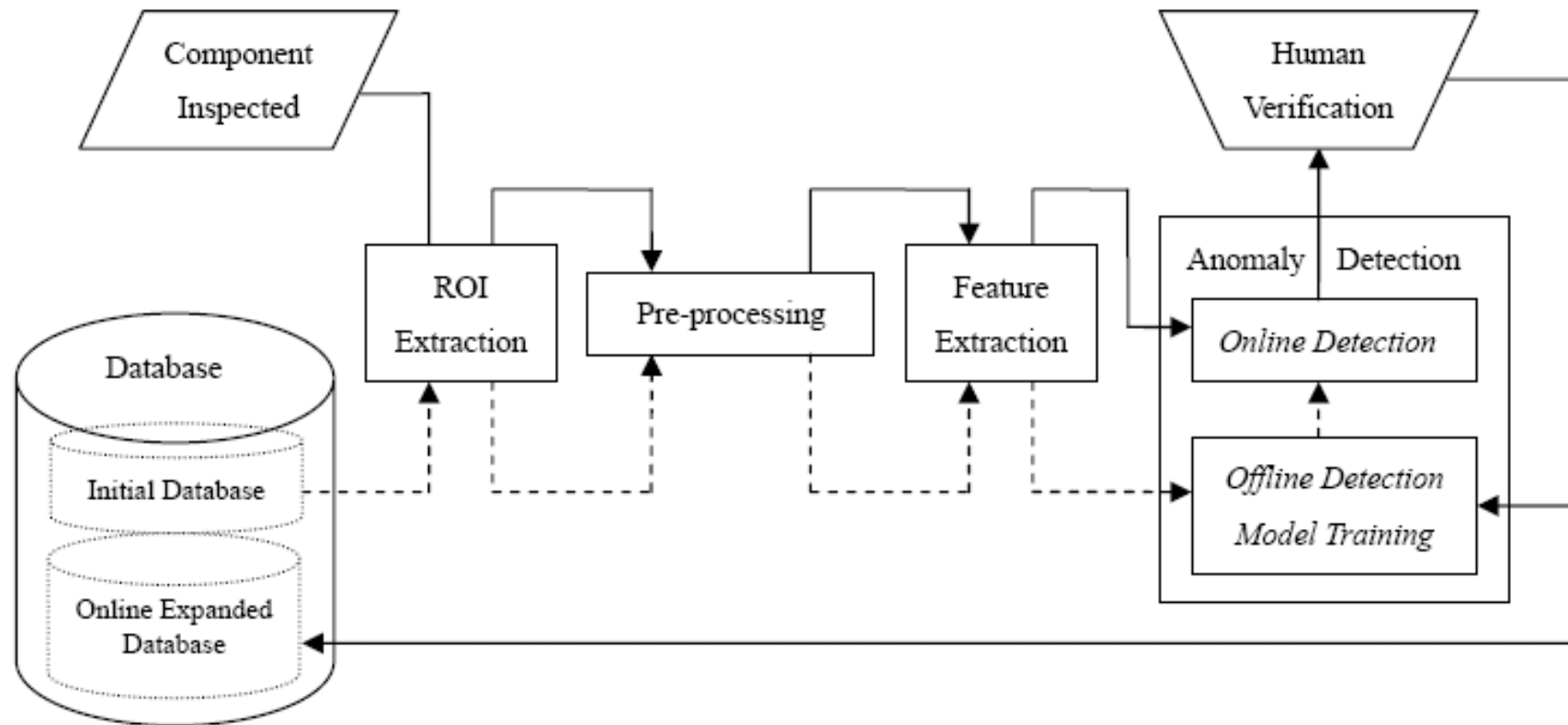
- ❑ **Data available**

A large database containing many leaded-components with human-verified normal and defective leads is provided to us by Vi Technology

- ❑ **Software available**

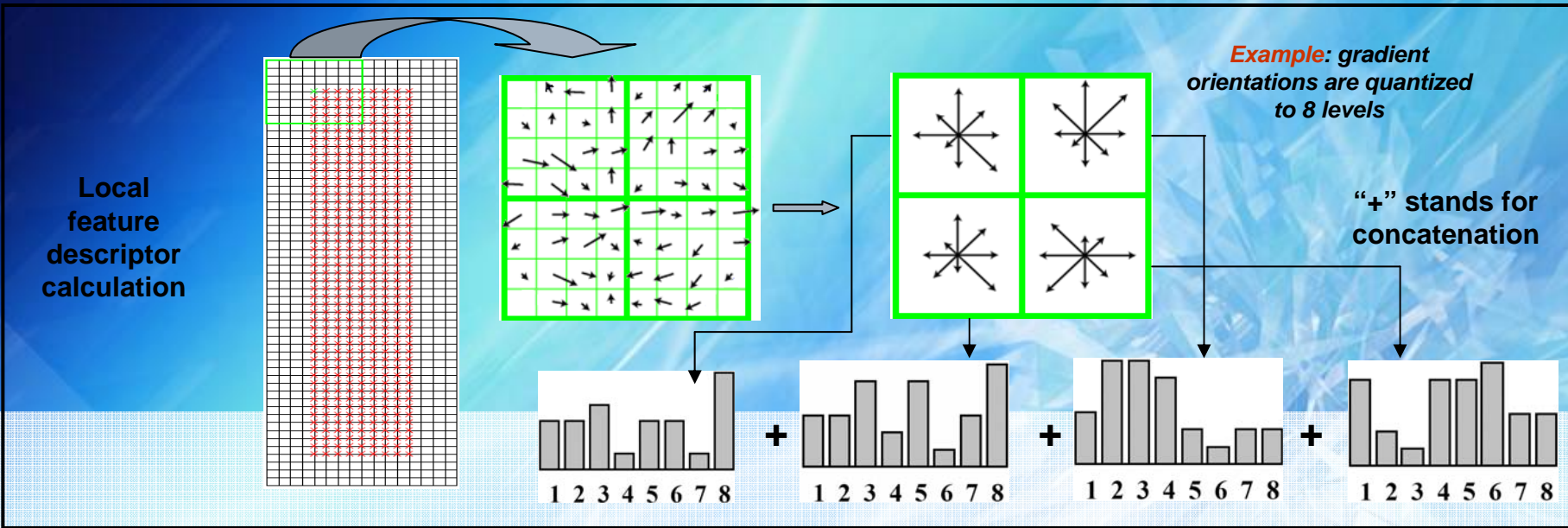
An executable file cropping leads from the component with top and side margins able to be manually adjusted

System Framework



Backbone Algorithms

Feature Extraction



Vocabulary learning using k-means based on local feature descriptors of some randomly selected training samples



Backbone Algorithms

Outlier Detection

- ❑ **Support Vector Machine (SVM)**
- ❑ **One-Class SVM**
- ❑ **Chi-square distance**
- ❑ **Gaussian Kernel**

Parameter Sensitivity

- ❑ **ROI extraction**
- ❑ **Feature extraction**
- ❑ **Outlier detection**

Experiments

In Technical Report

The background of the slide is a vibrant blue gradient, transitioning from a darker blue at the top to a lighter, almost white-blue at the bottom. It is filled with abstract, geometric patterns, including sharp, crystalline shapes and soft, glowing light streaks that create a sense of depth and movement. A horizontal white band with a fine grid pattern runs across the middle of the slide, serving as a backdrop for the text.

Questions?