

# DEFCLAS & EPCOS

## Advanced Defect Classification Preparation & Ex-Post Analysis



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### MOTIVATION & GOALS

- **Automatic optical inspection (AOI)** in **semiconductor industry** is an extremely important and demanding task for detecting significant errors on the **wafer fab process** within the Quality Process Control pipeline.
- **Yield deviations** can more seamlessly identified and engage the engineers to locate the exact source of error with the numerous complex process steps.
- With the advanced analytic techniques (e.g. **Deep Learning**) as well as **parallel computing** (deployment of GPU servers) it is possible to **classify** and **label** the **errors** on the **chip surface** by feeding large **images datasets** to Neural Networks

#### Project FactBox

**Project Name** EPCOS/DEFCLAS

**Project ID** MFP3.1-1/-2

**Duration** 12 Months

**Area 3**

Cognitive Decision Support

**Project Lead**

Prof. Dr. Stefan Thalmann

### METHOD

- Extract chip images with the defect centered
- Identify the relevant parts of the images
- Apply methods to analyze whether the chip images contain the appropriate context in terms of defect structure
- Propose an iterative active learning framework of a convolutional neural network to classify defects

### CONTRIBUTION

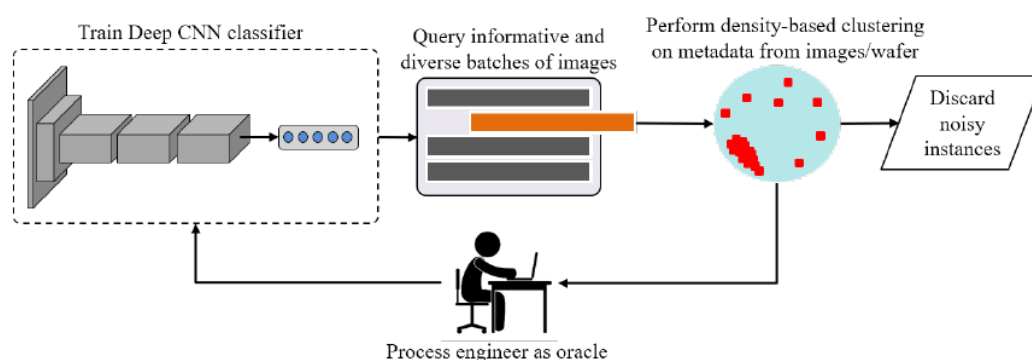
#### Scientific contribution

- 1 scientific publication accepted
- 1 scientific publication under review

#### Economic contribution

- A specially designed convolutional neural network for defect classification in a real wafer fabrication site
- Less effort and time is required by the process engineer for labelling the defect images

### SYSTEM ARCHITECTURE



Sample images of two types of chip defects

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