

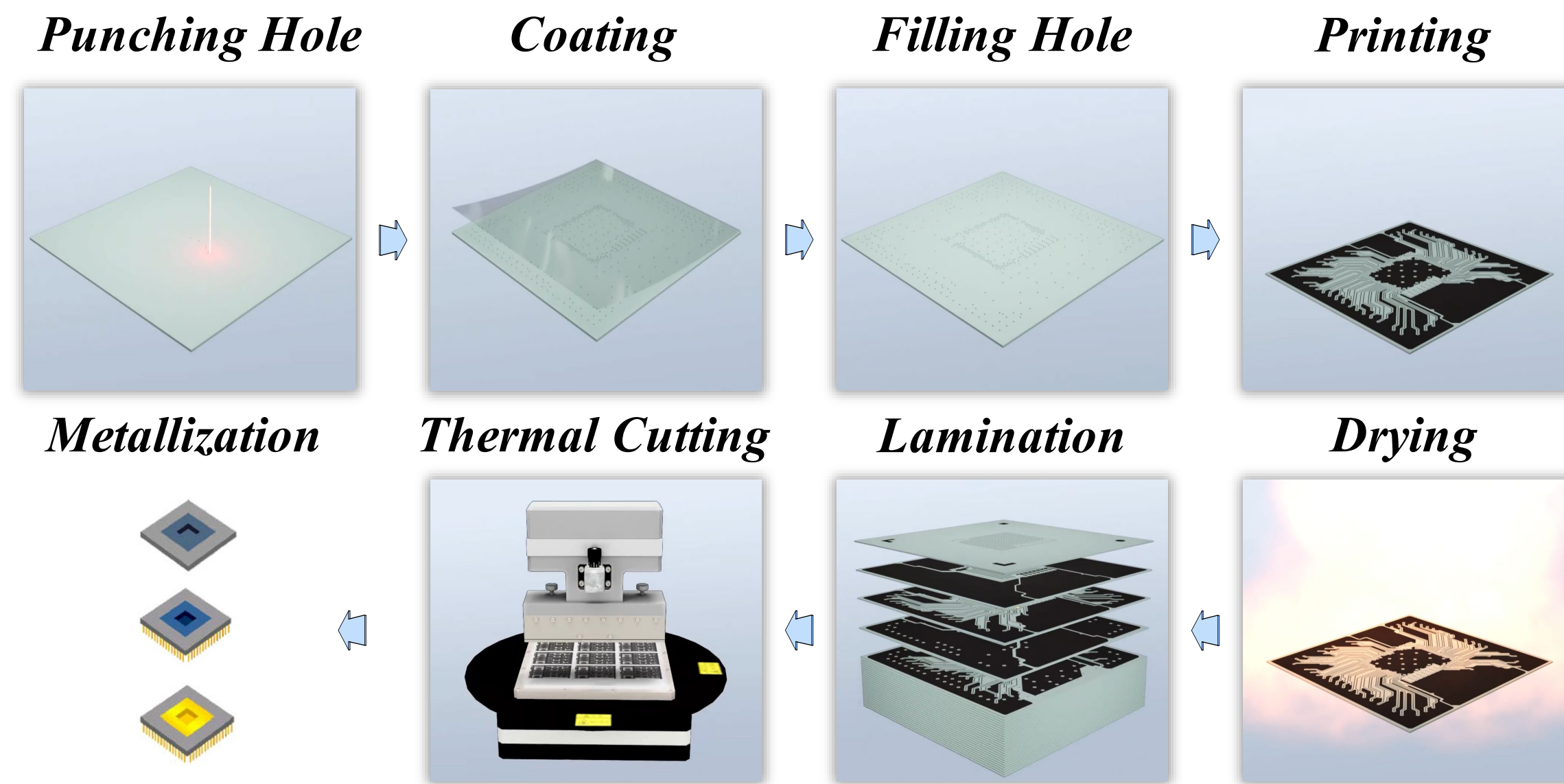


# Anomaly Detection of Integrated Circuits Package Substrates Using the Large Vision Model SAIC: Dataset Construction, Methodology, and Application

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## Introduction

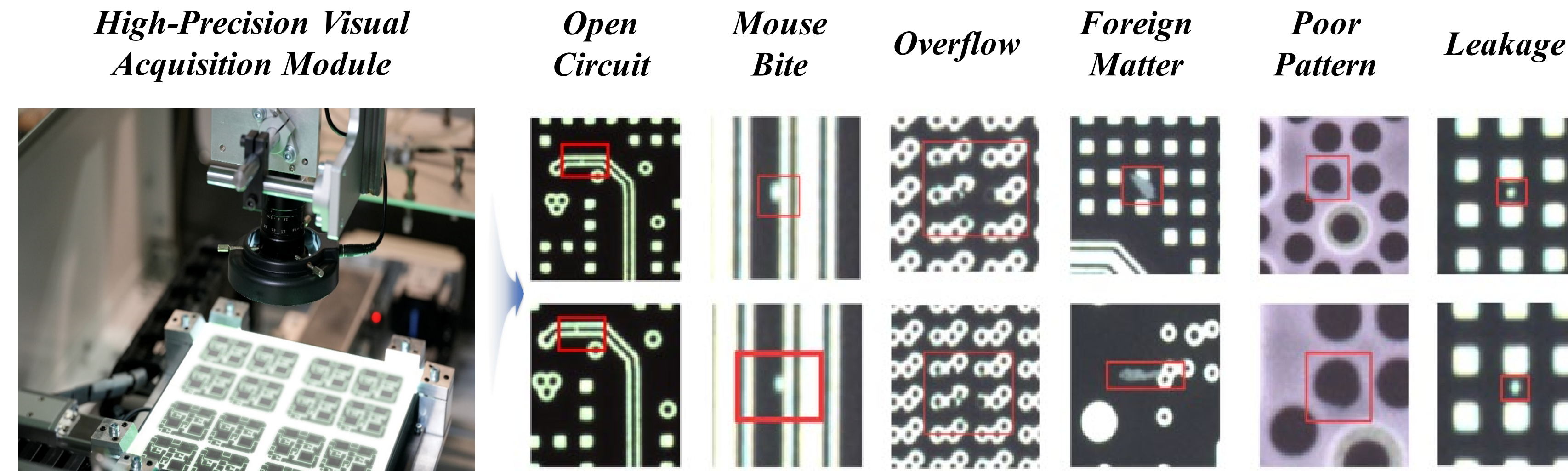


- In response to the high-precision graphic inspection needs of core processes such as punching, filling, and printing for ceramic package substrates, we have collaborated with leading companies in the industry to independently construct a dataset named CPS2D-AD. At the same time, we are conducting research on technology related to anomaly detection large models and developing automatic optical inspection (AOI) equipment for key processes of ceramic package substrates.

## Contribution

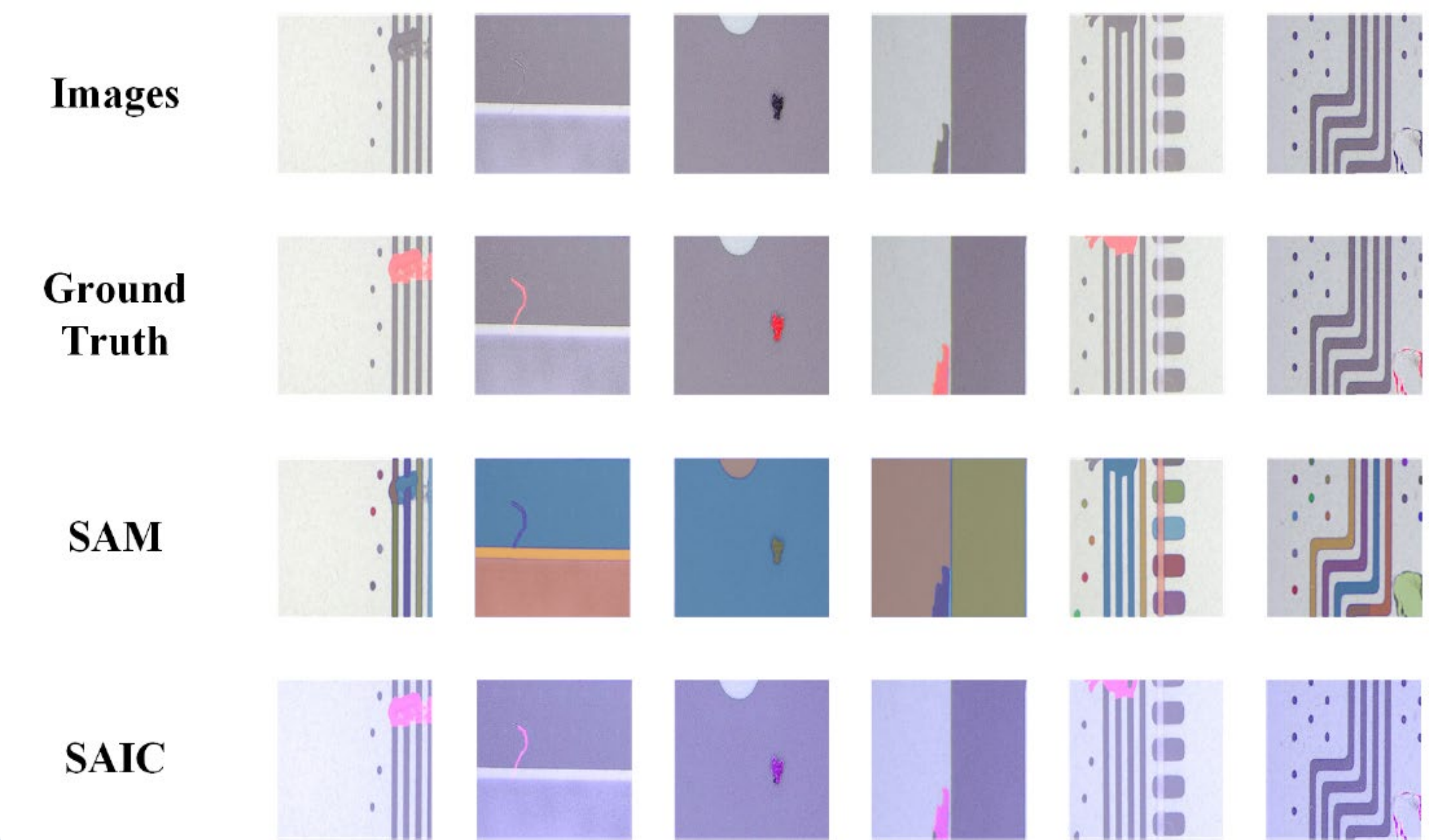
- We construct a novel dataset named CPS2D-AD for anomaly detection of ceramic package substrates. CPS2D-AD is the **highest precision** and **largest scale** dataset in the field of integrated circuits, containing 6 common types of defects from 40 different product.
- We develop a embedding-based distillation mechanism to fine-tune large vision model which aims to Segment Any Integrated Circuits (SAIC).

## CPS2D-AD Dataset

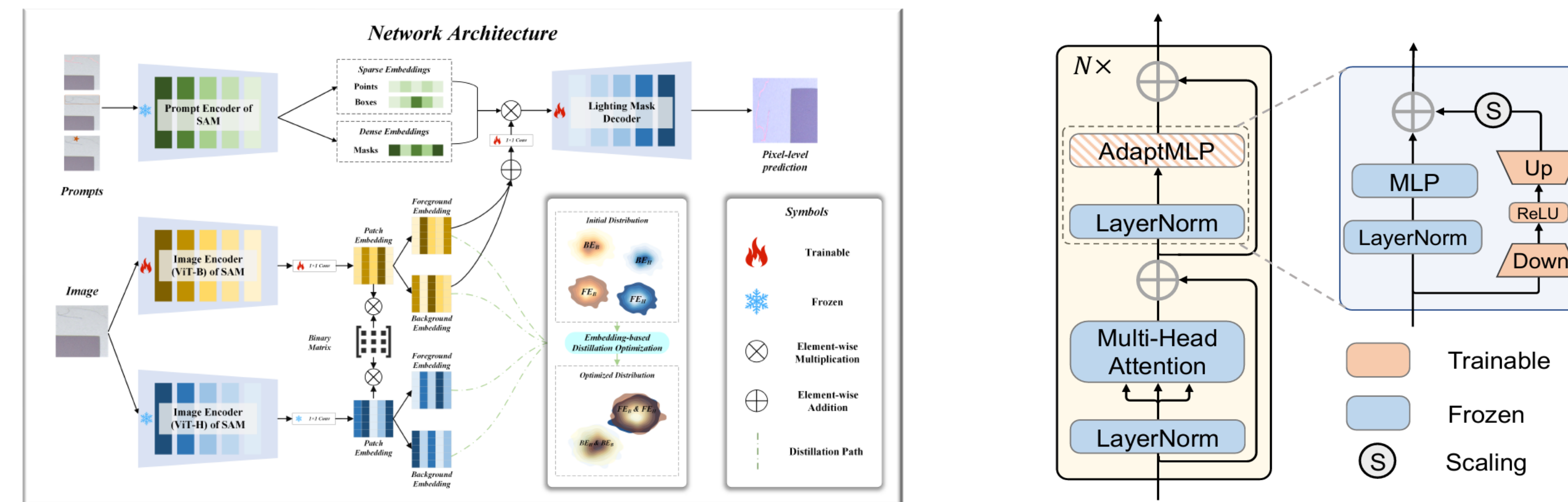


- A high-precision visual acquisition module is constructed using an ultra-high resolution area array camera and a liquid high magnification telecentric lens. The size measurement accuracy can reach **1  $\mu\text{m}$**
- The CPS2D-AD dataset includes 20781 ceramic package substrate samples, including 11000 normal samples and 9781 abnormal samples, covering six surface defects

## Results



## Methodology



- Build an edge based visual defect detection model that fully integrates semantic and visual feature information.
- Based on CPS2D-AD dataset, design a knowledge distillation mechanism for model training to further improve the accuracy and generalization of the model

## AOI Equipment

