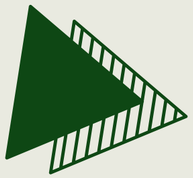
ELEVATOR PITCH

Team 4

DETECTING AND CLASSIFYING DEFECTS IN CHIPS WITH COMPUTER VISION



The Problem

Why Does This Matter?

- *Manual defect inspection in semiconductors is slow, error-prone, and expensive.*
- *Existing systems struggle with tiny, overlapping, or complex defects.*
- *Result: Increased costs, lower yield, and reliability issues in chips.*

Our Solution

A Multi-Model AI System for Defect Detection

- *Used 5 advanced Machine Learning, Deep Learning and Vision Models*
- *Real-time detection via Flask/Streamlit interface*
- *Cloud-deployed on AWS (S3 + EC2)*
- *Supports continuous learning through feedback*

Methodology

Our Workflow Pipeline

1. *Data Collection: PCB (1.3k images), Wafer (811k+ maps)*
2. *Preprocessing: Resize, normalize, augment, and label*
3. *Modeling: Train & evaluate five models with stratified K-fold*
4. *Deployment: Flask UI + AWS Cloud + Real-time inference*

Key Results

Model Performance Highlights

Model	Accuracy	Precision	Recall	Inference Time
YOLOv8	98%	95%	93%	1 sec
CNN (Wafer)	95%	98%	90%	Moderate
ResNet	87%	89%	94%	2 sec
Faster R-CNN	87%	86%	90%	2 sec
V-DETR	40%	44%	40%	High

Product Demo Snapshot

From Image to Insight

- *Upload interface (PCB/Wafer image)*
- *Real-time prediction + bounding boxes*
- *Immediate result & feedback loop*
- *(Insert interface screenshots)*

What Makes It Unique

Innovation Highlights

- *Multi-model comparison & evaluation*
- *Human-in-the-loop continuous training*
- *Highly scalable via AWS deployment*
- *Integrated front-end for industrial usability*

Thank you.