RMIT UNIVERSITY
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AI-Enhanced Vision for High-Speed Defect Sorting

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🔍BACKGROUND

- Automated defect detection system for ChocoPie boxes.
- Based on AI-powered vision coupled with the ABB's PickMaster Twin.
- Automatically sorts Good or Defect products on conveyor belts.

🚀 OBJECTIVES

- Traditional vision systems: slow, centralized, inflexible.
- Manufacturing has strong demand for accuracy, flexibility and real-time quality control.
- Ensures higher throughput, less waste and consistent product quality.
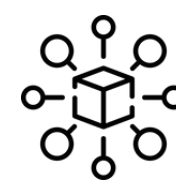
⚙ METHODOLOGY

Image Capture	Preprocessing	AI Model	Integration
Basler camera + external sensor detects ChocoPie on conveyor.	OpenCV improves clarity (noise removal, contrast, normalization).	CNN-based classifier (YOLO, MobileNet, ResNet tested) classifies Good vs Defect.	Coordinates sent to ABB PickMaster Twin, defective products are removed by the robot.

📊 RESULTS

🛠 KEY COMPONENTS

- Hardware: Basler Camera, ABB Conveyor & Robot, External Sensor.
- Software: Python, TensorFlow, OpenCV, ABB RobotStudio SDK.
- Models Evaluated: YOLOv8, MobileNetV2, ResNet50, EfficientNet.