

High Speed Solder Joint Inspection

Industry: Electronics Manufacturing

The Problem

A Tier-1 Electronics Manufacturing Services (EMS) provider was experiencing a 15% false-positive rate with their traditional Automated Optical Inspection (AOI). To maintain production speed, images were sent to a local server, but network congestion caused "latency spikes," leading to line stoppages.

Solution

Klyff deployed a **Custom Quantized CNN (Convolutional Neural Network)** directly onto the camera's edge processor. By performing inference at the "Glass" level, we eliminated the need for image transmission.

1. Hardware

- **Edge Processor:** Hailo-8™ AI Accelerator integrated with an industrial PC.
- **Sensors:** 12MP High-Speed Global Shutter Camera.

2. Software

- **Optimization:** Hailo Dataflow Compiler (to convert the model to 8-bit integer format).
- **Pipeline:** GStreamer with Klyff's low-latency "Vision-Link" wrapper.

Results



Latency: Reduced from 120ms (server-based) to 8ms (on-device)

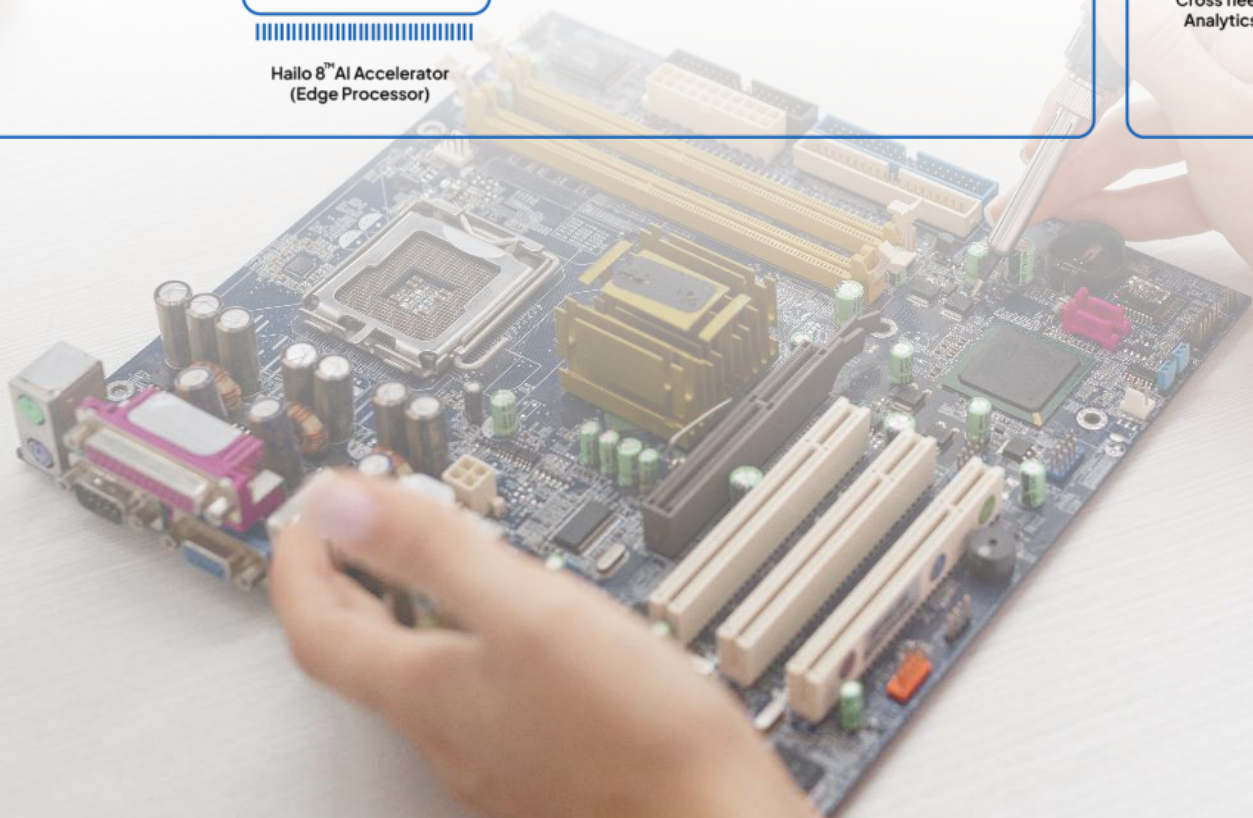
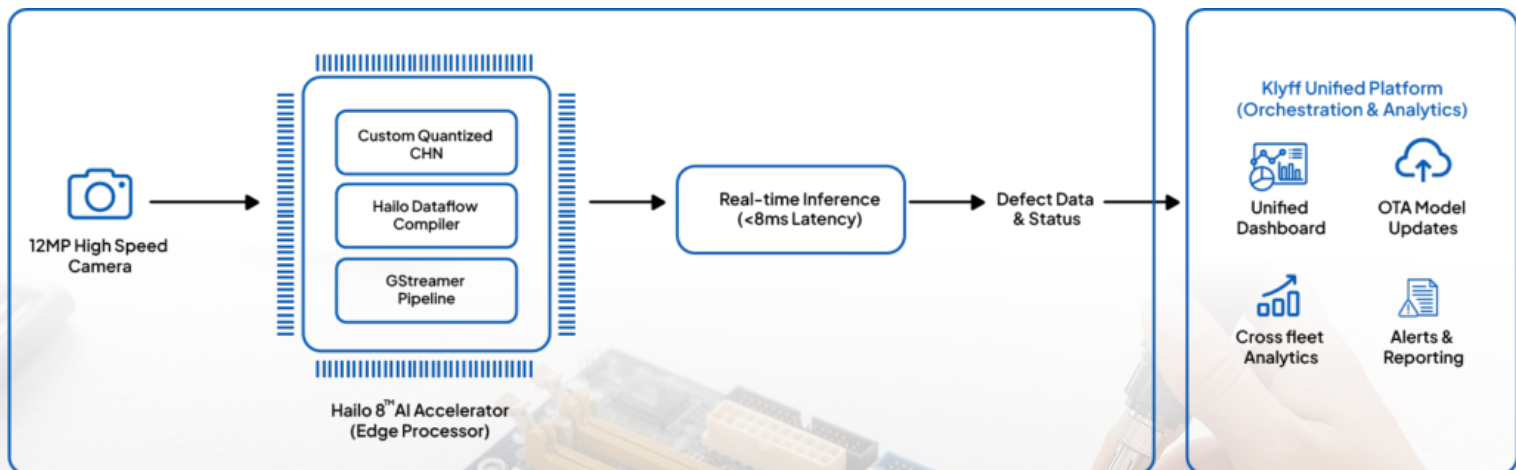


Accuracy: False-positive rate dropped to <2%



Cost saving of an estimated \$12,000/month in manual rework costs per line.

Solution Flow



Klyff gives a significant advantage over traditional Cloud IoT

Feature	 Traditional Cloud IoT	 Klyff "Hard Tech" (Edge-First)	 The Klyff Advantage
 Response Latency	200ms – 2 seconds (Cloud Round-trip)	< 10ms – 20ms (On-Device Inference)	10-50x Faster. Essential for high-speed safety stops and robotics.
 Data Transmission Costs	High. Constant streaming of raw sensor/video data.	Near-Zero. Only anomaly "events" are sent to the cloud.	90% Cost Reduction. Saves thousands in cloud egress and storage fees.
 Data Privacy & Security	High Risk. Raw sensitive data travels over the public internet.	Secure by Design. Raw data never leaves the device; only insights move.	GDPR/Union Compliant. Ideal for worker monitoring and IP-sensitive zones.
 Connectivity Reliance	System fails or "freezes" if Wi-Fi/4G drops.	100% Autonomous. Decisions continue even during network outages.	Critical Reliability. No downtime for remote mines or offshore assets.
 Hardware Efficiency	Heavy data logging drains battery and bandwidth.	Hardware-Optimized. Uses NPUs/FPGAs to run AI at 10,000x higher efficiency.	Extended Asset Life. Models run on ultra-low-power \$5-\$20 chips.
 Failure Detection	Reactive. Alerts you after a threshold is crossed.	Proactive. Identifies "micro-drifts" in machine behavior weeks earlier.	True Predictive Maintenance. Moves from "alerting" to "preventing."

Most IoT platforms are just "pipes" for data. Klyff is the intelligence at the end of the pipe. We focus on the **Silicon-to-Model optimization** unlike Cloud Dashboards

Let us help you with predictive maintenance

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