

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.

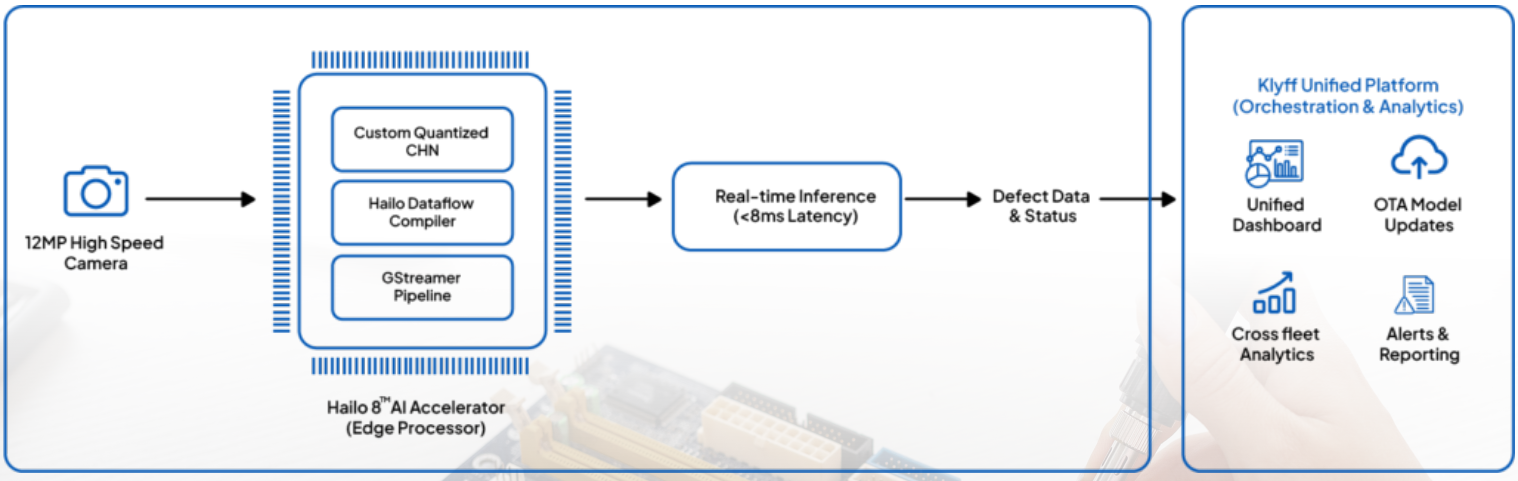
2. Software

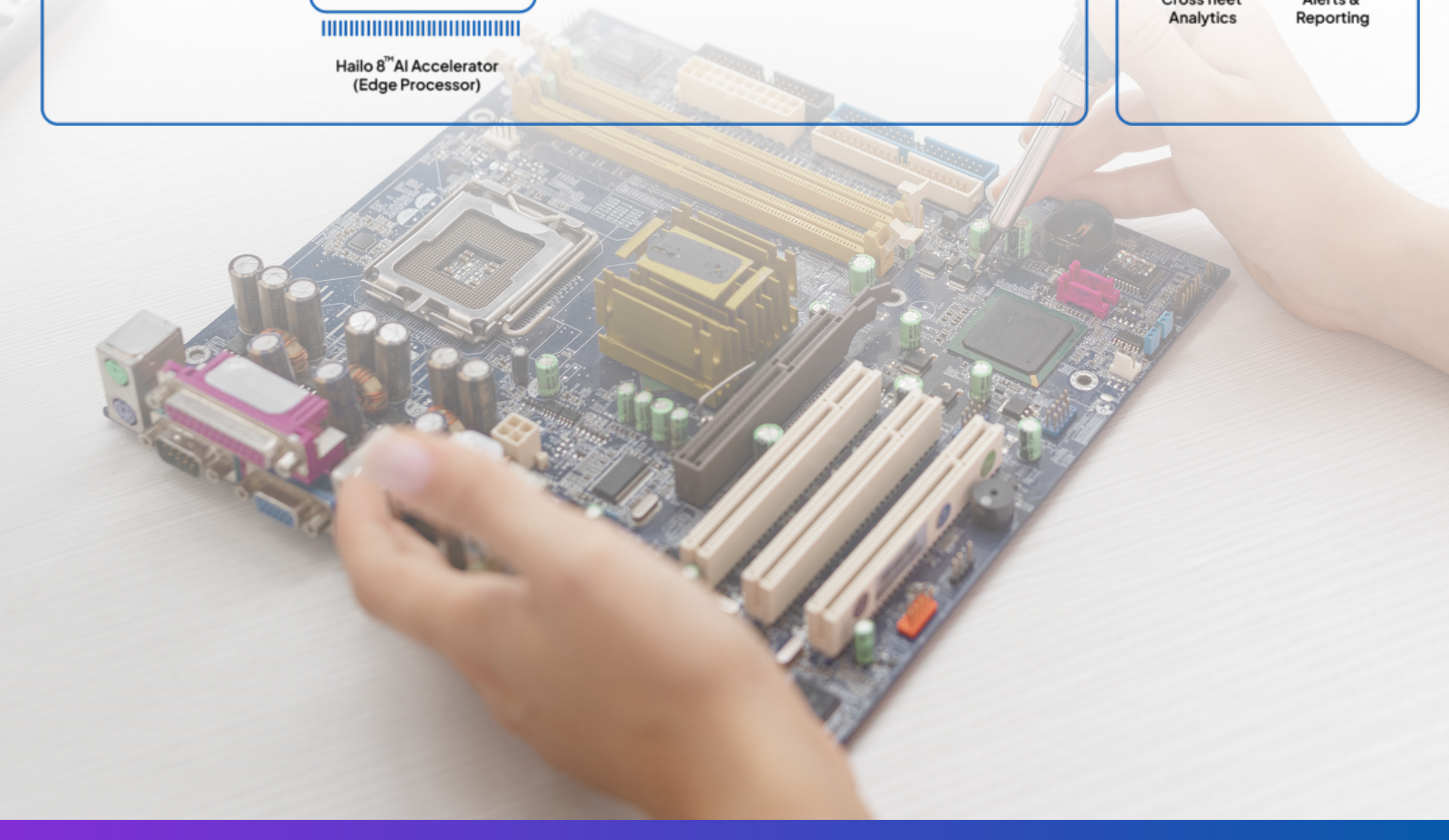
- **Optimization: Hailo Dataflow Compiler** (to convert the model to 8-bit integer format).
- **Pipeline: GStreamer** with Klyff's low-latency "Vision-Link" wrapper.

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 tha 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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