

# PVC White Defect Summary Report

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## Background Context

Sankei manufactures PVC White Printing products — called "cuffs" — for the healthcare industry. These products are exported in large volumes to overseas markets where strict quality standards are non-negotiable.

Traditionally, quality control at Sankei was performed entirely by human inspectors. This approach came with significant drawbacks: high labor costs, slow throughput, and a well-known limitation of human attention — after 8 consecutive hours of inspection, accuracy naturally declines, allowing defective products to slip through undetected.

To address these challenges, Sankei adopted an AI-powered Computer Vision system integrated with the VIISAN Scanner, capable of processing 2–5 pages per second. The goal is straightforward: replace human fatigue with machine precision — delivering fast, consistent, and continuous defect detection at manufacturing scale.



## Project Overview

PVC White NG Detection System is an advanced quality control solution designed to detect manufacturing defects automatically. It leverages machine learning to perform per-layout binary classification (**Good** vs. **No Good**) for 54 distinct layouts of PVC white prints. The core purpose is to identify anomalies such as Pudar (Fading), Miring (Skew), Ghost Print, and Luber/Missing paint defects on manufacturing lines.

## Technical Capabilities

**Layout Classification:** High-speed multi-class classification across 54 layouts with 96.2% top-1 accuracy.

**Quality Detection Models:** 49 dedicated per-layout binary AI models specifically trained to distinguish subtle QC violations.

**Advanced Processing:** Dynamic HSV fading detection, block skew analysis, LAB grid scanning, and blob segmentation techniques.

**Unified Platform:** Features real-time detection, integrated ROI collection, rule-based matching, and web-based continuous training loops via feedback apps.

## System Visuals (Screenshots)

Below are automated quality checks extracted directly from the system showing the fully annotated defects:

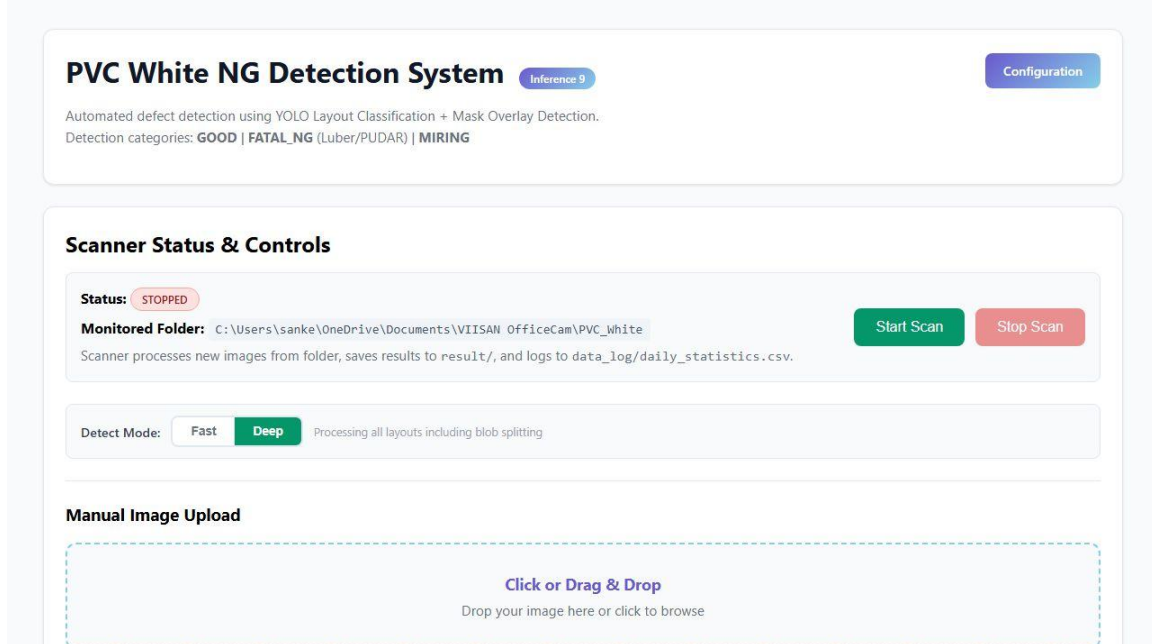


Figure 1: Screenshot of the Inference 9 Web Dashboard interface ready for inspection.

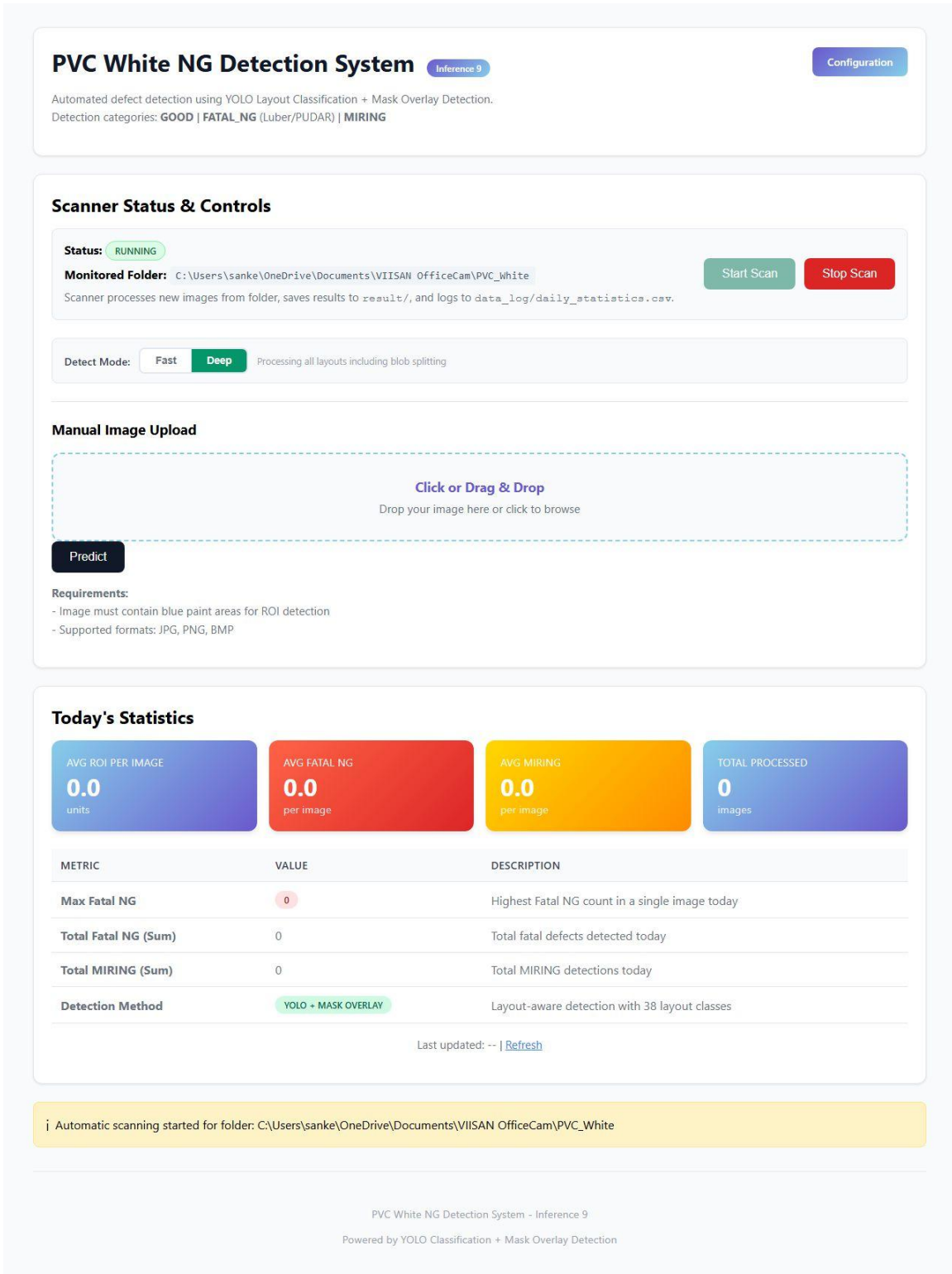


Figure 2: Real-time detection output from the dashboard after testing a product image.

## Full Board Defect Analysis (Before & After)

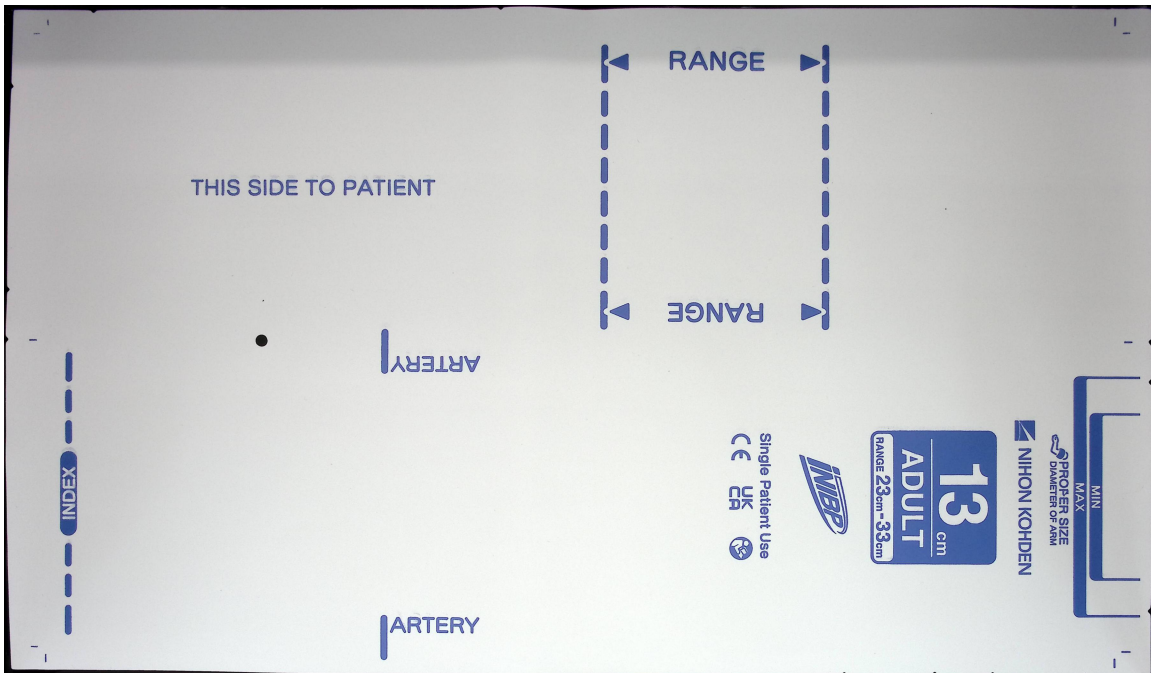


Figure 3: Raw Input (Before Prediction) - The full PVC white board as captured by the camera.

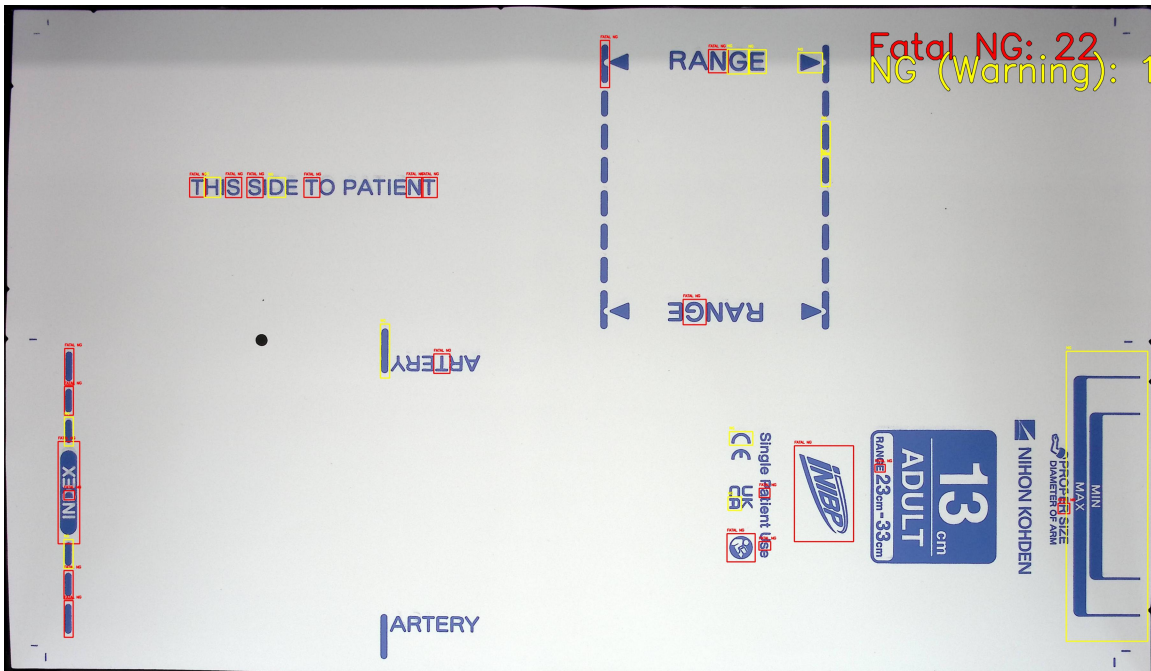


Figure 4: Annotated Output (After Prediction) - System overlays bounding boxes marking all NG (No Good) regions and defects.

## Business Impact

### 24/7 Efficiency & Cost Reduction

The implementation of this system natively enables continuous, reliable, and high-speed operation exactly suited for 24/7 manufacturing environments. By phasing out slower, error-prone human assessment with targeted AI models, the organization yields a **70% cost reduction for manual QC (Quality Control)**. Real-time feedback loops and automated tracking guarantee precision at industrial scales, elevating throughput and baseline product quality simultaneously.



Link Video Demo:

<https://drive.google.com/file/d/1xxEv3GMYcrCNzNQTGrIlubWw3d-S82Fc/view?usp=sharing>