



# Improving Electronics Quality with AI-Powered Nanoscale Defect Detection

## Challenge

A leading international electronics manufacturer specializing in consumer and industrial products sought to improve the accuracy and efficiency of its quality control processes.

Detecting nano-sized defects in components is critical, but traditional inspection methods are slow, labor-intensive, and prone to missing subtle yet significant flaws that can lead to product failures. Manual inspections at the nanoscale require specialized expertise and are highly error-prone, creating delays and raising the risk of defective products reaching the market.

The company needed a more streamlined, precise, and automated approach to nanoscale defect detection and reporting, so they sought a trusted partner to help improve their process.

## Solution

INSPIR Solutions partnered with the client to design and implement an AI-driven defect detection system that combined advanced imaging with machine learning for quality control optimization.

Key components of the solution included:

- **Automatic Defect Detection:** Leveraging high-resolution imaging and image vector transformation algorithms, INSPYR Solutions deployed an AI-based anomaly detection system built with Python frameworks (TensorFlow and OpenCV). This enabled precise comparisons of electronic component images to identify even the smallest defects.

Defect detection rates improved by 35% and production delays were reduced by 10%.



- **Defect Classification and Reporting:** Using a machine learning model trained on extensive defect image datasets, the system could accurately identify and classify defect types. Automated reporting provided detailed insights for the quality control teams, reducing reliance on manual intervention.

### Outcome

The AI-powered inspection system delivered measurable improvements for the manufacturer such as:

- **Accuracy:** Defect detection rates improved by 35%.

- **Efficiency:** Production delays were reduced by 10%.
- **Quality:** Higher-quality products reached the market faster, strengthening customer trust and brand reputation.

### Client Profile

The client is a global electronics manufacturer with more than 10,000 employees that produces a wide range of consumer and industrial electronics.

### Technologies Supported

Advanced image processing, artificial intelligence, machine learning, Python frameworks (TensorFlow, OpenCV)

### About INSPYR Solutions

Technology is our focus and quality is our commitment. As a leading expert in delivering flexible technology and talent solutions, we strategically align industry and technical expertise with our clients' business objectives and cultural needs. Our tailored offerings include a wide variety of professional services, project solutions, managed services, and talent resources, all bolstered by our strategic partnerships with cutting-edge technology services. By always striving for excellence and focusing on the human aspect of our business, we work seamlessly with our talent and clients to match the right solutions to the right opportunities. Learn more about us at [www.inspyrsolutions.com](http://www.inspyrsolutions.com).