INSPYR SOLUTIONS

Improving Quality Control Through AI-Powered Automated Battery Defect Detection

Challenge

A large manufacturing and distribution organization managing high volumes of product inspections and warranty claims had always relied heavily on manual, visual inspection processes to identify battery defects. These inspections were subjective and time-intensive, leading to inconsistent defect classification, higher operational costs, and limited scalability.

The manual approach also made it difficult to provide timely feedback from field inspections and manufacturing environments, slowing quality control decisions and claims validation. As inspection volumes increased, the organization needed a faster, more consistent, and scalable method for identifying defects from images while supporting both manufacturing and warranty-related use cases.

Solution

The client chose to work with INSPYR Solutions as a trusted partner to help the company move to a modernized system. Our team delivered a mobile-first inspection and analysis solution that combined image capture with automated, AI-driven defect detection. The solution was designed to support both plant-based and field inspections while providing near real-time insights. Key components of the solution included:

- **Mobile Inspection App:** A cross-platform mobile application built with .NET MAUI, enabling inspectors to capture battery images directly from manufacturing facilities or the field.

AI-powered inspections cut costs, boost accuracy, and scale quality control with real-time precision.

- **Automated Defect Detection:** Integration of Python-based computer vision and AI libraries to analyze images and identify visible battery defects with greater consistency and accuracy.
- **AI-Driven Classification:** Automated classification of detected defects to support standardized quality assessments and warranty claim validation.
- **Backend Processing Services:** API-based backend services to process images, apply defect detection models, and return structured defect insights to the mobile application.

This approach reduced reliance on subjective, time-intensive visual inspections while enabling inspectors to receive actionable defect information quickly.

Outcome

The automated inspection solution delivered clear operational benefits:

- Reduced manual inspection effort and inspection-related costs.
- Improved consistency and accuracy in defect identification.
- Faster quality control decisions and claims validation.
- Near real-time feedback from field and plant inspections.
- A scalable foundation for expanding automation across additional inspection workflows.

The engagement demonstrated how AI-assisted image analysis can enhance efficiency, accuracy, and scalability within manufacturing quality control and warranty processes.

Technologies Supported

.NET MAUI, AI, API-based backend services, Azure, computer vision, Python

Client Profile

The client is a large manufacturing and distribution organization operating high-volume inspection and warranty workflows within a quality-critical production environment.

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 inspyrsolutions.com.