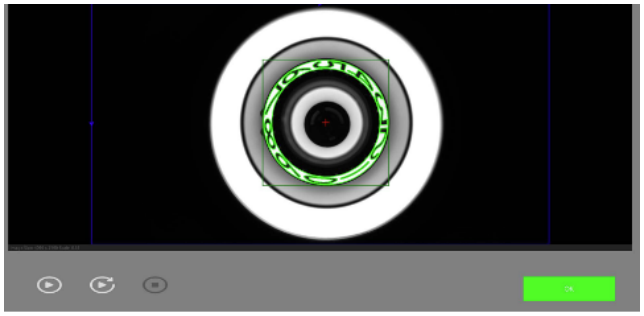
AUTOMOTIVE

Quality Assurance with Automated Machine Vision

Problem Identified

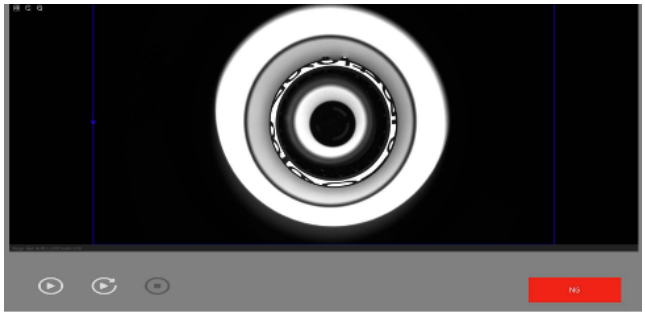
The industry faced recurring issues with inconsistent wheel printing quality that directly affected product reliability and customer satisfaction. Manual inspection methods were prone to human error, leading to misclassification of defective parts and inconsistent outcomes across different operators. This not only increased rejection rates but also risked defective items being shipped to customers, creating reputational risks. Furthermore, manual inspection was slow and labor-intensive, causing bottlenecks in production and reducing overall efficiency.

Solution Provided



To address this issue, an automated machine vision inspection system was introduced using a monochrome camera, 360° lens, and controlled ring lighting, supported by advanced image processing software. The system was capable of distinguishing acceptable (OK) parts from defective (NG) parts in real-time with high accuracy and repeatability. Unlike manual inspection, this automated solution ensured consistency, eliminated subjectivity, and enabled faster throughput, reducing dependency on human operators. Technology also allowed integration into existing production lines, making the transition smooth while minimizing downtime.

Results & Summary



After implementation, the automated system successfully differentiated between OK and NG printing with consistent accuracy. This reduced inspection errors, increased production efficiency, and minimized the risk of defective parts reaching customers. Measurable improvements were observed, such as a significant reduction in inspection time per part and higher defect detection rates compared to manual methods. The before-and-after comparison highlighted major gains in accuracy, reliability, and productivity across the production line, ensuring that every inspected part met industry quality standards.

This study highlights how the adoption of machine vision technology addressed a critical quality assurance challenge in wheel printing inspection.