

AUTOMOTIVE

Automated Vision Inspection System for Car Seat Quality



Problem Identified

The client was experiencing quality control issues during the verification process of small assembly components. Manual inspection of screws often resulted in oversight, leading to defective products passing undetected. The challenge was heightened in detecting welded areas on plastic parts due to low contrast between the weld and surrounding material. Existing vision systems lacked the resolution and contrast sensitivity needed for consistent and accurate detection. These limitations increased the risk of rework, production delays, and customer dissatisfaction.

Solution Provided

An upgraded vision inspection setup was introduced to improve accuracy and reliability. A high-resolution industrial camera was integrated with a precision lens to capture fine component details at the required working distance. Specialized bar lighting was installed to ensure uniform illumination, improving contrast for component detection. The image processing software was configured with a circularity function to identify round features, such as screw heads, with high precision. For weld inspection, a future enhancement involving a robotic arm and laser profiler was recommended to achieve close-range, high-contrast verification.

Results & Summary

The system achieved a full detection rate for screw verification under optimal lighting conditions and accurately identified missing components without manual counting errors. Inspection speed was consistent with production cycles, greatly reducing reliance on manual checks. Weld detection remained limited due to low contrast, confirming the need for the recommended hardware upgrade. Overall, the solution improved detection accuracy, inspection reliability, and production efficiency, ensuring higher quality output with reduced operational risks.

Electrical Wiring

