



# Use Case

## Quality Control - Class A Surface Defect Detection

### Customer Tier 1 Automotive Part Manufacturer

**Need** Reliable, affordable way to detect defects smaller than 0.5 mm on high-end rims for luxury cars in 7 seconds.

**Challenge** Detection of very small defects on reflective, highly polished 3D surfaces is challenging as we need to teach the AI model not to mistake shadows and other lighting artifacts as defects (false positives) or overlook defects that are in poorly-lit areas (false negatives).

Speed of detection was a huge challenge. Several high-resolution images are needed to detect the small defects and need to be analyzed by the AI algorithm fast enough to not slow down the line.

**Solution** We implemented a multi-camera solution that is able to illuminate even the recessed parts of the rims. We trained pass/fail and object detection algorithms to first detect and then classify paint, casting or mechanical defects.

**Process** Step 1 was the development of a custom multi-lighting and camera solution. We then used existing defective rims to annotate images, build a training library and train an AI model. The model learned to identify defects based on that training.

If new rim models are added, we can add new images to the library and retrain the model to include these new rim designs in a matter of days.

**Outcome** AI-based solution successfully detects and categorizes defects on class A rims surfaces in under 7 seconds.

This avoids shipping defective products to customer, reduces returns, increases customer satisfaction and decreases labor cost through reduction of QC personnel. Defect classification can also support root cause analysis which can be used to prevent defects in the first place.

### Contact Us

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