Use Case
Quality Control - Class A Surface Defect Detection

NEED

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

OUTCOMES

- AI-based solution successfully detects and categorizes defects on class A rim surfaces in under 7 seconds.
- Avoids shipping defective products to customer:
  - reduces returns
  - increases customer satisfaction
  - decreases labor cost through reduction of QC personnel
- Defect classification supports root cause analysis ➔ prevention of defects

CUSTOMER: Tier 1 Automotive Part Manufacturer

CHALLENGES

- Train the models to detect very small defects on reflective, highly polished 3D surfaces and not mistake shadows and other lighting artifacts as defects (false positives) or overlook defects that are in poorly-lit areas (false negatives)
- Speed of detection, several high-resolution images are needed to detect the small defects, analysis by the AI model has to be fast enough to not slow down the line

SOLUTION

Multi-camera system capable of illuminating all parts of the rims, incl. recessed areas. The model was trained to first detect and then classify paint, casting or mechanical defects

PROCESS

- Development of a custom multi-lighting and camera solution
- Existing defective rims were used 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, new images can be added to the library for model retraining within days.

Contact

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