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Cracks detection

Automotive

TASKS

Image analysis
Defects detection
Segmentation
Classification
Measurement
Annotation
Computer vision

INDUSTRY

Manufacturing
Automotive

TECHNOLOGIES

AI-go Studio
AI-go Runtime
Invariant.ai®

REQUEST

To improve quality control to meet stringent safety requirements for the manufacture of rockets used in steering systems, the client sought to automate the inspection process, traditionally performed with magnetic particle inspection techniques.

STARTING POINT

Rockets must be free from defects, such as pre-existing cracks in the steel rod used in production or cracks that form during heat treating. An automated quality control process is vital, especially because production includes the high-heat processes of carburizing (i.e., hardening by adding carbon) and induction hardening, both of which can create a wider variety of defects.

The solution is based on AI and exploits image segmentation techniques that not only identify anomalies on the component, but also graphically show where there are located. Image analysis is conducted directly on the inspection machine while the algorithm learning phase is carried out in the cloud, following the annotation (i.e., labeling) activity of example images, performed with the support of a metallurgist.

RESULTS

Compared with visual control conducted by an operator, there was a significant decrease in the detectability value - an accuracy index measured on a scale of 1 to 10, with 10 being “no possibility of identifying the defect” - in the Failure Mode that effects the analysis process.

With the samples used in the project evaluation phase, Oròbix's AI solution had the potential to reach a detectability value of 2, whereas the detectability value achieved with an operator's visual control was almost three times greater.

Improved defects detectability**Data-driven approach**

To keep track of defects in order to review the process and/or the supply chain for continuous improvement.
Operator-independent approach.

Reduced quality control costs**Compliance with corporate sustainability goals****Fast return of investment**