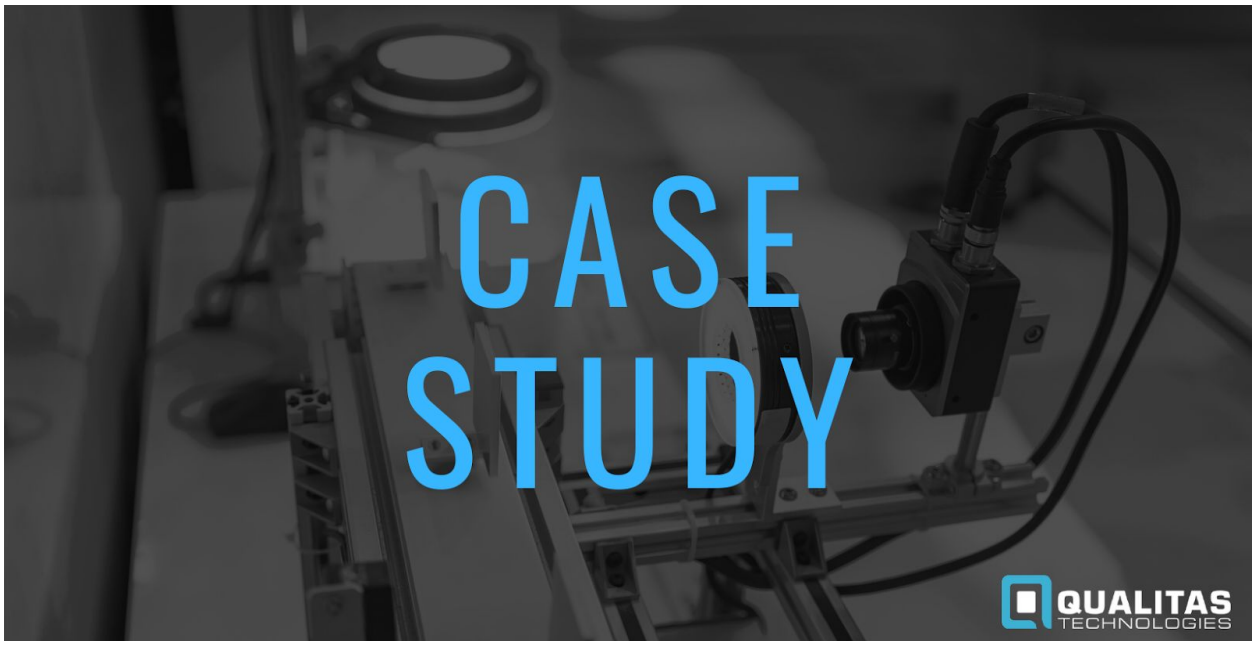
Protein Filter Surface Defect Inspection



Client

Our client is an international pharmaceutical and laboratory equipment supplier, covering the segments of Bioprocess solutions and Lab products and services. In 2018, the technology group earned sales revenue of 1566.0 million euros. Founded in 1870, the Gottingen-based company currently employs around 8,125 persons.

Problem Faced

- Identification of defects on the Top and Bottom surface of the protein filter.
- Challenge: Manual visualization of the defects.
- To remove manual visualization of defects they wanted an automated solution.

Technology introduced by Qualitas

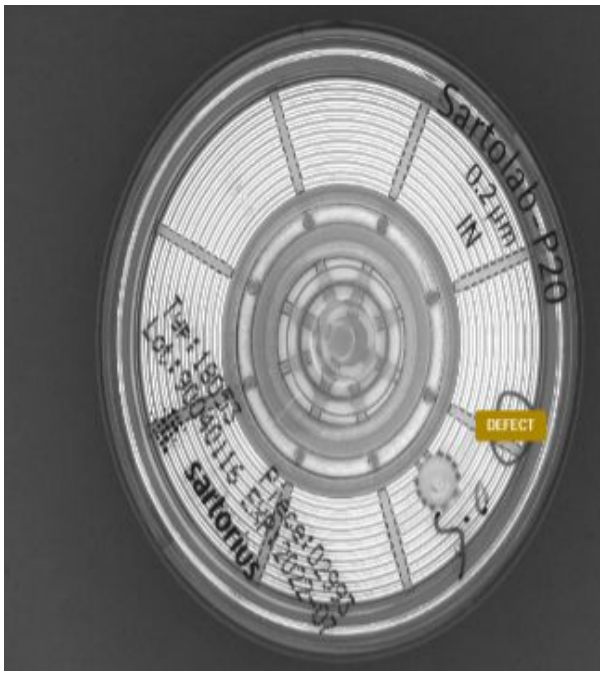
Artificial Intelligence and Deep Neural Network (DNN) for image processing helps in optimal decision-making and precise results. The previously used conventional rule-based image processing was a time-consuming task and wasn't reliable when accuracy was asked for. This is how the previously used technology worked; the image processing was done by comparing the captured image to a master image. During the comparison, any difference in captured image pattern above the pre-set threshold value resulted in rejection and images with pattern difference falling less than pre-set threshold value were accepted. But the issue here was with the accuracy and limitations of the application.

In AI-based image processing, a sufficient number of rejected images are added to train the system to identify the faults. The solution is generated to identify any fault in ROI (Region of Interest). During Image processing, every image is processed in DNN to identify the fault and results are generated. All the rejected images are highlighted with an annotation indicating the faulty area to be fixed. This results in generating application based optimal solutions with 100% accuracy.

Solution

- The filter was fed to the vision system conveyor (manual feeding).
- Proximity type or through-beam laser sensor triggered the camera which captured top and bottom surface images (2D).
- Both the images were processed and real-time results were displayed over the Qualitas custom-built GUI.
- The defects were displayed with annotation.
- Results (OK/NOT OK) from the top and bottom inspections actuated the flapper and components were separated accordingly.
- Rejected components with defects on both top and bottom surface or only on one face got collected in the same bin.
- Rejections based on different types of defects were identified or classifying the defective components based on different types of defects was out of scope.
- The system would completely be a stand-alone. Communication with any upstream or downstream external devices would be out of scope.

Images

Captured Image	*Annotated Image*
	

Results

The proposed solution works for all the trained OCR characters.

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