

USE CASE

SURFACE INSPECTION OF OIL FILTERS



CLIENT/INDUSTRY BACKGROUND

The client stands out in filtration products.

Manufacturers of more than 1500 unique products like oil, air, fuel, coolant, and hydraulic filters, they are one of the largest exporters and suppliers of such products.

The oil filter keeps the engine clean. It filters out the contaminants, which may deposit over time. The oil filter housing secures the oil filter into place.

PROBLEMS

- Poor product handling is one of the main reasons for defects like dents, scratches, cracks, etc on the outer body, which are being missed during manual inspection. Defects are as small as 0.5mm
- Manual pick and place is very time-consuming and labor-intensive

PROBLEM IMPLICATIONS

- Defects like cracks and holes may result in dripping oil
- Increase in customer complaints
- Brand image impairment

CLIENT REQUIREMENTS

- To automate the inspection of the outer body(housing) of the oil filters for defects like scratches, dents, paint marks, cracks, etc with the help of machine vision
- Classify the products as correct or defective
- Provide the coordinates of these filters to a robot to perform pick and place operations.

DEFECTS



CURRENT PROCESS

Inspection is being done by operators manually. Additional man power is deployed for the inspection. Operators are manually rejecting the defective products

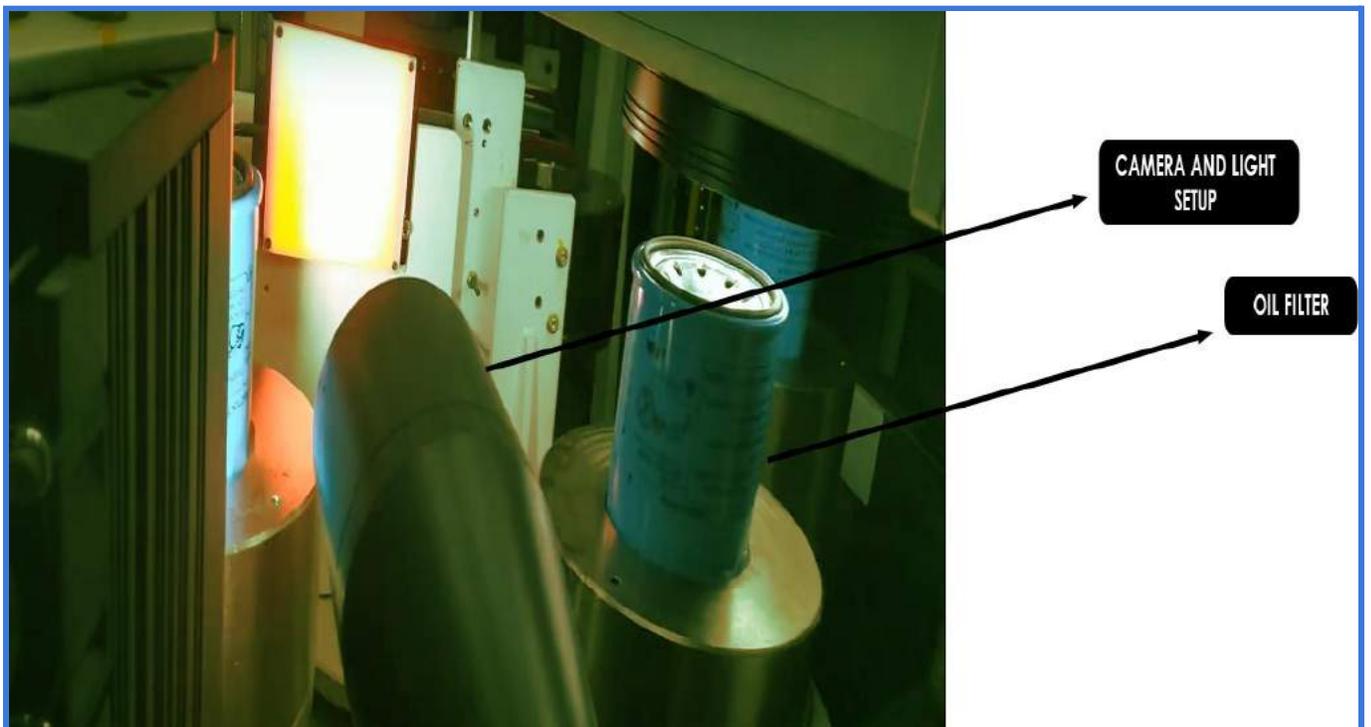
BUSINESS IMPACT

1. Increase in Cost Of Quality (COQ)
2. Increase in cost for additional labor and training
3. Increase in defect cost

SOLUTION USING MACHINE VISION AND AI

A camera or set of cameras with appropriate illumination is set up to [identify the defects](#) on the filters. Images are captured and sent to the software ([Qualitas EagleEye® Platform](#)) cloud where the training is done using deep learning algorithms. Once the program is trained, real-time defect detection takes place, based on which the results are sent to PLC to take action.

SETUP



SOLUTION USING VGR(VISION GUIDED ROBOTIC) SYSTEM

Robotic arms with integrated vision systems are used to identify the coordinates of the items to move from one station to another. A vision system with a large FOV(Field of View) quickly sends the coordinates to the robotic arm, in order to pick and place the filters with desirable accuracy.

IMAGES

DETECTING DEFECTS IN QEP(QUALITAS EAGLE-EYE® PLATFORM)



CONCLUSION

POC(Proof Of Concept) is conducted and the following conclusion is observed:

1. The accuracy of defect identification is ~ 98%
2. Observed a total reduction in labor skill development cost
3. Increasing the number of quality products reduces customer complaints



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