QUALITAS TECHNOLOGIES

USE CASE

AUTOMATED BEARING INSPECTION - NEEDLE BEARINGS

CLIENT/INDUSTRY BACKGROUND

Our client is one of the finest Technologies in the world in Needle Bearing manufacturing. They became associated with India's most progressive business group in the field in the year 200. They have the capability of manufacturing their special purpose machines required for Bearing manufacturing.

PROBLEMS

- Due to high-speed line (3 bearings/second), the bearing with missing needles are being missed to inspect and shipped to the customers
- The false acceptance rate is 21 percent whereas false rejection is approx 3 percent.
- Large production volume of bearing requires huge manpower and yet the accuracy of assembly verification is 74 percent
- Inspection is time-consuming and hence prolonging the time of supply to their customers

PROBLEM IMPLICATIONS

- The rate of returns and recalls of needle bearings is as high as 20-30 percent
- Missing needles may not distribute the load equally and eventually breakdown of bearing may occur
- False acceptance causes the defective bearing to be shipped to the clients whereas false rejection may reduce the production volume
- Reduced efficiency of the equipment where defective bearings are assembled

CLIENT REQUIREMENTS

- To automate the process of identifying missing needles in needle bearings
- Expedite the inspection process to meet the client's demand
- To reduce/manpower to cut down the quality cost
- Inspect SKUs varied a lot in terms of size, from 125 mm to 160 mm

CURRENT PROCESS

The bearings are coming on the conveyor and being inspected by the operators standing at the end of the moving line. The visual inspection is completely manual. Defective bearings on the conveyor are picked up by the operators and placed in the rejection bin. 3 operators are standing at each moving production line.

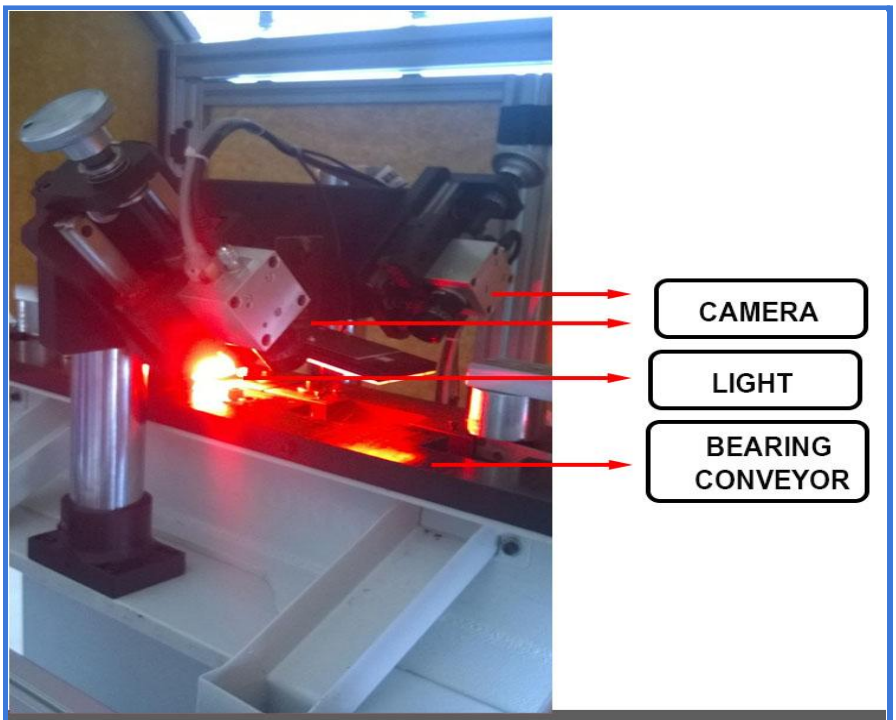
BUSINESS IMPACT

1. Increase in recall rates would lower the profitability
2. Increase in Failure in machinery would increase the risk of losing clients and revenues
3. Without the machine vision system, highly trained operators are required, which increases the cost of the inspection.
4. Due to prolonged time in delivering the bearings the risk of losing clients increases.

SOLUTION USING MACHINE VISION

A camera at the top position with appropriate illumination(red lights in this case) is set up to detect the needles in the bearing. 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 detection of needles takes place. Based on which the results are communicated to PLC to take action such as the action of rejection.

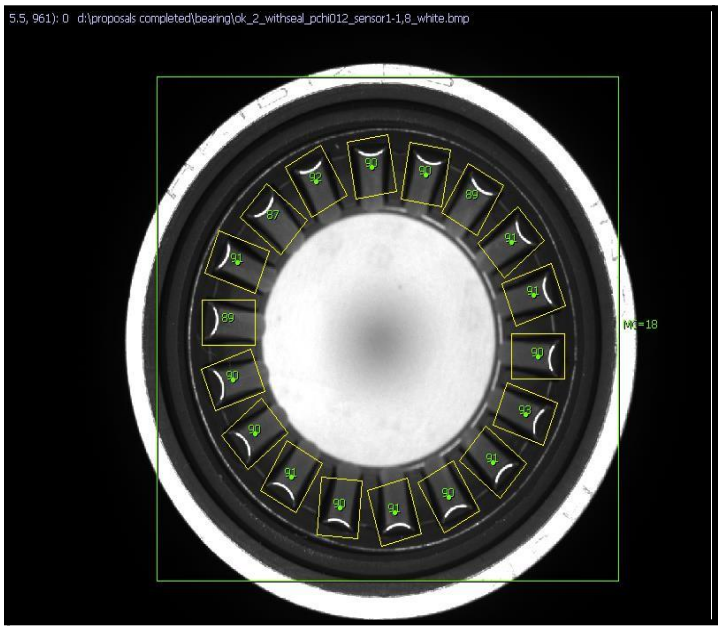
SETUP



BEARING INSPECTION SETUP

IMAGES

NEEDLES DETECTED IN QEP(QUALITAS EAGLE-EYE® PLATFORM)



CONCLUSION

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

1. False acceptance is reduced up to 2-3% whereas false rejection is reduced to 0%
2. Inspection cycle time is reduced up to 1 second with an accuracy of up to 97%
3. Human intervention is reduced by 66% that translates to reduced cost of inspection

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