nasscom
Center of Excellence-IoT & AI
A MeitY Initiative with Govt. of Karnataka, Haryana, Gujarat & AP

Ministry of Electronics & Information Technology
Government of India

Digital India
Power To Empower

GiL
GUJARAT INFORMATICS LIMITED
(A Government of Gujarat Company)

DSt
Department of Science & Technology
(Government of Gujarat)

NASSCOM CoE Enables NBC Bearings & ATAI to co-create a solution on smart counting

ABOUT NBC Bearings

NBC Bearings is India's leading bearings manufacturer and exporter, renowned for excellence in quality and delivery.

Headquartered in Jaipur, NBC Bearings is an integral part of the US$ 2.4 bn CK Birla Group, with five manufacturing plants in Jaipur, Newai (Rajasthan), Manesar (Haryana) and Vadodara (Gujarat). Having started with 30,000 bearings in 19 sizes in 1946, NBC has evolved to manufacture over 200 million bearings each year offered in 2300+ variants to serve a host of customers in India and over 30 other countries across five continents in automotive, railways, aerospace and industrial segments.

NBC Bearings offer large product portfolio ranging from 06 mm bore to 2000 mm outer diameter, Also Preferred bearings brand of Indian and Global Automotive OEMs and Railways

HIGHLIGHT

200
million bearings manufactured each year

30+
Export countries over the globe

2800+
employees

Background: The problem that the partner was facing

The manufacturing plant receives a large number of components (e.g inner race, outer race, rolling elements, retainers, etc) with high variability in shape and size. These components arrive in different packaging formats such as cartons, open metal boxes and wooden boxes and need to be counted for completeness.

Component counting is performed manually and checks are done through weight-volume relationship masters maintained. The manufacturing organization wanted to add an additional check through camera vision and image analytics to further strengthen their operations

The NBC Bearings was looking for a solution to validate the quantity received in each lot with increased efficiency. NBC Bearings was also looking for a solution with ease of use and scalable with applicability to various components / bearings in further upstream processes.

The Solution Concept

ATAI conceptualized, designed and worked with the manufacturing company to develop an AI-ML enabled vision based Instant Component Counting solution at the receiving inspection area

The major task completed in solution design started with

1. Object Detection Model Training Set-up & Validation
2. Anomaly Detection Model Training
3. Algorithm Implementation - Component and Box Height detection to enable vision based counting
4. Integration of End-to-End ML Pipeline
5. Database & Application Framework Design
6. Solution Integration & Testing

The solution provided a visual indication & alert in case of a mismatch in the number of components in a package. The whole process works in real time & takes just a few seconds
with accuracy of over 99% for hundreds of items scanned each day

NASSCOM CoE's – The Enabler - Role of NASSCOM

NBC Bearings wanted to create effective solution for receiving materials from their business partners which would help them in further strengthening their process and help with increasing process efficiency. It was a very unique situation to handle and NBC Bearings decided to nominate this use case for 3rd edition of Manufacturing Innovation Challenge.

After detailed scrutinization process and panel presentations from experts associated with NASSCOM, the proposal from ATAI lab was found suitable to meet this challenge. Throughout the whole process NASSCOM played the role of catalyst, helping NBC Bearings finding right solution.

Outcomes:

The solution was tested in live environment at the material receiving station. During initial trials, the vision analytics system achieved accuracy of above 90% and has a potential to go upto 99% in determining the quantity range in a particular box.