Success Story

Bosch India's advanced analytics solution reduces End-of-Line Test cycle time for its manufacturing divisions

Robert Bosch Engineering and Business Solutions Private Limited

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Challenge

Fuel injection pumps required several rounds of stringent quality checks in order to ensure product quality. As a result, the test cycle time at end-of-line testing phase was relatively high. Bosch's manufacturing division needed a cost effective solution that could reduce the test cycle time and ensure product quality.

Solution

Bosch India's data scientists and domain experts developed and deployed a predictive analytics model to estimate the delivery rate of the fuel injection pump. The solution optimized the end-of-line testing procedures resulting in reduced test cycle time with minimal necessity for test measurement devices.

Results

Integrating the manufacturing analytics solution into the existing end-of-line testing systems for Bosch's manufacturing division resulted in,

- Reduced End-of-Line (EOL) test cycle time by 35%
- 20% improved productivity
- Increased savings in maintenance cost

Customer background

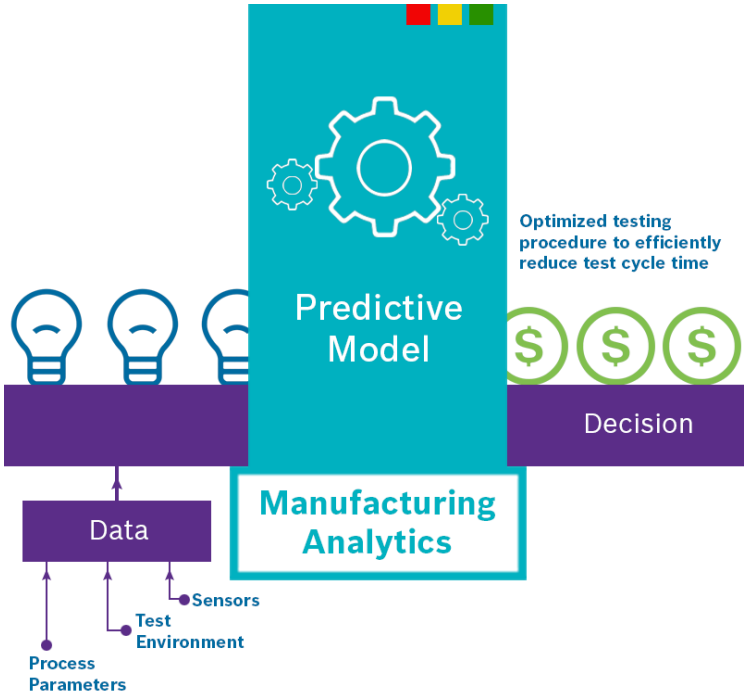
Bosch Limited, founded in 1951 is an industry leader in the automotive component manufacturing sector. Its product portfolio includes diesel and gasoline fuel injection systems, automotive aftermarket products, starters and generators, industrial equipment, packaging machines, electrical power tools and security systems, apart from industrial and consumer energy products and solutions. And, one of its manufacturing facilities located at Bidadi (India) manufactures a range of common rail pumps and fuel injection pumps.

Business Problem

Manufacturing of fuel injection pumps comprises of a number of complex processes such as machining, heat treatment, assembly and testing. In the end-of-line testing phase, the pump needed to undergo several stringent quality checks to meet customer's specifications. The testing phase proved to be highly time-consuming when compared to other manufacturing processes. The production head needed an innovative and cost-effective solution to optimize the testing procedures and to reduce the test cycle time; ensuring product quality.

Resolution

Bosch India deployed data scientists and manufacturing domain experts to develop a manufacturing analytics solution to address the pertinent business challenge. The data generated from temperature sensors, assembly line process parameters and test environment were analyzed. Bosch employed advanced data mining techniques to establish the correlation between process parameters and product performance.



The team applied wavelet analysis and regression techniques to extract features from significant process parameters. It developed a predictive analytics application to predict the delivery rate of the pump. The application optimized the testing procedure and reduced test time with minimal necessity for test measurement devices.

Results

The predictive analytics application was successfully integrated into Bosch's production environment. The key impacts of the solution are,

- Reduced End-of-Line (EOL) test cycle time by 35%
- 20% improved productivity
- Reduced maintenance cost due to minimal use of expensive test measurement devices
- Increased floor space in the production units due to removal of redundant apparatus

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