

Success Story

Bosch India's analytics model predicts engine failures with high accuracy for a leading engine manufacturer

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Challenge

A leading diesel engine manufacturer catering to a wide-range of industries was facing issues of engine failures in the middle of the trips for their large engine segment. At times the technical team had to fly in and out several times in order to diagnose repairs, procure spare parts and resolve issues. This incurred huge warranty costs for the customer and eventually, resulted in delayed shipment deliveries.

The customer required a solution to monitor the engine function and send an alert when engine degradation occurred. A timely maintenance alert system benefits both the OEMs and their customers to schedule the engine maintenance. As a result, warranty costs and delivery downtimes are significantly reduced.

Solution

The analytics team at Bosch deployed a stochastic model to study ship's engine performance for a period of 6 months. Initially, the engine's function and performance were modelled into the system. It then continued to detect engine degradations and send alerts to the after-sales service team. The predictive analytics solution was able to detect and alert the servicing team on engine issues about 2 weeks prior to an actual field failure with no false alarms.

Results

Bosch's comprehensive solution reduced warranty costs and delivery downtime. The implementation of predictive analytics model resulted in,

- Prediction of engine failures 2 weeks in advance
- Close to 100% accuracy in detection of engine degradation

Customer background

The customer is a leading diesel engine manufacturer with more than 100 years of history in manufacturing engines for a wide range of applications including shipping, construction, and agriculture.

Business Problem

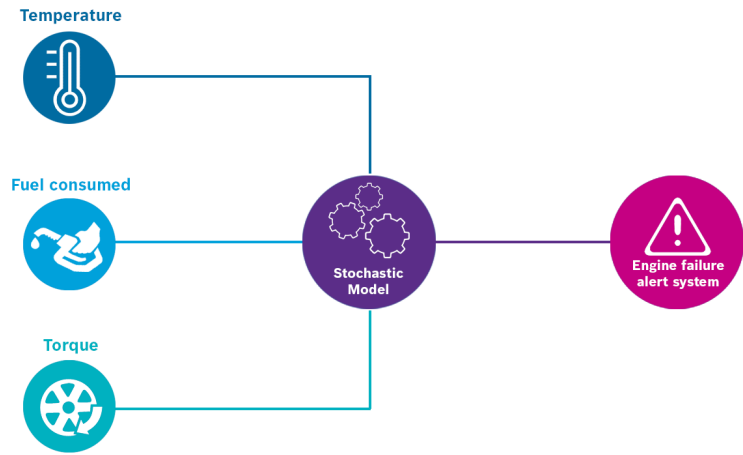
Warranty costs were one of the major expenses for the customer. Additionally the after-sales service team also faced a few other challenges in order to effectively detect engine degradation at an early stage. The challenges were:

- The engine performance was affected by a number of variable factors like operating conditions, load, speed etc.
- The engine performance suffered due to environment variation like age, wear and tear etc. which cannot be termed as engine degradation
- A false alarm for scheduling early engine maintenance would lead to increased maintenance frequency, ultimately increasing the cost of warranty.

Resolution

Bosch India's data scientists and domain experts analyzed historical data collected from one of the customer's engines for over a period of 5 years. The team developed a three-phased solution to resolve the issue:

1. An algorithm based stochastic model analyzed data received from the engine's sensors and detected engine degradation.



2. When the solution predicted an engine degradation, it generated an alert to the after-sales service team scheduling the maintenance at the next opportune stop. The solution significantly reduced warranty costs for the customer and thereby, reduced delivery downtime for the owners.

Results

Complex algorithm and predictive analytics model coupled with IoT technology facilitated the customer to effectively predict engine failures and conduct maintenance in advance. Bosch's solution,

- Detected engine degradation with high accuracy
- Predicted engine failures with an average lead time of 2 weeks
- Generated zero false alarms
- Reduced warranty costs for the manufacturer and reduced delivery downtime for the owners

