



AI at Scale

**Detect anomalies using sensor data**

## The Big Picture

A leading European engineering company had sensor data that was continuously collected through its multiple turbines. The company wanted to build an algorithmic workflow to enable automatic detection of gearbox anomalies by utilizing gearbox sensor data. This was challenging because the company needed to collate the data from multiple sensors and also deploy the solution in production (on high-velocity data) and predict machine failures at an early stage.

## Transformative Solution

Spectral data from different sensor-variant-frequency combinations were analyzed to understand the gearbox behavior. Based on the trends, all time series were classified into different categories and model performance was evaluated for each category. Additional filters were deployed to prevent false alarms.

The approach used two models for anomaly detection. One captured long-term system behavior, and the other captured recent trends. Anomaly scores from the models were passed into a detection engine to identify anomalies. The engine raised an alarm if the anomaly scores were beyond an acceptable threshold for a specified time period.

## The Change

As a result of the solution, the company realized several benefits. Due to the model's anomaly detection capability, and flexible and scalable methodology, it can be deployed as a product on the client's internal platform to enable cost savings from early detection of machine failures. The anomaly detection model was capable of making predictions using live streaming sensor data (high-velocity data). The models were developed using adaptive machine-learning methods, which saved the time that would be required in building models at regular intervals of time.