INNOVATION PILOT

Data Mining and Machine Learning for waste analysis in the machining process

The challenge

One of the leading supplier of fully integrated drivetrain and electrified propulsion systems for all passenger vehicles, faces the challenge of:

- respecting an increasingly stringent specific product quality criteria;

- understanding the causes of increased waste levels;

- achieving problem anticipation in a perspective of Predictive Quality;

- timely preparation of a quick resolution.

The solution

The focus is the production of the synchronizer ring in the plant in South of Italy, specialized in the mechanical components for the automotive market.

The **Machine Learning** methodology, in particular the **classification algorithms**, identifies the generative factors of waste elements in the manufacturing chain, monitoring specific features.

Following pre-defined steps, such as **Feature Selection, Pearson's Correlation, Classification and Model Training**, the **implemented algorithm learns** how to classify the observations starting from a set previously labelled of time window historical data and not analysed a predefined output.

The collected data is also used to compile a **near real-time Business Intelligence dashboard** containing some useful process performance indicators.

The benefits

For each specific use case the most suitable ML algorithm reaches the final objective evaluating KPIs such as: **Precision, Recall, F-Measure, Accuracy**.

Predictive Quality within the production process reduces presumed waste which results in both the recovery of the pieces produced and in greater higher revenues.

"The analysis based on machine learning pointed out hidden patterns and helped to pave the way for corrective actions

Lorenzo Macchi
Global BU Manufacturing General Manager

+95%
out of range
pieces recovered