TrendMiner
A SOFTWARE AG COMPANY

INDUSTRY
Specialty Chemicals

PROCESS TYPE
Continuous Processing

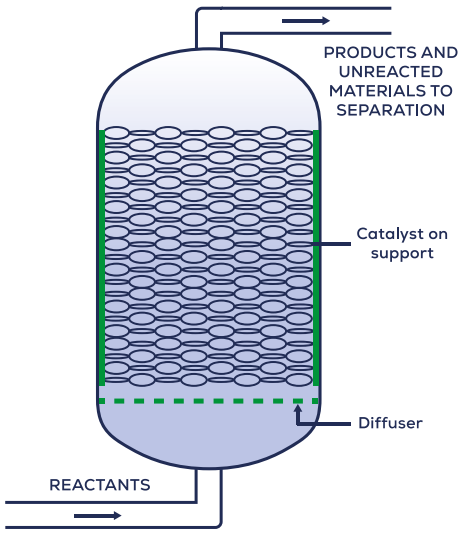
ANALYTICS TYPE
Predictive Analytics

KEY OBJECTIVE
Predictive maintenance

Life Monitoring & Prediction of Useful Catalyst Life for Predictive Maintenance

BACKGROUND

In certain chemical plants, reactors may contain catalyst beds. The catalyst bed loses activity over time and needs to be replaced on a routine basis. It is critical that preventative maintenance is scheduled at least a few weeks prior to catalyst failure, as any premature catalyst failure could be detrimental to the production lines.



CHALLENGE

Due to variability in catalyst life, forecasting when the catalyst will fail can be challenging. As supply chain, maintenance, and operations would all be affected in the event of a premature catalyst failure, it is critical to replace the catalyst prior to failure. Traditionally, there has been no easy way to predict when a catalyst bed would fail.

SOLUTION

The engineers wanted to monitor the failure rate of the zinc oxide catalyst, so they can forecast when the catalyst will reach the end of useful life. Knowing this in time helps to schedule maintenance timely.

Approach

- Smoothed out reactor temperature tags using TrendMiner aggregations.
- Zoomed in to the current catalyst run temperature and utilized predictive mode with two historical layers.
- Visually identified the end of useful catalyst life on the sub-layers.
- Placed scooters for the two most similar catalyst runs to quantitatively mark the threshold for the end of useful life.

RESULT

- With the click of a button, a forecast based on historical data can be presented to the subject matter expert, who can then inform maintenance, operations, and supply chain to allow for more accurate production scheduling.
- The useful remaining catalyst life, based on historical performance, can be successfully predicted, which in this case was 3-7 months.
- The analyses performed can be applied to other packed bed reactors.

TRENDMINER FEATURES USED

TAG BUILDER

TrendMiner's tag builder allows the creation of time series data through the use of formulas on and aggregations of the tags. The results of these tags can be visualized just like any other tag. The tag builder can also be used for importing time series data via a CSV file.

LAYER COMPARE

Using pattern recognition technology, TrendMiner uses a similarity search feature to find similar past patterns. The most important part of the pattern can be emphasized with a graphical weighing factor to improve accuracy of the search results.

MODEL-FREE PREDICTIVE MODE

TrendMiner's interactive and model-free predictive mode is based on patented technology and fundamentally works differently from classical model-based predictive technologies. Our software calculates possible trajectories of the process and predicts future evolutions of key variables and process behaviours.

EARLY WARNINGS

Fingerprints can be used for monitoring deviations and also for assuring the process is within specifications. For both situations, TrendMiner can capture the event and label it automatically. Based on root causes found upstream and use of the fingerprints, early warnings can be used to improve control over the production process.

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