TrendMiner
A **SOFTWARE AG** COMPANY

INDUSTRY
Petrochemical

PROCESS TYPE
Continuous
Processing

ANALYTICS TYPE
Predictive
Analytics

KEY OBJECTIVE
Improve Pump
Network Performance

Condition-Based Monitoring of Pygas Stripper in a Steam Cracker

BACKGROUND

This petrochemical plant produces light alkenes, such as liquified petroleum gas (LPG) and naphtha, through a process called thermal steam cracking. In the Pygas stripper column, C4 and lighter components are stripped out of the cracked gas compressor condensates. Pygas is made from these and other streams.

Pyrolysis Gasoline

CHALLENGE

Production becomes limited when fouling occurs because quality and safety standards require removing C4-components from the Pygas stream. Delays and shutdowns can result in millions in production loss. When fouling occurs, the column must be cleaned. For some time now, process experts were unaware that the column was fouling before it had to be shut down to clean.

SOLUTION

Engineers decided to use TrendMiner to develop a condition-based monitoring system for the Pygas stripper. The monitor would detect abnormal operating conditions early. In turn, engineers could clean it early and reduce downtime.

Approach

- Based on search criteria, use Tag Builder to exclude outliers by filter
- Using the Influence Factors & Time Shift Function, build various models based on different known and unknown influence factors (linear combination) to describe the change in pressure in the soft sensors, including influence factor analysis
- Calculate and monitor the difference between modelled and measured change in pipe pressure and store as a new tag

Challenges

- The specific load of the stripper is not directly measured because feed and overhead flow rate are unknown.

RESULT

- Engineers used the condition-based monitoring system to detect abnormal conditions in the Pygas column early
- As a result, process experts were able to move cleaning of the Pygas column to a condition-based maintenance schedule, which meant they could schedule the right time to clean
- The company saved millions in downtime because it could clean the stripper column without bringing the factory to a complete stop

TRENDMINER FEATURES USED

DATA VISUALIZATION MODES

TrendMiner offers various visualization modes for analyzing time series data. Besides the common time trend, time series data of multiple tags can be shown in a stacked mode for specific time sequences or can be grouped together in a "swim lane". For multivariate analysis, our software offers a multi-scatterplot that shows tag histograms and multiple histograms of each pair of the selected tags.

FAST FILTERING

TrendMiner makes it easy to exclude irrelevant time periods from an analysis. Time based filters are static filters applied to certain time periods. These filters can be created manually or on top of search results. Furthermore, dynamic criteria-based filters can be created and are automatically applied to both historical and new/incoming data.

TAG BUILDER

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

INFLUENCE FACTORS & TIME SHIFT

TrendMiner helps find influence factors to discover the root cause of process anomalies. In some cases, the influencing factor may lay hours upstream in the process. With the use of an automatic time shift detection, the most likely influence factor can be found – even if it took place long before the tag was impacted.

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