TrendMiner
A SOFTWARE AG COMPANY

INDUSTRY
Petrochemicals

PROCESS TYPE
Continuous Processing

ANALYTICS TYPE
Root Cause Analysis

KEY OBJECTIVE
Prevention of Unwanted Flare Spikes

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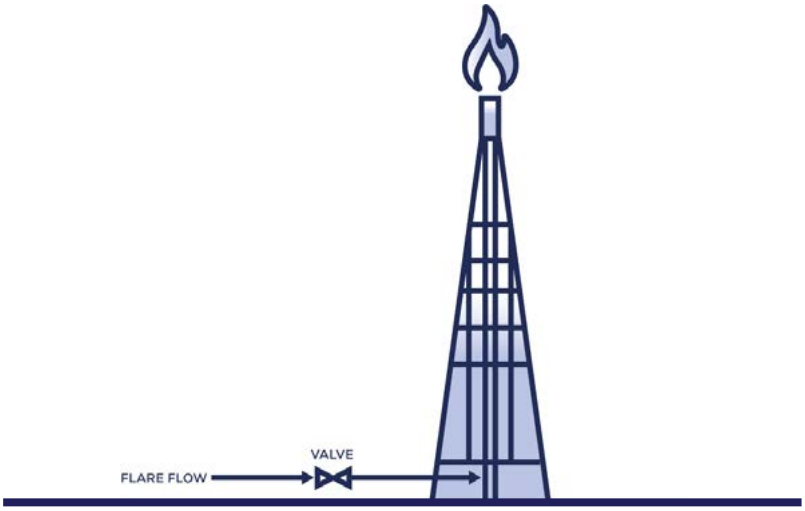
BACKGROUND

For some industrial processes, side products or waste streams need to be released from the plant to prevent pressure buildup. These gases cannot be emitted in their original forms into the atmosphere because they can be toxic and harmful to the environment. Therefore, flares are installed to burn the gases to convert them into water and carbon dioxide. However, sometimes problems will occur in the process that will cause unwanted spikes in the flare.



CHALLENGE

One of the plant's flares showed deviations from normal behavior. At times, the flow toward the flare would spike, leading to an unwanted big flare. Ultimately this caused problems both with the neighborhood and with the local government due to flaring regulations. This issue needed to be investigated and solved. However, using traditional methods, the investigation would be extremely time consuming as it would involve browsing through various tags to try to find a potential issue. Moreover, the plant lacked tooling that had this functionality. The process experts needed a quick and efficient root cause analysis approach in which they could analyze the data to identify, describe, and address the problem.

SOLUTION

Process experts used TrendMiner to solve this issue. It has the functionality to perform descriptive analytics to find out if this was the first spike or if it had happened in the past. Additionally, TrendMiner's Recommendation Engine recommended all the potential tags that were related to the issue and helped the plant's team find the potential correlations which they might not have found otherwise.

Approach

- The process experts loaded the relevant tags to look at the data surrounding the flare spike. These results were then overlayed in preparation for using TrendMiner's similarity search function.
- The team used TrendMiner's Similarity Search functionality to check for past events which helped in identifying the root cause of the problem
- Next, they used the Recommendation Engine to find potential correlated tags to expose the root cause. The problem was subsequently corrected, and measures were set in place to prevent it from happening again.

RESULT

- Through easy data comparison, the process experts found instances of similar past behavior.
- Using TrendMiner's Recommendation Engine, the process experts found the root cause of the problem which was a malfunctioning valve. Maintence was informed to resolve the issue.
- A monitor was set to warn the operation team of a potential issue which would give them time to take corective measure.
- By resolving the unwanted flare spike, the environmental burden and the associated chemical waste were decreased.

TRENDMINER FEATURES USED

DATA VISUALIZATION

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 multiscatter plot that shows tag histograms and multiple histograms of each pair of the selected tags.

RECOMMENDATION ENGINE

TrendMiner's Recommendation Enginer gives suggestions for correlations and fingerprint deviations based on selected time frames, tags and layers. Our software provides an almost instant analysis across all indexed tags by combining information from multiple similar situations thus avoiding false correlations. Using automatic time shifts, it helps detect early indicators of deviating behavior.

SIMILARITY SEARCH

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. This functionality lets process experts know if an issue has occurred in the past and if so, how many times.

MONITORS

TrendMiner is like a watchdog; it continuously monitors processes and sends notifications when deviations from predefined fingerprints, process conditions, or operating zones occur. These early warnings improve plant output by allowing the plant to run at optimal energy consumption and waste reduction and at the same time, to comply with safety, health and environmental regulations.