



INDUSTRY
Power
Generation



PROCESS TYPE
Continuous
Process



ANALYTICS TYPE
Descriptive
Analytics

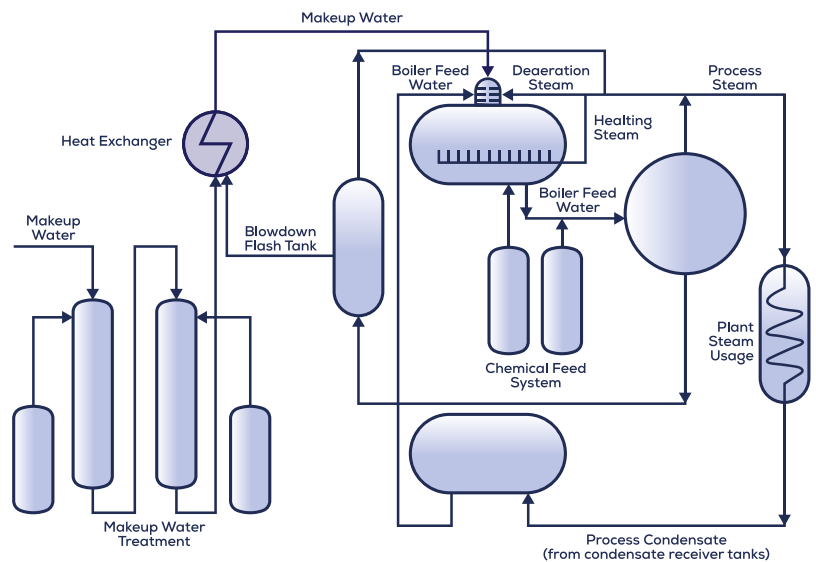


KEY OBJECTIVE
Monitor Steam
Network

Calculating the Steam Balance to Monitor & Alert Network Deviations

BACKGROUND

Recognizing and detecting deviations in steam balance ensures they do not rise past a certain desired threshold. Optimally, that limit is near zero. But to find the deviations, engineers must calculate the steam balance for the various networks (low-, medium-, and high-pressure steam), which is the difference of the quantity of steam coming in (provider) minus the steam taken off during the process (consumer). They also must determine from that balance if too much or too little steam was coming into the process.



CHALLENGE

Engineers at a plant that generates steam as a production resource want to know to the root cause of anomalies in its steam network. For example, anomalies that lead to an increase in steam delivery consume excessive amounts of energy and therefore increase production costs. However, the company does not have calculations for correct steam balance and must develop them before beginning a root-cause analysis.

SOLUTION

- Calculate the steam balance as a function in TrendMiner's tag builder as the steam provided minus the steam consumed, where the optimal answer is 0
- Load newly created tag from the steam balance calculation to get the amount of steam consumed in a 24-hour interval based on the aggregation of the tag
- Determine, based on the amount of steam used in a 24-hour period, if too much was delivered (>0) or too much was taken off (<0)
- Monitor the process based on these calculations and alert for deviations

Challenges

Process experts must eliminate several potential root causes to find the right one. Anomalies could include measurement inaccuracy, event-related peaks or valleys, or a leak in the pipe network.

RESULT

- Using TrendMiner, process experts learn when the steam network is out of balance
- They can determine if the supplier provided incorrect measurements of steam consumed during the process or if something else caused the problem
- In the future, engineers can monitor for periods of irregular steam consumption to avoid high energy costs
- The company also could save taxes on the amount of steam it produces, as it could require fewer CO₂ certificates

TRENDMINER FEATURES USED

TAG BUILDER

TrendMiner's tag builder allows the creation of time-series data using 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.

VALUE BASED SEARCH

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. It also uses a value-based search to find anomalies in the time series data by analyzing criteria, numerical values, and limits.

ALERTS & NOTIFICATIONS

Process experts can use TrendMiner to create batch fingerprints and monitor production processes in relation to these fingerprints. Automatic notifications can be inputted into our software to alert engineers and operators when patterns of interest are detected. TrendMiner supports various notification mechanisms, including embedded inbox and email alerts. These notifications also include suggested courses of action and can be designated to trigger a webhook to fire a workflow in other business applications, such as the maintenance management system.

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

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