TrendMiner
A SOFTWARE AG COMPANY

INDUSTRY
Energy Generation-Renewable

PROCESS TYPE
Continuous

ANALYTICS TYPE
Diagnostic

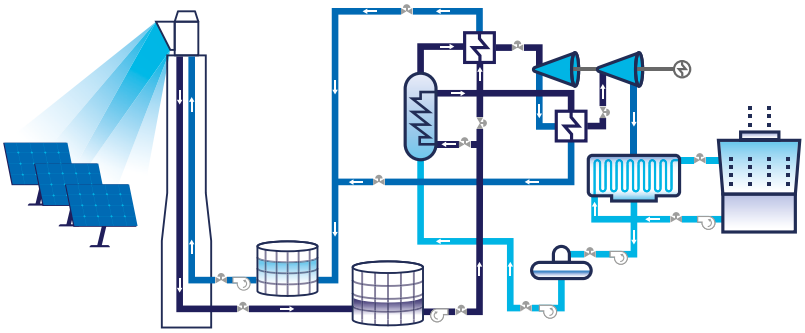
KEY OBJECTIVE
Detect water leaks in a solar plant

Detecting Water System Leaks in a Solar Plant-Rankine Cycle

BACKGROUND

The Rankine cycle system of a solar plant includes a pump, boiler, turbine, and condenser. At the end of the cycle, the pump delivers water to the boiler before it turns to steam. This steam then is used to drive the turbine. The water for this process needs to be maintained and controlled to avoid any problems while the process continues. A leak could lead to less water in the system, which could cause the turbine and evaporators to become unstable. The leaks can lead to corrosion, attrition, plant lifecycle reduction, and increased utility consumption.

Concentrated Solar Power – Power Tower Process Diagram



CHALLENGE

At this solar plant, the water level in a tank that collects leaks in the steam heat exchanger is noticeably higher. To reduce the accumulation of this wastewater, operational experts perform a root-cause analysis to pinpoint the origin of the leaks. Once the cause is found, they will set up a monitor and alert to inform them when wastewater levels begin to increase.

SOLUTION

- Perform a value-based search to look for leaks after the tank level goes down
- Check the mass balances on each heat exchanger to pinpoint potential loss in mass that could indicate a leak
- Calculate the overall equipment efficiency to reduce energy and utility consumption

Challenges

- Several slow leaks have not been measured, and therefore it will be difficult to determine the source of the leak
- The intermittent nature of a solar plant creates a lot of noise in the data that must be filtered out

RESULT

- Using TrendMiner, operational experts find the root cause of the water system leaks
- They set up a monitoring system that checks for new leaks
- When leaks are detected, operational experts will receive an alert that will empower them to take proactive actions to reduce waste and utilities consumption
- By correcting the leaks, the overall equipment efficiency and process efficiency will increase by 2%

TRENDMINER FEATURES USED

VALUE-BASED SEARCH

A value-based search is used to find anomalies in the time-series data by analyzing criteria, numerical values, and limits.

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.

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.

CAPTURE EVENTS OF INTEREST

Specific occurrences can be captured as events and labeled automatically, based on monitoring alerts for saved search patterns, fingerprints, and rules. The captured events can be used to monitor how often these events happen and even to prevent and control overall production performance.

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