![TrendMiner — A Software AG Company]

INDUSTRY
Mining & Metallurgy

PROCESS TYPE
Continuous Processing

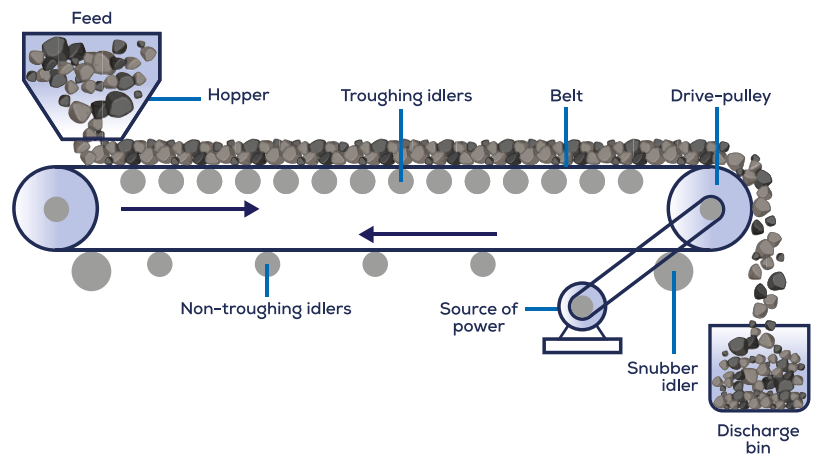**ANALYTICS TYPE**
Predictive Analytics

KEY OBJECTIVE
Optimize Conveyor Belt Efficiency

Reducing Energy Usage Through Conveyor Belt Optimization

BACKGROUND

Conveyor belts are an integral part of the mining and metals industry. Large steel belts transport raw material out of the ground and get it to production. In the metals industry, several kinds of conveyor belts help transport material from one process to another during smelting and other production methods. Because the belts are energy intensive, they need to be cleaned regularly to ensure energy is managed properly and production is optimal.

Feed / Hopper / Troughing idlers / Belt / Drive-pulley / Non-troughing idlers / Source of power / Snubber idler / Discharge bin

SITUATION

Engineers at this coal mining operation wanted to learn more about the way its underground conveyor belt used energy. The belt brings coal from the mine to the surface prior to cleaning and transport and is considered the bloodline of the operation. Process experts wanted to change the cleaning schedule from fixed intervals to performance based in addition to optimizing energy use. To achieve this, they needed to determine the conveyor belt throughput and the relationship between energy usage and the throughput. This would provide the optimal operating point. Once that point was determined, engineers would set up new monitors that would look for deviations from ideal operating parameters. They could use these monitors to schedule maintenance to improve operational and energy efficiency.

SOLUTION

- Create a throughput formula tag based on hopper weight

- Make formula tags for energy used per kilogram of coal transported (specific energy)

- Determine the relationship between the throughput and specific energy consumed

- Set up operating zone monitors to determine when performance drops, which indicates it's time to clean and perform maintenance

RESULT

- Process experts were able to identify the optimal throughput for the conveyor belt

- To further optimize energy performance, the hopper control was narrowed

- The new operating zone monitor gives a clear indication of when the conveyor belt needs maintenance

- Engineers can schedule the maintenance when it is necessary to improve operational efficiency, which reduces energy consumption

Challenges

Engineers had to calculate the immediate throughput of coal, which is a complication of the process. They also had to filter and clean the data to exclude periods when the conveyor belt was intentionally taken offline for maintenance or other business decisions.

TRENDMINER FEATURES USED

f(x) 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.

AREA SEARCH

Used to gain new pattern-based insights to detect anomalies outside best operating zones and is achieved by combining two tags.

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.

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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