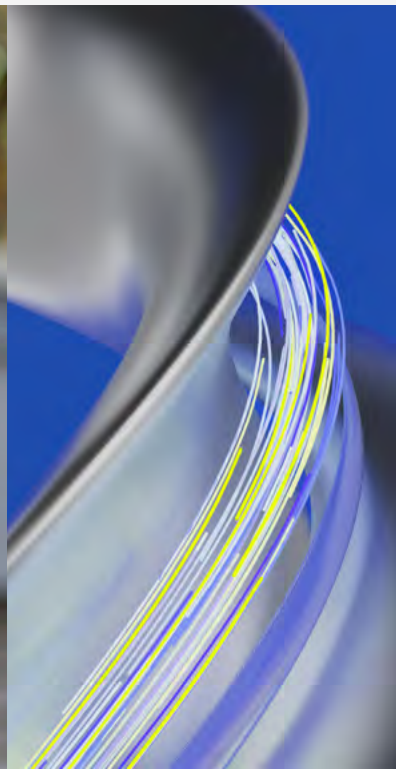
Factsheet

Machine Learning and Big Data

for Detecting System Anomalies

Acting instead of reacting - this is how maintenance works. The IT solution SR::SPC ML efficiently examines millions of measured data on anomalies using machine learning. Anomalies in plant behavior can be early messengers for possible damage. Once recognized, they warn in time of impending failures.



Data tell a story

Creeping changes in plant behavior may point to imminent damage or performance losses. If such changes are detected in good time, malfunctions can usually be remedied before they cause longer failures or major losses. The enormous amounts of data in modern process control systems and other data sources offer the opportunity to identify critical changes already on the basis of the available measurement data.

In practice, minor changes are difficult to detect without proper tools due to the huge amount of data. Measuring value noises, external influences and the variety of possible operating states obscure changes in addition. The potential in this data remains therefore usually unused without supporting tools.

Machine Learning (ML)

After a training phase, huge amounts of data can be analyzed and monitored almost instantaneously with the help of machine learning. The algorithms of ML can be applied to all available measurements of a plant without major manual effort. The performance of the ML approach depends strongly on the right combination and adaptation of the algorithms.

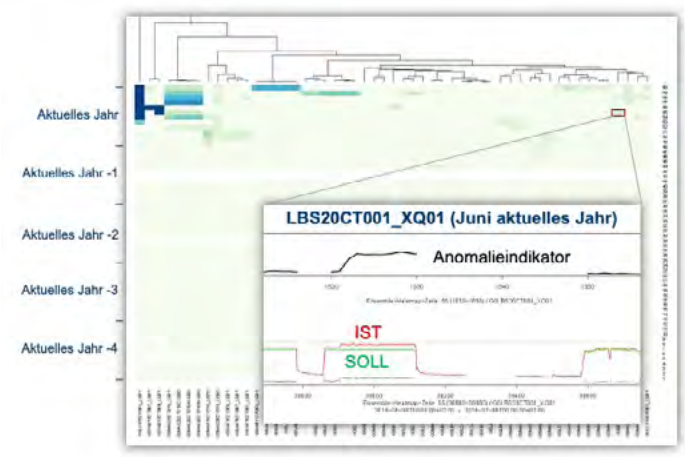
With over twenty years of experience in data-driven modeling of technical processes, Iqony has developed SR::SPC ML, a powerful software that reliably detects abnormalities in your data. The software provides best detection rates with particularly low false alarm rates. Special ML knowledge of the user is not required to create reliable models.

The variety of procedures used is one reason for the high hit rate and low false alarm rate of SR::SPC ML.

From technicians to technicians

With SR::SPC ML, the user is able to create and maintain their own models after just a short training period. The proven SR::SPC surface effectively supports the user in ML model creation. Thus, created models can first be validated offline, or e.g. be recorded online with one click to continuously monitor the system. The results are displayed optionally in different compression levels. From the heat map with highly condensed data, which shows the complete plant condition of the last five years at a glance (see excerpt), up to the detailed representation, which documents the chronological course of a single disturbance with all participating measured values in high resolution. Dendrograms group measurements with a similar anomaly history so that they can be easily assigned to individual disorders.

SR::SPC ML combines various algorithms of ML with powerful filters and statistical tests to detect anomalies in the system behavior automatically, early and reliably. The variety of procedures used is one reason for the high hit rate and low false alarm rate of SR::SPC ML.



5-year overview of all anomalies of a turbo set

Smart Data

SR::SPC ML combines the benefits of two worlds. The extension ML allows a fast monitoring of all available measured values without much initial effort and achieves almost the quality of the neural models of the classic SR::SPC manually tuned by experts. If required, the recognition rate for particularly important sizes can be further enhanced using the classic and well-tuned SR::SPC expert models. The methods are also scalable and can be combined „smartly“. The complete monitoring with ML can be supported in key areas through the classic and knowledge-based approach. When monitoring with SR::SPC ML, you will no longer miss a creeping change in system behavior.

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