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Case Study ||

Save Energy, Buy Time: Automated Evaluation of Sensor Data Optimizes Steel Production

Management summary

✓ Industry 4.0   ✓ Big data   ✓ Quality assurance   ✓ SAS Business Analytics Platform   ✓ Oracle database
✓ Industry analytics   ✓ Process control   ✓ Production optimization

Goals

- ✓ Standardized format for all sensor data in hot strip production
- ✓ Real-time display of sensor data
- ✓ Efficient quality control of the steel strips produced

Approach

- ✓ Consolidation of the sensor data in a database
- ✓ Definition and display of important key figures
- ✓ Development of reports that connect the data to get the best results possible

Results

- ✓ Automated reports based on sensor data
- ✓ Marked alleviation of workload for shift supervisors
- ✓ Significant energy savings by optimal control

Initial situation

To roll a steel block into a strip, lots of precisely aligned work steps are required. These work steps are defined in a rolling schedule including a huge number of parameters: the temperature of the furnace, the gas mixing ratio, the iron ore consumption, and so on. Throughout the rolling process, thousands of sensors collect data that needs to be checked. And this is just where the challenge lies for steel producers: Although the sensors usually gather and transmit the data automatically to central databases , its evaluation – if one takes place at all – is done manually. This means lots of work for the shift supervisors, and the companies run the risk of jeopardizing energy efficiency or product quality if data is not evaluated properly. Good reasons to seek to analyze sensor data automatically. In close cooperation with the users on the shop floor level, mayato consolidated sensor data on a central platform for a major German steel producer and prepared it so that reports could be generated.

Manual evaluation and individual monitoring

The steel producer had ambitious goals with its Industry 4.0 project: Not only should production become more efficient overall, but product quality should also be improved even more. The material properties of a steel strip are essentially determined by various parameters in production. The company now wanted these parameters to be monitored and saved in the long term. Using the ID of the steel strip produced at each specific time, the idea was to ensure seamless quality assurance and documentation. In our case, the management and those responsible in production had already been vexed by the manual evaluation of the sensor data for a good while.

Displaying the values separately in the individual monitoring systems from different providers was just as much work as exporting them to Excel. If errors occurred, it took a long time to fix them – which could lead to significantly higher operating costs, for example in the case of, a defective temperature sensor. In the first step toward an automated solution, the specialists from mayato GmbH set about classifying all the sensor data from several furnaces and the production environment, and then converting it into a standardized format. In interviews with the company's technical experts, the consultants gathered the following information:

- ➐ The meaning and the relevance of the individual values
- ➐ Whether figures had to be converted and which conversions were necessary
- ➐ Which information had to be supplemented
- ➐ Where the data originated

Particular attention was paid to the last point: With several thousand generated sensors and tables with hundreds of columns, you need to know precisely what information you're looking for.

"fast Processing of such enormous volumes of data is a real challenge. That's why skillful selection of the queries is required to generate the reports."

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Paolo Vacilotto
Team Lead SAS
mayato GmbH
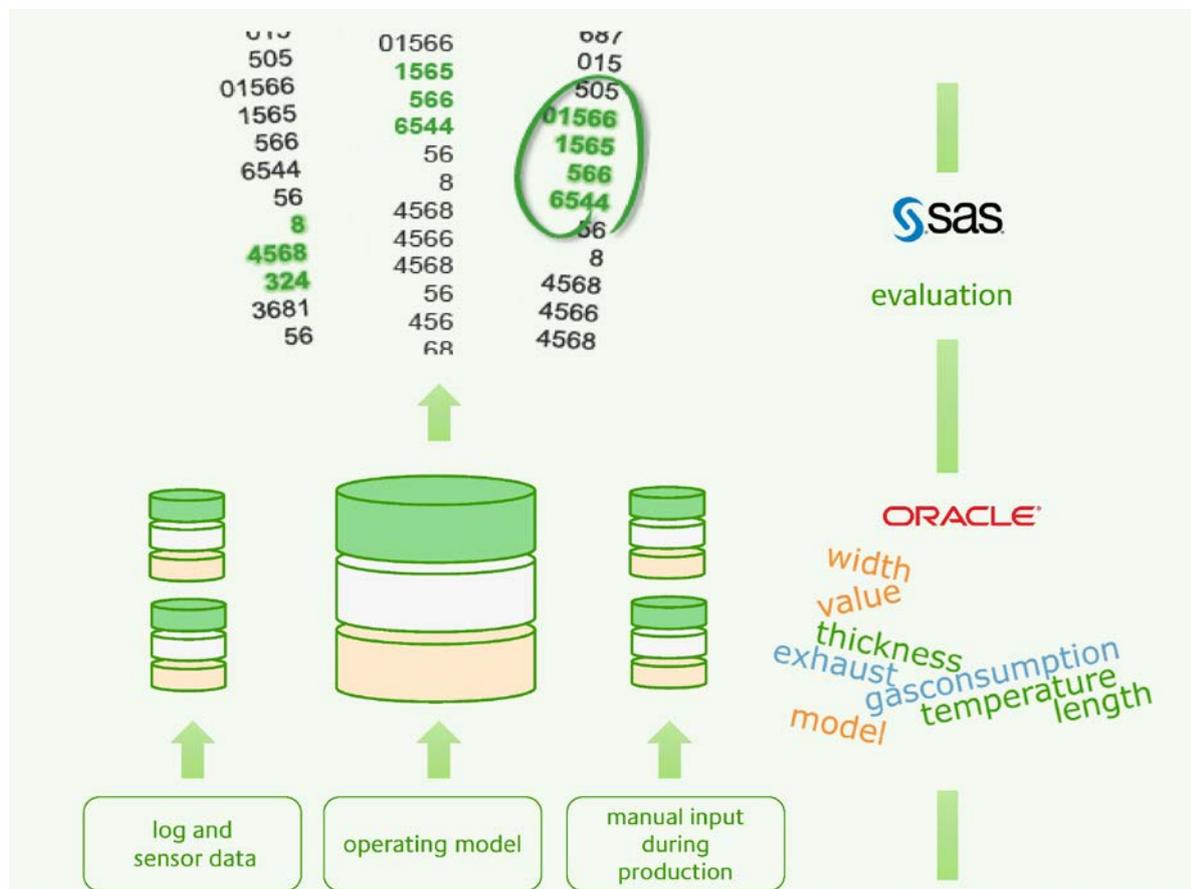
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Individual analysis and meaningful visualization

Then the team prepared the selected data in such a way that it could be stored and evaluated on a universal platform. As software for the central analysis of the data, the steel producer chose the business intelligence platform from SAS. First, the mayato experts developed prototypes of the reports, which were then successively refined using agile development methods. Today, the company's technical experts have 20 different base reports at their fingertips, which can be further adapted by selecting different parameters. Altogether this means several hundred different analyses can be performed – all within a short period of time. The danger of undetected errors is almost completely averted, and the automated analysis stops energy from being wasted unnecessarily and faulty materials from being produced.

Efficient production and seamless quality control

Overall, the company now enjoys several advantages:

- Action – relevant production data can be analyzed and saved in a targeted way
- Reaction – if parameters deviate from the process, this is detected fast and countermeasures can be introduced
- Prevention – faulty sensors are registered immediately and can be monitored or replaced

The shift supervisors in steel strip production are impressed. They can concentrate fully on analyzing the reports they receive. It's easy to make nominal-actual comparisons and, if required, measures can be taken immediately. Furthermore, the company benefits in financial aspects: The optimal use of resources reduces operating costs in the long term and compliance with regulatory emissions standards will prevent penalties. At the same time, improved production processes contribute to higher quality results.

"Letting data rest unnoticed damages every company in the long term. The example from the steel industry demonstrates how to use this data for your own advantage."

Eric Ecker
Head of Industry Analytics
mayato GmbH

About mayato

mayato GmbH empowers companies to capitalize on their information. Together with our customers, we develop and implement solutions in the areas of financial analytics, customer analytics, industry analytics, and IT security analytics.

A team of experienced process and technology consultants operates out of our offices in Berlin, Bielefeld, Mannheim, and Vienna. They analyze and optimize your business processes and work with you to determine the requirements for technical implementation. They assist you in selecting the right tools, develop successful strategies, and conceptualize tried-and-true modern architectures. And of course, mayato consultants also help with the practical side of implementing your chosen solutions. Technical standards and governance enable economical, effective projects and efficient operations in the long term.

Analysts and data scientists from mayato use these solutions on your behalf to establish connections between data from many different sources and to forecast trends and events. They devise convincing business cases and produce tangible monetary benefit from your processes and applications. Your employees learn how to use state-of-the-art data analysis methods, how to tackle data quality issues, and how to interpret and visualize results. Working with mayato future-proofs your company for the age of big data.

mayato GmbH was founded in 2007. Among mayato's customers are renowned large and midsize companies from a range of industries. As a partner of several software providers, mayato is committed to remaining neutral and – first and foremost – to delivering its own high-quality services. For more information, visit www.mayato.com.

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