rexroth
A Bosch Company

Predictive Analytics

Definition, functionality and benefits

The inexorable progress of information technology is making its way into almost every imaginable application, including industry. New business opportunities are opening up with the use of ever-increasing volumes of data. Companies must develop new solutions to remain competitive. However, why is this happening now? In addition, what are the advantages for companies? Learn more about Predictive Analytics in this white paper.

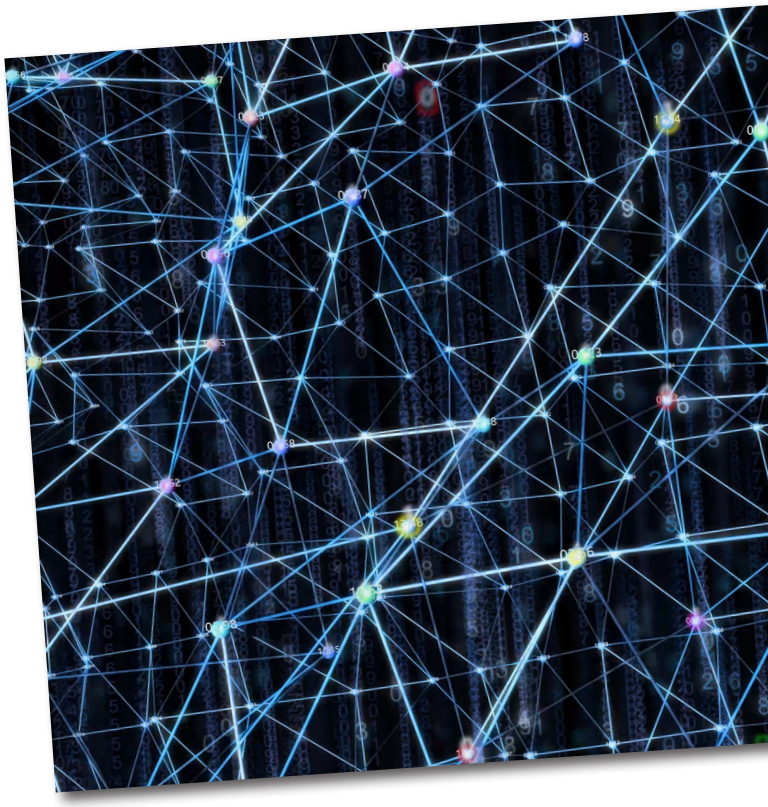
WHAT IS THE GOAL?

Predictive Analytics means deriving a mathematical model from historical data and using it to make predictions based on current observations. The requirement for predictive analytics is the ever-increasing amount of data that is used for building more and more accurate mathematical models. Thanks to Big Data systems, processing of large data volumes is now possible and companies can put this data to use in various use cases. In industrial applications, Predictive Maintenance has emerged as one of the most important use cases of Predictive Analytics. Here, such models can help to avoid unplanned downtimes and thus enable smooth production by identifying possible problems in advance. The associated benefits include ensuring effective resource planning, the ability to plan maintenance work, exploiting the full lifetime of a component, reducing inventory and ultimately lowering maintenance costs.

HOW DOES PREDICTIVE ANALYTICS FOR PREDICTIVE MAINTENANCE WORK AND WHICH METHODS ARE USED?

To implement predictive maintenance for industrial applications, methods such as machine learning and trend analysis are required. [You can learn more about machine learning and big data in our next white paper.]

First of all, suitable data is collected from the system via existing or retrofitted sensors and securely transmitted to the cloud and stored there. This historical data contains information about the behaviour of the machine. Algorithms search the incoming data for changes in observed data patterns. Anomalies in data patterns are thereafter valuated by human experts and maintenance actions are defined if necessary. This enables the machine operator to prepare maintenance in advance and to operate his maintenance activities more efficiently. For example, an advance warning of a component failure leaves enough time for spare parts procurement and replacement of the component can be carried out during the non-production time during a weekend. With the help of predictive analytics solutions, companies can effectively use their collected data volumes and derive information that is not directly measurable. Thus, they also serve as a decision-making support for companies.



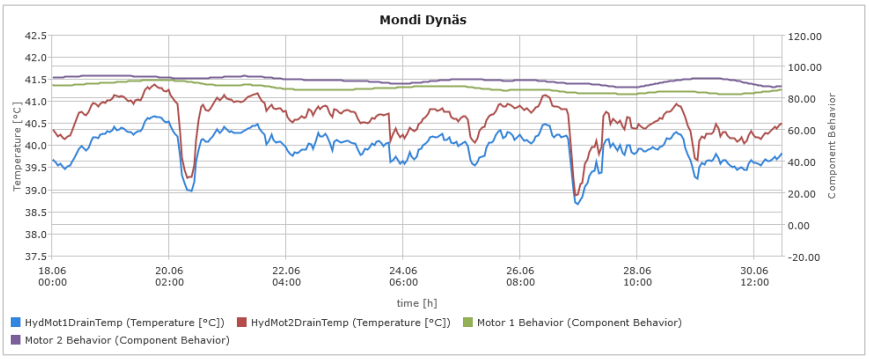
DOES REXROTH USE PREDICTIVE ANALYTICS?

Online Diagnostic Network (ODiN) is a Predictive Analytics solution from Bosch Rexroth. ODiN is a cloud-based service, which comprises analysis via the ODiN platform, operation of the user interface (account), monitoring, support with reporting, and the provisioning of advice and recommendations for Predictive Maintenance.
ODiN works mainly in industries where downtime costs are very high, e.g. in metallurgy, mining, pulp and paper industry, cement industry, sugar industry and rubber processing.
The continuously increasing volume of data stored in ODiN can not only be used to improve the Predictive Maintenance offering itself, but also for the development of additional data based services, further increasing the productivity of customer machines.

WHERE AND HOW IS THE COLLECTED DATA VISUALIZED?

The data is centrally stored and evaluated on Bosch servers. Worldwide access to the data is possible via a web portal.

The figure above shows an example of available time series. Both recorded sensor signals (e.g. volume flow) and calculated characteristic values can be displayed.



▲ **01 Display of the time series of selected parameters from a hydraulic unit**

The calculated values provide a compact overview of the development of machine behavior. The input data that is used for the calculation can be displayed for evaluation in order to analyze the causes of deviations.

WHAT ARE THE BENEFITS OF AN ODIN SOLUTION?

◀ **02 The advantages of ODiN as a predictive analytics service from Bosch Rexroth**

The ODiN predictive analytics solution from Bosch Rexroth offers customers additional benefits:

- Domain knowledge, analysis know-how, infrastructure and services are offered from a single source.
- No additional IT infrastructure is required at the customer's site or rather we do not burden the customer's infrastructure.
- The realization (installation, status report, maintenance recommendation) is executed by Bosch Rexroth.
- The customer has a contact person who can be reached at any time.
- The security of your data is guaranteed by the transmission of encrypted data, storage in the Bosch data center, confidential handling and unidirectional transmission.

CAN PREDICTIVE ANALYTICS PREDICT THE FUTURE?

Predictive analytics solutions are a big step forward in daily life in industry, but you cannot automatically predict the future with it. However, by combining current and past wear data as well as domain expertise, an assumption about the future can be made.

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