



MACHINE LEARNING IN MANUFACTURING

The department has long been involved in finding solutions to a wide range of industrial problems, using machine learning methods. One focus of our research is so-called Deep Learning – machine learning with deep architectures.

Data analytics ensures product quality

Modern production plants face a great challenge in trying to understand the relationship between the various influencing factors in the manufacturing process and the quality of a product. Optimizing the production processes requires quantifying the effects on quality and performance variables when individual process parameters change. Fundamental in this effort is the possibility of using machine learning to predict quality variables from process parameters or features derived from these.

At the department, we develop feature selection/construction algorithms as well as process models based on measurement data from the real manufacturing process, expert knowledge about the process, and related theory.

Optimizing predictive maintenance – through machine learning

Ideally, a technical system is considered reliable and economical, if it is repaired promptly and available when required. This is only possible if the company can reliably predict the maintenance requirements of the systems, taking into account the current production plan and past load history, while guaranteeing the availability of the appropriate resources such as specialists, spare parts, logistics, etc.

Reliable prediction of future events is an integral part of any Predictive Maintenance (PM) system. An important key lies in the analysis of patterns in past events. In a joint modeling approach, we model not only the continuously measured sensor data, but also repetitive discrete event data and failure data. We develop machine learning methods to recognize and visualize complex high dimensional patterns as well as the dynamics and trends of production process states. Furthermore, we use machine learning algorithms to predict and characterize the condition of technical systems.

1 Quantification of the dependency of a measured quantity of product quality by means of three significant influence variables of a plastic extrusion process

