

SCCH
Software Competence Center
Hagenberg GmbH

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 Competence Centers for
 Excellent Technologies

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 Discovery), 2019 – 2022,
 multi-firm



Machinery in production in Marchtrenk (source: starlim)

FROM PROCESS DATA TO DECISIONS

SIMULTANEOUS MONITORING OF HUNDREDS OF INJECTION MOLDING PROCESSES INCREASES STABILITY OF MACHINERY AND PRODUCT QUALITY.

By its very nature, the manufacturing industry generates large amounts of data. To be able to use these for data-driven analysis tasks, a suitable system is required. This begins with data acquisition and storage, data processing and analysis, and continues with a suitable definition of use cases and project goals, right through to the use and integration of the analysis results into the production system.

Successfully implementing this process chain is demanding. For this reason, *starlim* brought the experts from the Software Competence Center Hagenberg on board in 2018 as part of the COMET project "SmartDD" to show that this can work in a long-term, continuous collaboration.

starlim is the world's largest processor of liquid silicone and specializes in the injection molding production of small parts made of silicone in single- and multi-component technology. *starlim* produces more than 14 billion silicone parts annually on several hundred machines for industry, life sciences and the mobility sector.

In elastomer injection molding, the material is injected into a product mold, known as a "shot." In the mold, the product vulcanizes at about 200° Celsius and is ejected. During each shot, several hundred data points are collected that map both the physical state of the process, e.g. temperature and pressure, and the current machine configuration as well as product characteristics, such as volume.

SUCCESS STORY

Stable process, highest product quality

The aim of *starlim* is to create a data infrastructure that can assess the stability of machine park processes and the associated product quality. This could provide automated information to trained machine operators on which machines processes need to be optimized.

Expert knowledge required

Standard IT solutions will not get you there. Injection molding processes are too complex for that, and heterogeneous mass production with many different product types is a huge hurdle.

In the first two years, a concept and a prototype of a data infrastructure were developed to enable all future applications. An important success of the project was, for example, consistent data through automated pre-processing steps across all machine types and versions. From the beginning, use cases from data analysis were processed in parallel.

This made it possible to gain initial insights and added value at an early stage and to define precise requirements for the infrastructure. The individual stages in a digitization process are highly inter-dependent. A major advantage is that SCCH has research groups in all the disciplines involved, enabling close interaction between the respective experts.

A complete implementation of an analysis project takes place during the real-time detection of a sporadically occurring problem in the injection molding process, the material flow obstruction. This is evident in the process data through the occurrence of multi-variate outliers in parameters designed by the subject matter experts at *starlim*. However, standard methods for detecting outliers did not provide satisfactory results. However, a multi-stage online algorithm developed by SCCH specifically for this purpose led to success.

The industry partner is currently working on integrating this application into the production system.

Project coordination (Story)

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