



Kronach (visitable at short notice)

# KNOWLEDGE MINING TO SUPPORT USERS WITH CUSTOMIZED MACHINES

Application for the manufacturing industry - assistance systems

## SUMMARY

The assistance system for complex production machines supports the user by proposing operator interventions to fit the current process situation. The knowledge required to guide the user is generated automatically from the operating history recorded by the machine. The software is largely independent of the machine.

## CURRENT SITUATION

Despite or even because of the high level of automation, today's production machines ask a lot of their operators. They usually have a number of machines to look after and do not always have sufficient experience when problems occur. This can lead to machine outages or quality problems. In many companies, this situation is exacerbated when a new generation of employees comes in.

## SOLUTION

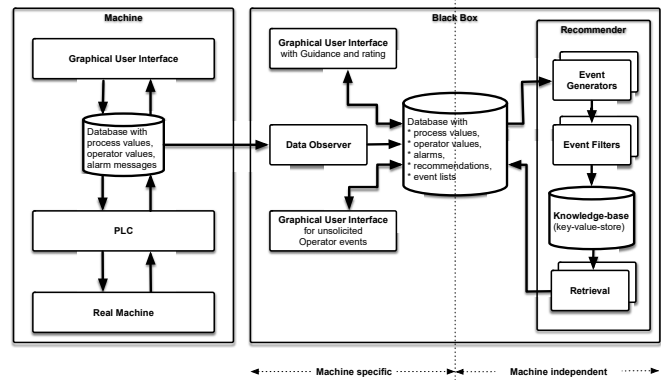
The software extracts user interventions from the data recorded during operation. This are saved as a "fingerprint" together with the machine condition. The knowledge database created in this way can be used to generate proposed action for the current fingerprint. In this way, the experience stored in the machine can then be leveraged.

## CONTACT

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## INDUSTRIE 4.0 – FEATURES

Training at the workplace in an environment marked by complex systems and Industrie 4.0 is improved and sometimes made possible in the first place by assistance systems that give the machine operator recommendations on how to act in specific situations.



## PROJECT DESCRIPTION

The assistance system is being developed within the scope of a project run by the "Car Infotainment and Man-Machine-Interface" research body at Hof University. Hans Weber Maschinenfabrik GmbH from Kronach, the manufacturer of the plastic extruders, is involved in its role as a user alongside Rehau AG and H.N. Zapf GmbH & Co. KG as operators of the machines. The machine-independent part of the solution is based on the case-based reasoning process. The knowledge database is automatically built up using the data generated during operation. In contrast to other machine-learning processes, the knowledge database can be edited, thus allowing a process expert to review the viability of the recommended actions.

## PARTNERS



## PUBLICATIONS

- V. Plenk, S. Lang, and F. Wogenstein. Providing user guidance in special purpose machines by machine-learning algorithms. International Journal On Advances in Software, 10(3 and 4):167 – 179, December 2017
- V. Plenk, S. Lang, and F. Wogenstein. Scoring of machine-learning algorithms for providing user guidance in special purpose machines. Proceedings of CENTRIC 2017: The Tenth International Conference on Advances in Human-oriented and Personalized Mechanisms, Technologies, and Services, Athens, October 2017
- V. Plenk. Improving Special Purpose Machine User-Interfaces by Machine-Learning Algorithms. Proceedings of CENTRIC 2016: The Ninth International Conference on Advances in Human-oriented and Personalized Mechanisms, Technologies, and Services, August 2016, Rome

## STANDARDIZATION APPROACHES

Appropriate profiles could automatically recognize and call the relevant data points. To this end, statements on the data source (user input, regulator output, measured value) would have to be returned using OPC UA mechanisms. Standardized administration shells and sematic description would facilitate implementation.