Current research of project B3 from CRC 876

Data Mining on Sensor Data of Automated Processes

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Research focus

Challenges

- Constantly changing process conditions
- Increasing complexity in industrial processes
- High product variety
- Short reaction times for process adaptations
- Complex, hard-to-measure process characteristics
Current and planned research on 

**Real-time processing**

<table>
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<tr>
<th>Real-time aggregation and feature extraction</th>
<th>Real-time learning and model adaption</th>
<th>Online management of many models</th>
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<td>- Adaptive windowing of streaming data</td>
<td>- Filtering, analysis and learning from data in real-time</td>
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<td>- Online aggregation and feature extraction</td>
<td>- Online detection of concept drifts</td>
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<td>- Preparation and indexation of sets of features</td>
<td>- Distinction between drift and noise</td>
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<td>- Automatic real-time selection of data representation</td>
<td>- Managing interactive data sets and models</td>
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<td>- Changing combination rules</td>
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<td>- Continuous update of learners</td>
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<td>- Structural update of learners</td>
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![Graph showing time window and amplitude with events](image1.png)

![Diagram showing process flow](image2.png)
Current and planned research on

**Combination of ML & process simulations for real-time optimisation**

- How can process simulations and machine learning be reasonably combined?
- How can process configurations be identified to refine pre-trained models?
- How should processes be adapted online based on model predictions?
Current and planned research on

**Utilisation of quality predictions for product quality inspection**

- How can the final quality inspection as a bottleneck be relieved by means of suitable strategies?
- How can the ratio of test duration to slack be optimised?
- How can relevant quality-related parameters be identified?
- How should quality control loops be positioned within process chains?
Thank you for your kind attention!

Contact

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