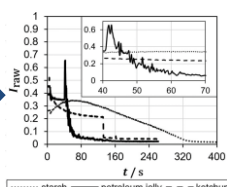
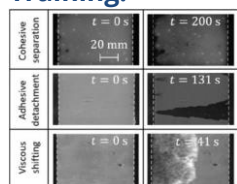
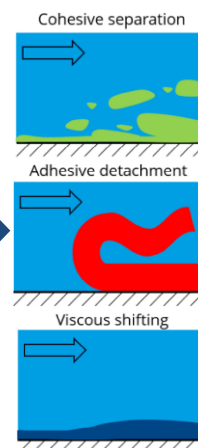
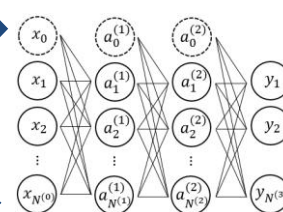


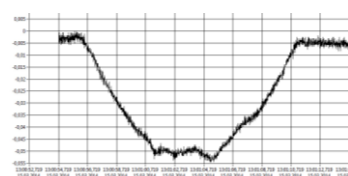
Master thesis / Diploma thesis

Training and evaluation of a machine learning algorithm to recognize the cleaning mechanism based on industrial process data

Training:


GW(t)


Application:


e.g. Q(t), T(t), p(t)

Motivation and topic:

Dirt deposits (fouling) are a problem in many industries and cleaning them is essential, especially when it comes to hygiene-critical processes such as food processing. The illustration shows (right) three of four different cleaning mechanisms for soils. It is possible to recognize/classify these mechanisms by means of neural networks using grey-scale images (top left), which are recorded over time during cleaning (Golla *et al.* 2022). Since no images are normally taken during cleaning in the food industry (and therefore gray-scale image data is not available), the approach is to be extended to process data where the cleaning mechanism is unknown.

In the final thesis, patterns similar to the patterns in the gray value image data for the classification of the cleaning mechanism are to be found in process cleaning data from a dairy plant. Additional data from cleaning trials where the cleaning mechanism is known can be used. Thus, the cleaning mechanisms in the industry are to be predicted using machine learning (ML) models. In a further step, the model results are to be validated by tests in the technical center in Dresden

Procedure:

The aim of the work is to develop a machine learning (ML) classification approach for retrospective prediction of the cleaning mechanism using one or by combining multiple sensor signals. This includes creating an ML pipeline to process the data and train ML models. Therefore, we require programming skills (preferably in Python) for this work, basic ML knowledge should be acquired at the latest at the beginning of the work.

The work will be supervised by both universities together (thus face-to-face and online meetings, possibly the opportunity to visit the other university), the main focus is on:

- Uni Hohenheim: Industrial process data & data evaluation for machine learning.
- TU Dresden: Gray scale images of model soils, cleaning tests & soil characterization.

If you are interested, please get in touch with the contact person listed for your university in the footer.

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