

Condition Monitoring of a Hydraulic System using data-driven machine learning methods

Motivation:

The use of intelligent data analysis tools focussing on the evaluation of production data for **condition monitoring and predictive maintenance** are important activities for the efficient and economical operation of a plant. Furthermore, these methods provide reliable predictions about expected maintenance actions which can be used to avoid unnecessary shutdowns.

Task:

Data-driven machine learning methods such as Support Vector Machines, Deep Neural Networks, Decision trees etc. are to be applied for Condition Monitoring of a Hydraulic System (please refer the literature attached). Comparison of the testing results for the different machine learning methods.

Assignment I

- Familiarize with the **concept of Condition Monitoring and Fault classification**.
- Familiarize with the typical **machine learning algorithms** used for classification such as **Support Vector Machines, Deep Neural Networks, decision trees** etc.
- Familiarize with the **hydraulic system** and the different **variables effecting** the operation of the plant
- Development of the **Machine Learning Framework for fault classification** with the different algorithms.
- Documentation of the above-stated points.

Assignment II

- Implementation of the different algorithms in Python using the provided data sets.
- Definition and implementation of typical metrics provided in literature to measure the performance of the algorithms.
- Test and validation results for the predefined scenarios.
- A detailed comparison between the different algorithms.
- Documentation.