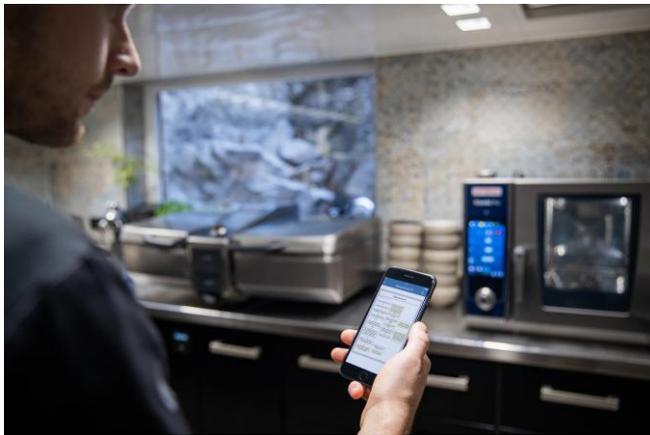


## Data-Driven Predictive Maintenance for Industrial Systems

### Exploring Classical and Deep Learning Approaches using Real-World Machine Data

In this project, students will explore anomaly detection and condition monitoring techniques for predictive maintenance using real-world data from industrial machines such as 3D printers and coffee machines. The focus lies on understanding and applying both classical machine learning methods and modern deep learning approaches for time-series analysis, especially in the context of complex multivariate sensor data.

The project involves the reproduction and consolidation of previously developed analysis pipelines. Students will work with pre-existing code fragments and datasets and are encouraged to contribute to a more structured and reusable workflow. Collaboration is welcome, although the project can also be completed individually. This internship is particularly suitable for students who want to deepen their practical skills in data-centric AI and contribute to applied research in the context of industrial machine health.



#### Scope of the internship

- Preparation of data for machine learning by filtering information and creating features
- Implementation and evaluation of different anomaly detection and prognosis algorithms

#### Requirements

- Experience with Python and common data science libraries (e.g., NumPy, pandas, scikit-learn, PyTorch)
- Interest in time-series data, anomaly detection, and explainable AI
- Ability to work independently with available datasets and notebooks
- Basic knowledge of machine learning workflows and evaluation
- Teamwork welcome but not mandatory
- Language: English (working proficiency)

**Qualification level:** Advanced Bachelor or Master level

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