Interdisciplinary Project

Machine learning-based fault detection and classification in agricultural machinery

Task

Recent advances in computing and robotics technologies have brought about improvements in technologies commonly employed in agriculture. As a result of mechanization and automation in agriculture, autonomous systems are frequently used in field operations. Since these systems are operated in various and unstructured environments, they are prone to failures.

Condition monitoring (CM) is important to reduce operational costs, prolong lifetime of machines and enhance operational uptime. CM is used to inspect the state of the machine and to detect components causing faults or anomalies. Analyzing the frequency spectrum of rotating machineries is a frequently used approach for CM. However, interpreting certain features of vibrations in frequency domain requires human expertise. For the development of assistance systems to support operators of agricultural machineries, we work on fault detection and classification techniques.

Work packages

- A short literature review on ML-based fault detection and classification
- Processing raw data for training/test/evaluation collected by the thesis instructor
- Implementing a suitable ML-based approach for fault detection (e.g., GPC, SVM)
- Evaluation and discussion of the results (Performance comparison with previously implemented approaches)
- Documentation

Prerequisites

- Being a good team player
- Good skills in python
- Prior knowledge of machine learning
- Motivation to learn new topics
- Structured and independent way of working

Remote work and meetings at Campus Garching are possible. Guidance in choosing an IDP course will be provided.

Start: April

Send your application by email to ertug.olcay@tum.de including

- A short email elaborating your background and motivation
- Curriculum vitae (CV)

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