

Master Thesis Proposal

Data Analysis and Clustering Methods for Fault Diagnosis and Identification of Unknown Faults in Automotive Applications

Fault diagnosis and system monitoring considers the problem of classifying the system health and identify if a fault is present in the system. Fault diagnosis is important in the automotive industry to reduce emissions, avoid unexpected down-time due to malfunctions, and to improve reliability and safety of autonomous systems. Faults are rare events, resulting in many unknown fault scenarios that must be identified. The increasing number of connected vehicles together with cloud-based data analysis makes it possible to analyze trends and patterns in vehicle fleet data that are important tools for predicting remaining component lifetime and for assisted troubleshooting during workshop visits.

In this master thesis project, data clustering and analysis techniques are to be investigated for fault data classification and clustering, for example topological data analysis and persistent homology. The objective is to identify patterns in diagnosis data for identification of both known and unknown fault classes. The analysis will be performed using real data from different faults measured using an internal combustion engine in the Vehicular Systems Engine Lab.

In this master thesis project, we are looking for students that are interested in learning more about machine learning and apply these methods for pattern analysis. There are also possibilities to conduct experiments and collect real data using one of the engines in the engine lab.

If you are interested or have questions, please feel free to mail me:

daniel.jung@liu.se

or come by my office in the vehicular systems corridor (B-building behind Café Java).