École Polytechnique Fédérale de Lausanne
Distributed Electrical Systems Laboratory
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Student project proposal

Project title

Waveform Event Labelling Pipeline for ML-based Classification of Incipient Faults

Project type ☐ MSc thesis ☐ BA semester project ☒ MSc semester project

Project responsible and e-mail
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Project description
Equipment on the grid typically show early signs of failure that can be observed on current and voltage waveforms and are called Incipient Faults (IFs). As each type of equipment failure has a unique waveform signature, we want to classify IFs to enable our clients to perform predictive maintenance on the failing equipment. In order to train and evaluate ML-based classification models, we need to collect a large amount of expert-labelled data. This project focuses on setting up a fully-fledged data labelling solution. We have identified three main objectives for this project:

1. Contribute to the definition of the IFs labelling task.
2. Setup and deploy a customized labelling solution.
3. Build ML models and pipelines to support expert labellers.

Tasks of the student
- Conduct a literature review of IFs on distribution networks to define the appropriate set of labels and present a short report.
- Conduct a review of the available tools for multivariate time series labelling.
- Setup and deploy the labelling solution as well as the necessary data pipelines.
- Design ML models for interactive labelling (find the segments to label) and/or automatic pre-labelling (suggest most-likely labels for each segment).

Requirements
- Understanding of data science concepts.
- Hands on Python and willingness to explore the design and deployment of data/ML pipelines.
- Basic software engineering knowledge – how to write modular code – how to test the code.