

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

Project type:	<input checked="" type="checkbox"/> Semester project	<input type="checkbox"/> MSc thesis	<input type="checkbox"/> Internship
Project responsible (email):	guillaume.tauzin@zaphiro.ch		
Project description and objectives:			
<p>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:</p> <ol style="list-style-type: none">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:			
<ul style="list-style-type: none">• 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 labeling solution as well as the necessary data pipelines.• Design ML models for interactive labeling (find the segments to label) and/or automatic pre-labeling (suggest most-likely labels for each segment).			
Required skills:			
<ul style="list-style-type: none">• 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.			
Other benefits and/or compensation:			
Depending on the final project type, scope and deliverables, Zaphiro may consider providing additional adequate compensation.			
About Zaphiro:			
<p>Zaphiro is an innovative smart grid company based in Lausanne, Switzerland, and Milan, Italy, that was founded in 2017 as a spin-off from EPFL and is backed by well renowned international groups such as ABB and CDP Ventures.</p> <p>Our product, SynchroGuard, is the first distribution grid monitoring & automation system based on D-PMU (Distribution-Phasor Measurement Unit) technology, specifically designed to easily retrofit distribution substations and integrate with existing control room solutions (e.g., SCADA, DMS). SynchroGuard helps utilities increase grid observability, particularly in presence of high DER penetration, and improve grid resiliency by reducing the impact of blackouts on their consumers.</p>			