

Master Thesis Project

“Machine Learning-based Predictive Maintenance for Power Conductor Rails”

Keywords: Predictive maintenance, industrial automation, machine learning

Background: Under the general transformation of the industrial automation sector through the Industry 4.0 paradigm the area of system maintenance is facing new challenges and opportunities due to the ability to connect machines and extensively extract data at runtime. This opens the path towards data-driven approach and predictive maintenance. VAHLE (www.vahle.com) early on identified this area as important leading to the development and introduction of the world's first smart pantograph (VAHLE Smart Collector). In this context, continuous improvement of the predictive maintenance system is of high interest, leveraging for instance technologies such as IoT, IIoT, Cloud Computing, Machine Learning, etc.

Project Description: In this master thesis, the goal is to identify and evaluate new solutions for predictive maintenance of conductor rails and current collectors of different types, so that both maintenance and repair actions can be predicted in advance. Machine Learning solutions for automatic processing, diagnosis and isolation of faults shall be proposed and evaluated. The performance evaluation of any proposed solution can be benchmarked through advanced back-end analysis of collected time series data.

Project Partners, Organization and Prerequisites: VAHLE (www.vahle.com) is a global system provider for mobile industrial applications. As one of the world market leaders, VAHLE develops high-quality power, data transmission and automation systems that are used in mobile industrial applications worldwide. The cross-industry portfolio includes smart solutions for flexible power and data transmission, positioning and control. In particular the VAHLE power conductor rail systems are high-performance solutions for different verticals in industrial automation and are utilized all over the world at facilities of global players in these areas.

The project will be conducted in collaboration with Prof. James Gross at KTH Stockholm. The project can be performed fully remotely while VAHLE offers attractive conditions for prospective students. Visits to the VAHLE Technology Center in Kamen/Germany are welcomed but are not a hard requirement.

Interested students are invited to submit an email application with a short (max 2 page) CV and a copy of transcript. Students are generally expected to have a background in signal processing and machine learning. Knowledge of automation and control systems is a plus but not essential. Project start shall be beginning of 2023, depending upon the availability of the student.

Contact for questions / applications: jamesgr@kth.se

Latest date to submit application: Oct 30th 2022