Data-driven Fault Detection Diagnostics
for multi-residential building

Cenaero (http://www.cenaero.be) is an applied research center that provides numerical simulation methods and tools to companies involved in a technology innovation process, allowing to invent and design more competitive products. Our ambition is to be internationally recognized as a technology leader in modeling and numerical simulation, to be a strategic partner of large global industries as well as a real support to regional companies including innovative SMEs. We are mainly active in the aerospace, process engineering, energy and building sectors, and provide expertise and engineering services in multidisciplinary simulation, design and optimization in the fields of mechanics (fluid, structure, thermal and acoustics), manufacturing of metallic and composite structures. Having a solid and recognized experience in numerical simulations and the development of methodologies and tools for turbomachinery applications, Cenaero is an official strategic R&D partner of the Safran group.

In addition to providing engineering services and software development, Cenaero operates a Tier-1 supercomputing infrastructure (tier1.cenaero.be). Our headquarters are located in Gosselies (Belgium), with a subsidiary office near Paris (France).

To support the expanding research activities focusing on energy management of building systems, we are looking for an intern student.

Internship description

The proposed research work is part of a building energy management project at a multi-residential building scale. The goal of the project is to provide the building owner with a tool for water and energy data analysis and FDD (Fault Detection and Diagnosis) functionalities based on the usage of a numerical building energy model and monitoring data (from IoT device) processing. We are looking for an intern student to work on time-series data processing including clustering and forecasting to contribute to the data-driven FDD methodologies. The objective is to use Machine Learning techniques on existing datasets to detect anomalies in the energy systems operation as well as in the building behavior (i.e. water and energy consumption and thermal comfort).

The length of the internship (3 to 6 months) may vary depending on the availability of the candidate.

Objective

The different steps of this work are the following:

- Brief state of the art and choice of method(s) to implement.
- Handling of the necessary open-source libraries (darts, ...).
- Implementation of the chosen method(s).
- Evaluation on test data.
- Algorithmic improvements.
- Writing of the report.

Profile

- Master's student in Computer Science, Information Technology, Mathematics or Engineering
- Good knowledge in Python is a must as well as the ability to work with data warehouse environment (e.g. PostgreSQL)
- Knowledge of Machine learning techniques (e.g. MLPs, CNNs or LSTMs) for time series forecasting is a real plus
- Fluent in English or French
- Real team player, able to work with autonomy

Contact

Motivated candidates are invited to send their CV and motivation letter to rh@cenaero.be and to mention the internship offer reference.