MS Thesis Project Opportunity

Carrier Corporation

Diagnostics of Chiller Systems: Use of Decision Models and Engineering Data

Problem Description:

Chiller systems are devices that produce cooling for several commercial and industrial applications – contributing to roughly 10% of global electricity consumption. Carrier is a global leader in cooling products and improvement in their design and control has an immediate impact on electricity consumption and global emissions.

The purpose of this thesis project is to explore and evaluate the usage of decision theoretic structures used in machine learning, augmented with engineering data from the use of the chiller equipment as well as design data. Applications ranges from monitoring and identifying optimal chiller operation (energy efficiency) as well as diagnosing equipment failures.

Project Description:

This project will be a continuation of an LTH MS thesis work (2022) that addressed ML methods for chiller diagnostics. The previous work identified several next steps including:

- Use graphical modeling to build and evaluate Bayesian networks in collaboration with Carrier to identify chiller faults.
- Incorporate "Carrier information", including technician information, equipment design data and physics knowledge (models) into the Bayesian network structure.
- Evaluate the power of such information and the prospects for updating Bayesian network models from a combination of measured data and Carrier specific information.

The student(s) will work closely with Carrier engineers that are currently collecting chiller performance data and designing diagnostics methods.

Student profile:

Skilled students with interest in machine learning, automatic control, physics of energy equipment, and programming. Experience with thermofluid systems, python, and lab or field data will be beneficial.

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Carrier has recently opened an office in Lund and is interested in hiring students from successful MS Thesis projects.