IZES

Institut für ZukunftsEnergie- und Stoffstromsysteme

Job Advertisement:

Thesis Opportunity

Bachelor's / Master's Thesis

(m/f/d)

Department: Technical Innovations

Job Advertisement (m/f/d)

Topic:

Optimization and Extension of the Thermal Simulation of Low-Exergy Heating Systems, Including Integration of an AI-Based Optimization Algorithm

IZES
Institut für ZukunftsEnergie- und Stoffstromsysteme

Thesis Opportunity: Bachelor / Master

Topic: *Optimization and Extension of the Thermal Simulation of Low-Exergy Heating Systems, Including Integration of an AI-Based Optimization Algorithm*

IZES gGmbH is an affiliated institute of the University of Applied Sciences of Saarland (HTW Saar) and an independent research institution associated with Saarland University, with locations in Saarbrücken and Berlin.

As a research institute, we develop innovative solutions to promote sustainable development as well as climate and resource protection- locally, nationally, and internationally.

The Research Project:

The proposed thesis is part of the project „ALEX – Application-Oriented Development, Implementation, and Validation of an AI-Based Controller for LowEx Tempering Systems Using Device-Independent Open-Source Hardware, Particularly in Combination with External Wall Tempering.“ The resulting ALEX controller is intended for future use in regulating slow-response heating systems, such as external wall tempering.

Through AI-based real-time optimization, it aims to enhance the use of renewable energy sources and improve the utilization of the systems‘ thermal storage capacity. As a first step, high-quality data must be generated, which will serve as the foundation for developing the AI and the optimization system

Objective of the Thesis:

The objective of this thesis is to further develop and expand the existing TRNSYS simulation model for the LowEx heating system by incorporating the components implemented in a demonstrator at Saarland University (external wall tempering, heat pump, ice storage, and PVT collectors). This also includes creating an interface for integrating the AI system, enabling dynamic optimization of the system's operation and adaptation to changing conditions.

Your Tasks:

- **Acquiring system understanding and conducting literature research**
- **Generating training data for AI development using TRNSYS building simulations**
- **Creating a simulation interface for evaluating the AI**
- **Further developing simulation-generated training data based on feedback from AI optimization within the simulations**
- **Documenting the process and writing the thesis**

Your Qualifications:

We are looking for students in the fields of energy and building technology or related disciplines, with knowlege of building simulation. Experience with TRNSYS as well as good English and/or French language skills are an advantage. The thesis can be complted as either a Bachelor's or Master's thesis, with the scope adjusted according to the respective study regulations. The collaboration period should not be less than six months. It is also possible to combine the thesis with a mandatory internship.

Our Offer:

IZES gGmbH offers the opportunity to write a thesis on a highly relevant and practice-oriented topic within an attractive working environment and ensures close supervision throughout the process. A dedicated office workspace at IZES gGmbH in Saarbrücken will be provided for the duration of the thesis, along with a monthly expense allowance of €556. IZES gGmbH actively promotes equal opportunities for all employees (m/f/d) and welcomes applications regardless of gender, nationality, ethnic and social background, age, religion, disability, as well as sexual orientation and identity.

Interested?

If you have any questions, Mr. Schulte will be happy to assist you.

Please send your detailed application (brief cover letter, CV, transcripts/certificates) via email to:

Stephan Schulte
E-Mail: schulte@izes.de
Tel: +49 681 844 972 – 11

We look forward to getting to know you!

Your application documents will be used exclusively for the selection process and will be deleted after the process is completed.

more information:
https://izes.eu/projektportfolio/alex