Bachelor's / Master's Thesis
Explainable artificial intelligence for energy systems

Energy systems are increasingly complex systems, connecting hundreds of millions of consumers, requiring balance of supply and demand on all time scales while integrating volatile renewable generation. Within the DRACOS group, we investigate these complex systems using a wide array of data-driven approaches, including machine learning. We aim to explain "black box" models using interpretability tools or develop outright interpretable models. Applications range from training a reinforcement learning agent or analyzing household demand to forecasting the stability of the power grid (see also figure).
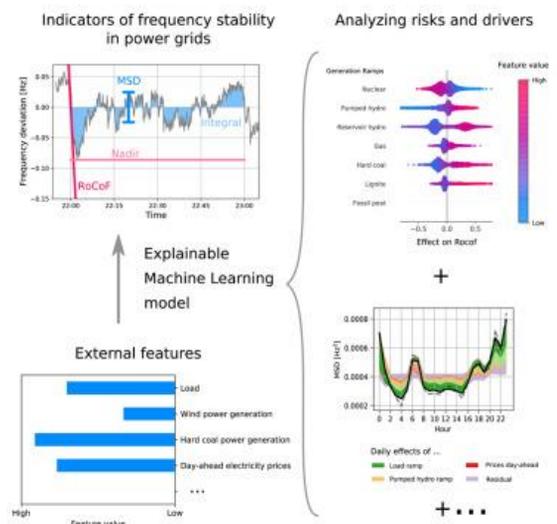
Image Source: Patterns 2021

Tasks:
- Details of your tasks will be adapted based on your skills and interests as well as recent research developments. Some tasks to expect
  - Processing and analyzing energy system data, such as power grid frequency recordings from Continental and islanded regions or from the Energy Lab at KIT
  - Training machine learning models (e.g. for forecasting or reinforcement learning)
  - Interpreting machine learning results: Are the results trustworthy and plausible? What do we learn about the energy system and its operation?

Education, Experience, and Skills:
- Studying Informatics/Computer Science
- Advanced Python skills
- At least basic experience with machine learning methods
- Good English skills (speaking and writing)

What we offer:
- Close supervision of your thesis
- Work in an international and interdisciplinary team
- Opportunity to work with latest data and machine learning methods

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