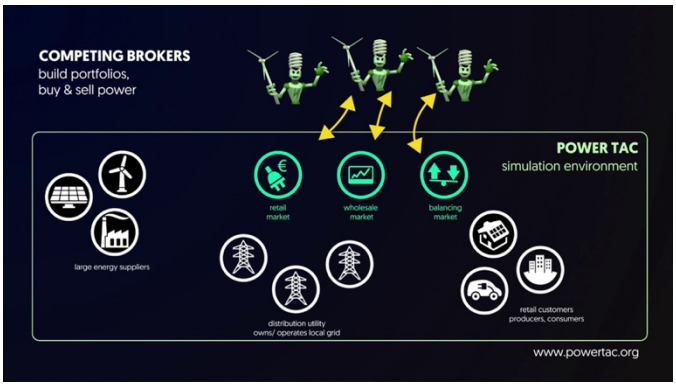
Faculty of Management, Economics and Social Science
Information Systems for Sustainable Society

Master thesis

Power TAC: Interpret the Broker's decisions using an XAI method

Power Trading Agent Competition (Power TAC) is a risk-free market simulation platform in which models the economic operation of an electric distribution system.

Self-interested, autonomous agents known as electricity brokers (aggregators), who aggregate energy supply and demand to make profits, play the central role within this simulation. The market structure includes a wholesale market in which the brokers can participate and buy the required energy from bulk power generators through a simple periodic double auction (PDA), balancing market in which potential grid imbalances in the retail market can be covered through a Vickrey–Clarke–Groves (VCG) auction, Distribution utility who is in charge of distribution grid infrastructure; and retail market in which the different customers with/without production capability or controllable loads are modeled, and they can choose and subscribe to the tariffs proposed by a particular broker. Therefore, brokers interact within these market components to maximize their profit.



This thesis aims to develop an XAI approach to understand the decisions of designed broker called IS3. To this end, first the best XAI method is realized for the broker, and it will be applied to the broker as additional module. The module interprets the published tariffs by broker in the interaction with the different markets.

Key tasks and objectives of the thesis

- Familiarization with Power TAC and its components.
- Analysis of the current version of IS3 broker.
- Finding the most appropriate XAI method for the broker.
- Implement the XAI as extra module to the broker.
- Derive and analyze the outcome via Power TAC experiment manager.

Your profile

- Study of mathematics, computer science, or economics with a quantitative focus
- Experiences in programming (e.g., with Python or Java) and basic knowledge on XAI

We offer

- Intensive and reliable supervision during your thesis
- Possibility of starting a Ph.D. in case of excellent performance

Contact

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Topics

- Energy Systems
- Bidding strategy

Methods

- Data Analysis
- Machine learning
- XAI