

Master project, 2021-2022

— AI techniques for on line optimal adjustment in an energy management system —

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Context

From the predictions of electricity demand and the intermittent renewable energy based generators (mainly PV and wind power), the research team has developed deterministic and stochastic optimization methods allowing to plan, one day ahead, the hourly set points of controllable conventional generators in an urban micro-grid. This operating planning enables :

- the minimization of operating costs (fuel, etc.),
- the minimization of emissions linked to the use of fuels,
- the planning of a power reserve in the event of the appearance of uncertainties.

The objective of this MSc internship is to study auto adaptive methods for updating these power references according to observed input data variations in real time by applying machine learning techniques derived from artificial intelligence. More specifically, the purpose will be to develop an AI module and to integrate it for helping the energy management system. The research application is to calculate adequacy corrective control functions in order to achieve previously calculated economic and environmental optima.



Work steps

- Bibliography study on “Application of Artificial neural Networks for power systems”.
- Scientific project on the code writing of a basic learning module, testing with a small database.
- Internship on the adaptation and development of a learning module with data from the energy management system.

Issues for the student

- Knowledge about machine learning algorithms
- Fundamental knowledge in operation of power systems, control and analysis
- Knowledge/experience about distributed networks, energy systems modelling and operation
- Hands-on experience in computer programming with Matlab language
- Prospective PhD position

Key Words

Smart grids, real time adjustment, artificial neural networks, learning algorithm

References from the research team

Energy management of urban electrical systems (smart city)

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