Optimal retraining interval for an AI-based grid load forecast

Today’s energy system operators already engage new technologies to face the challenges of the future power system. With more and more decentral energy generation, uncertainties of future grid states are increasing. At the same time, new energy market players enter the stage from different platforms. Thus, it is more important than ever before that system operators can quantify their short-term grid needs not only to be able to operate the system at minimum cost but also to inform the connected transmission system and local distribution systems about potential critical grid states as early as possible.

This bachelor thesis deals with a forecasting tool that already allows system operators to forecast their day-ahead grid load. In time, new data comes in and the system can face topological changes. In consequence, it is necessary to identify the optimal interval to retrain the underlying model with new data to avoid a model drift, while keeping a balance between computational effort and gaining better forecast performance in a long run.

The thesis builds upon following subtasks:

- Literature search:
  - Machine learning based short-term forecasting techniques
  - Batch learning vs. online learning
- Familiarizing with existing tools
- Preparation of the input data and automated training process
- Formulation of the optimization problem
- Testing and validation with real grid data

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