TITLE Thesis proposed by: ESAT-Electa	
Electrical load forecast- Case study: EnergyVille	
GUIDANCE	
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• Number of students	1

CONTEXT

Load forecasting has been a fundamental issue in the planning and operation of power systems. Over the past 100 plus years, researchers in this area have focused primarily on point load forecasting. In the most recent decade, though, the increased market competition, aging infrastructure and renewable integration requirements mean that probabilistic load forecasting has become more and more important to energy systems planning and operations.

This thesis will be executed within the context of EnergyVille, a research organization in which KU Leuven participates. The EnergyVille building is equipped with different energy meter devices which are measuring the energy consumption of the building (global consumption and detailed consumption). Data of these systems, combined with other energy measurements will be used to develop algorithms that answer questions such as: What is the quality of data measurement, Is there any interesting pattern in data consumption, what would be the consumption in day ahead and how much uncertainty involves in forecast.

GOAL

Develop a probabilistic forecast for EnergyVille electricity consumption, while using the measured data

METHODOLOGY

1- General analyzing the data:
   There are different sources to measure the data. First, the data should be checked in terms quality and quantity.
2- Pattern recognition
   That would be interesting to determine interesting possible pattern in the consumption data, since the electricity consumption for building have daily, weekly and seasonal behavior.
3- Point forecast
   Develop different regression methods, such as Long short-term memory (LSTM) to predict point forecast.

4- Probabilistic forecast
Build probabilistic forecast by calculate quantile function

PROFILE/REQUIRED SKILLS (e.g. rather theoretical / rather practical implementation, required knowledge (courses, methods, computer language(s), etc.)

Rather practical implementation
Required knowledge: python, data analysis, probabilistic forecast.
High interest in the energy domain.

REFERENCES

[1] Hong, Tao, and Shu Fan. "Probabilistic electric load forecasting: A tutorial review." *International Journal of Forecasting* 32, no. 3 (2016): 914-938.

[2] Nowotarski, Jakub, and Rafał Weron. "Recent advances in electricity price forecasting: A review of probabilistic forecasting." *Renewable and Sustainable Energy Reviews* 81 (2018): 1548-1568.