Karlsruhe Institute of Technology

Institute for Automation and Applied Informatics (IAI)

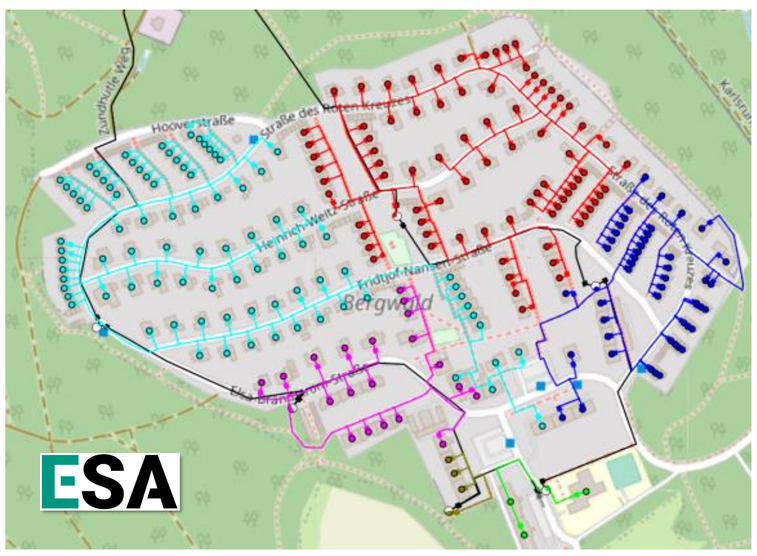
ESA

ENERGY LAB 2.0

Bachelor / Master thesis

Generation of Generic Distribution Grid Models Based on Statistical Analyses

With the energy transformation that has taken place in recent years, the electricity grid is also in a rapid change. The importance of the distribution grid is gradually increasing due to the increasing distributed generations (DGs) such as photovoltaic (PV) and wind power plants, as well as battery systems in the low voltage distribution grid. In order to operate the electricity network effectively and to prevent bottlenecks, the distribution grid should also be examined in detail in the analysis.
However, due to data privacy, it is not possible to obtain the real distribution grid data for analysis and research purposes. For this reason, parameterizable generic distribution grid models based on various statistical and sample model data need to be generated for different simulation software packages.



Tasks

- Analysis and structuring of available database for generic distribution grids
- Extraction and description of statistical characteristics of distribution networks
- Creating a workflow that will produce parameterizable generic distribution grid models from statistical data using Python
- Integration of machine learning methods as modeling aid
- Comparison of generated model topologies with literatures
- Analysis and validation of the simulation results in software packages as Pandapower and PowerFactory

Required skills

- Advanced Python knowledge
- Basic knowledge of electrical engineering and machine learning
- Experience with Pandapower and PowerFactory is an advantage

We offer

- Excellent support from the ESA group and experts at the EnergyLab
- Opportunity to gain experience in the field of energy informatics

Advisor:
M.Sc. Burak Dindar
Dr. Hüseyin K. Çakmak

Programming language:
Python

System, Framework(s):
Windows

Language(s):
German, English

For more information, please contact:

Working Group ESA (Energy System Analysis)

Burak Dindar
Phone: +49 721 608-28915
E-Mail: burak.dindar@kit.edu

Hüseyin K. Çakmak
Phone: +49 721 608-22962
E-Mail: hueseyin.cakmak@kit.edu

Institute for Automation and Applied Informatics (IAI)
Karlsruhe Institute of Technology,
Campus North
Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen