

PV power prediction by means of machine learning and hybrid methods at Chalmers site

Bakgrund

Renewable energy sources (RESs) have gained major interest globally to fulfill the growing electrical demand. Concurrently, installed power capacity from Photovoltaic (PV) plants has increased tremendously in recent years. The PV power production, however, is dependent upon various factors such as solar radiation and weather parameters which intensifies the importance of predicting the output power of PV sites to improve efficiency in generation planning and operation.

Three types of forecasting techniques can be used for PV production; Statistical methods, Machine Learning (ML) methods and hybrid methods (ML+metaheuristic, ML+physical methods, clustering method+ML, method) which each have their pros and cons and should be selected based on the application.

Problembeskrivning

This project is to develop a forecasting tool by ML/hybrid methods for the PV power production at Chalmers site. The project can be divided into the following sub-goals:

1. Evaluate different types of machine learning/hybrid techniques, such as support vector machine (SVM), Artificial neural network (ANN), extreme learning machine, and metaheuristic techniques and physical models to choose the most suitable for the project purpose.
2. Collect data essential for the forecast of PV production sites at Chalmers based on the model.
3. Develop forecasting tools in Python.
4. Evaluate the tool's accuracy for different time horizons and PV sites at Chalmers.

Målgrupp: TKAUT, TKMAS, TKELT, TKDAT, TKTFY,

Gruppstorlek: 3-6

Antal grupper: 1, 2

Förkunskapskrav: Knowledge of programming (e.g Python) and energy systems

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Projekt Rapport: Svenska / Engelska