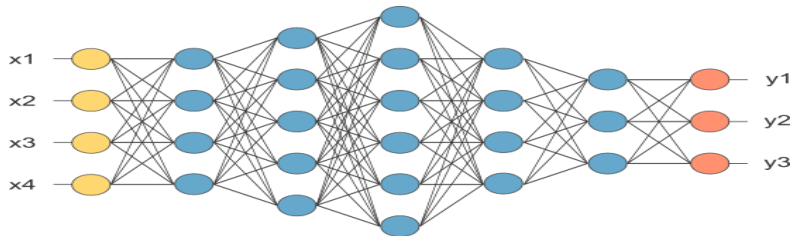


## Bachelor's / Master's Thesis

# A Novel Deep Learning Approach for Short and Long-Term Photovoltaic Power Forecasting with Weather Data

In recent years, the dynamics of our electricity networks has changed dramatically by integrating renewable energy production into the German power network. Thus, an accurate power generation forecasting becomes a very important prerequisite for balancing generation and consumption to not overload current electricity lines.

In this thesis, a variety of deep learning methods e.g. Convolutional Neural Network (CNN) or Recurrent Neural Network (RNN) will be scientifically analyzed and instrumented for achieving a more flexible and accurate prediction of short- and long-term power generation.



State-of-the-art deep learning frameworks such as **TensorFlow** or **Keras** will be used to build the forecasting models. The prototypical implementation of those models can foster existing technologies, e.g. **Jupyter notebook** running on an underlying **Big Data** cluster. Additional, a powerful big data environment including **Hadoop** and **Apache Spark** will be available to achieve the best performance.

### Tasks:

- Factor Analysis and Data Preprocessing
- Development of short-term and long-term Photovoltaic power forecasting models using deep learning
- Evaluate the performance of the proposed models

### Requirements:

- Student of computer science, electrical engineering, mechanical engineering or related disciplines
- General interest in application of data analysis, deep learning and Big Data
- Good programming skills in Python and Java
- Thesis can be written in English or German language

