

Topic 1:

Day-ahead Forecasting of Photovoltaic Power Production with Convolutional Neural Network

Supervisor:**Dr. Chao Huang**

Dr. Chao Huang received the B.Eng. degree in Electrical Engineering from Harbin Institute of Technology, Harbin, China, in 2011, the M.S. degree in Intelligent System for Transport from the University of Technology of Compiègne, Compiègne, France, in 2013, and the Ph.D. degree in Systems Engineering and Engineering Management from City University of Hong Kong, Kowloon, Hong Kong in 2017.

He was appointed as Postdoc Fellow with the Department of Systems Engineering and Engineering Management, City University of Hong Kong. He is currently an Associate Professor with the Department of Computer Science and Technology, University of Science and Technology Beijing, Beijing, China. His research interests include machine learning, computational intelligence, and renewable energy systems.

Duration of the project:

Three months (tentatively from May 2019 to July 2019)

Abstract:

Photovoltaic (PV) modules convert renewable and sustainable solar energy into electricity. However, the uncertainty of PV power production brings challenges for the grid operation. To facilitate the management and scheduling of PV power plants, forecasting is an essential technique. In this project, convolutional neural network-based data-driven model will be developed for the day-ahead forecasting of hourly PV power production. The project aims to capture the complex relationship of power production at different hours in a day and the evolution of power production at a

particular hour over days with a convolutional neural network.

Preferable Candidates: Undergraduate Master Ph.D All

Required Skills/Knowledge:

Proficient in Matlab and/or Python.

Reference Books/Papers:

1. C. Huang, L Wang*, and L. L. Lai, "Data-driven Short-term Solar Irradiance Forecasting Based on Information of Neighboring Sites", *IEEE Transactions on Industrial Electronics*, early access (DOI: 10.1109/TIE.2018.2856199), 2018.
2. Agoua, Xwégnon Ghislain, Robin Girard, and George Kariniotakis, "Short-term spatio-temporal forecasting of photovoltaic power production." *IEEE Transactions on Sustainable Energy* 9.2 (2018): 538-546.
3. Wang, Huai-zhi, Gang-qiang Li, Gui-bin Wang, Jian-chun Peng, Hui Jiang, and Yi-tao Liu. "Deep learning based ensemble approach for probabilistic wind power forecasting." *Applied energy* 188 (2017): 56-70.

Supervisor's Contacts

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