Centre for Systems Informatics Engineering Seminar

Forecasting Wind Speed and Power with Deeply Learned Data Features

Date: 24 March 2021
Time: 1:45 pm – 2:45 pm

Abstract

Forecasting methods are critical to tackle the wind uncertainty in operating grids with a high wind power penetration. This talk revisits the classical short-term wind power forecasting problem and presents novel methods via adapting recent deep learning to improve the forecasting performance. We will discuss the short-term deterministic wind power forecasting and probabilistic wind speed forecasting. In wind power forecasting, we propose a K-shape and K-means guided Convolutional Neural Network integrating Gated Recurrent Units method for developing the data-driven model to obtain the deterministic forecast of future wind power. For the probabilistic forecasting of wind speeds, we propose a Mixture Density Attention Network via Wasserstein Distance Based Adversarial Learning. Proposed methods introduce new paradigms of processing wind farm data collected by supervisory control and data acquisition (SCADA) systems as well as engineering data features to facilitate forecasting tasks. We verify the superiority of our proposed method in forecasting tasks by benchmarking against a set of deep and shallow wind power forecasting methods based on SCADA data collected from multiple wind farms.

Biography

Dr. Zijun Zhang received his B.Eng. degree in Systems Engineering and Engineering Management from the Chinese University of Hong Kong, Hong Kong, in 2008, and the M.S. and Ph.D. degrees in Industrial Engineering from the University of Iowa, Iowa City, USA, in 2009 and 2012, respectively.

His is currently an Associate Professor in the School of Data Science and Associate Director of Centre for Systems Informatics Engineering at City University of Hong Kong, Hong Kong, China. His research focuses on machine learning and computational intelligence methods as well as their applications in renewable energy, facility energy management, transportation systems, and manufacturing processes. He is a senior member of IEEE. He is currently serving as an Editor for IEEE Transactions on Sustainable Energy and an Associate Editor for Journal of Intelligent Manufacturing.

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