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Big Data Analytics for Renewable Energy Grid Integration

Abstract:

Variable renewable energy resources such as wind and solar power are becoming increasingly important sources of energy on the electric power system. The consistent growth of renewable energy calls for a paradigm shift in energy systems technologies, aiming to efficiently solve power systems challenges with large penetrations of renewable energy and energy efficiency technologies. Improving wind and solar forecasting accuracy becomes increasingly important to ensure economic and reliable operations. This talk will discuss state-of-the-art data-driven methodologies in wind and solar forecasting, such as: (i) improved wind power forecasting using big data information processing technologies, leading to significant production cost reductions in power system operations; (ii) a situation-dependent multi-expert machine learning solar forecasting methodology; and (iii) ramp identification and forecasting methods for extreme events. Both the economic and reliability benefits from improved wind and solar power forecasting will also be discussed.

Biography:

Dr. Jie Zhang is currently an Assistant Professor in the Department of Mechanical Engineering and Department of Electrical Engineering (Affiliated) at the University of Texas at Dallas (UTD). Before joining UTD, he was a Research Engineer at the National Renewable Energy Laboratory (NREL). Dr. Zhang received his Ph.D. (2012) in Mechanical Engineering from Rensselaer Polytechnic Institute (RPI), Troy, NY, USA. He received his B.S. (2006) and M.S. (2008) in Mechanical Engineering from Huazhong University of Science & Technology, Wuhan, China. His research expertise and interests are multidisciplinary design optimization, big data analytics, machine learning, complex engineered systems, wind energy, power & energy systems, and renewable integration. This research has resulted in over 100 peer-reviewed journal and conference publications. His research has been funded by DOE and energy industries. His major awards include: SAS/IIF (International Institute of Forecasters) award, 6 best paper awards from Renewable Energy journal and IEEE Power & Energy Society General Meeting. He is a senior member of IEEE and AIAA.