

IEEE BDA Webinar Series: Big Data & Analytics for Power Systems

Mining Smart Meter Data for Improving Distribution Grid Operation and Resilience

Prof. Zhaoyu Wang, Iowa State University



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(12:00 pm – 1:40 pm, MST) (1:00 pm – 2:40 pm, CST) (2:00 pm - 3:40 pm, EST)

Abstract: In the past few years, Iowa State University has been collecting a large amount of smart meter, PMU and SCADA data and associated grid models from collaborating utilities. This talk will focus on smart meter data analysis and how they can benefit utility operations. We will begin the talk by introducing the real smart meter data and one utility dataset that we share with the research community. Then we will introduce the data cleaning as well as the basic knowledge on statistics and machine learning to extract useful information from the data. By leveraging the smart meter data, we have proposed a multi-timescale learning model that enables utilities to infer hourly consumption patterns of unobservable customers using only their monthly billing information, thus significantly enhancing the grid observability. Further, the smart meter data has been used to develop a model-free framework to estimate cold load pick-up to assist utilities in making better service restoration plans and enhancing grid resilience.

Bio: Dr. Zhaoyu Wang is the Harpole-Pentair Endowed Assistant Professor with Iowa State University. He received the B.S. and M.S. degrees in electrical engineering from Shanghai Jiaotong University in 2009 and 2012, respectively, and the M.S. and Ph.D. degrees in electrical and computer engineering from Georgia Institute of Technology in 2012 and 2015, respectively. He was a Research Aid at Argonne National Laboratory in 2013 and an Electrical Engineer Intern at Corning Inc. in 2014. His research interests include power distribution systems, microgrids, renewable integration, power system resilience, and power system modeling. He is the Principal Investigator for a multitude of projects focused on these topics and funded by the National Science Foundation, the Department of Energy, National Laboratories, PSERC, Iowa Energy Center, and Industry. Dr. Wang received the IEEE PES General Meeting Best Paper Award in 2017 and 2019, and the IEEE Industrial Application Society Prize Paper Award in 2016. Dr. Wang is the Secretary of IEEE Power and Energy Society (PES) Award Subcommittee, Co-Vice Chair of PES Distribution System Operation and Planning Subcommittee, and Vice Chair of PES Task Force on Advances in Natural Disaster Mitigation Methods. He is an editor of IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid and IEEE PES Letters and an associate editor of IET Smart Grid.

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