MPEL Seminar

Michigan Power & Energy Laboratory

Mining Smart Meter Data for Improving Distribution Grid Observability

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ABSTRACT: This talk will present our research on enhancing power distribution grid observability using real utility data and machine learning techniques. We have received a large amount of smart meter, microPMU and SCADA data and associated grid circuit models from collaborating utilities. We will begin the talk by introducing our data and one real utility dataset that we share with the research community. 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 and help utilities make decisions in service restoration.

BIOGRAPHY: Dr. Zhaoyu Wang is the Harpole-Pentair 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*.