IEEE PES Subcommittee on Big Data & Analytics for Power Systems Le Xie, Subcommittee Chair, Texas A&M University Yang Weng, Webinar TF Chair, Arizona State University Qiushi Cui, Webinar TF Co-Chair, Arizona State University

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

Provable estimation in distribution grids: a physicsinformed statistical learning perspective

Dr. Deepjyoti Deka Los Alamos National Laboratory



10:00 am-11:30 am, Tuesday, Jun. 23, 2020, Pacific Time (7:00 pm - 8:30 pm, Tuesday, Jun. 23, 2020, Central European Time) (1:00 am - 2:30 am, Wednesday, Jun. 24, 2020, China Standard Time)

Abstract: Distribution Networks provide the final tier in the transfer of electricity from generators to the end consumers. In recent years, smart controllable devices, residential generator/storage devices and distribution grid meters have expanded the availability of sensor data in distribution networks that can be used for different learning/estimation problems. Such problems include topology identification, line impedance and load statistics estimation, phase identification and others. For a range of realistic operating conditions, including ones with partial observability, we develop learning algorithms by merging tools from statistical machine learning with physical laws related to static and dynamic operation in power grids. Use of statistical methods produces provably consistent estimation in the large sample regime, but also enables us to give robust guarantees on the performance in the finite-sample and noisy regimes. Additionally, I will discuss how statistical machine learning can work in conjunction with newer neural network based methods for estimation in other related cyber-physical networks such as gas systems, sensors and smart buildings.

Bio: Deepjyoti Deka is a staff scientist in the Theoretical Division at Los Alamos National Laboratory, where he was previously a postdoctoral research associate at the Center for Nonlinear Studies. His research interests include data-analysis of power grid structure, operations and security, and optimization in social and physical networks. At LANL, Dr. Deka serves as a co-principal investigator for DOE projects on machine learning in power systems and in cyber-physical security. Before joining the laboratory he received the M.S. and Ph.D. degrees in electrical engineering from the University of Texas, Austin, TX, USA, in 2011 and 2015, respectively. He completed his undergraduate degree in electrical engineering from IIT Guwahati, India with an institute silver medal as the best outgoing student of the department in 2009.

Link: https://asu.zoom.us/j/5513218843