From Grid Eye to Grid Mind - A Data-driven Autonomous Grid Dispatch Robot Powered by AI

Monday, September 23, 2019, 09:55 AM
Room W122, Engineering Building 2

Dr. Di Shi, GEIRI North America

LECTURE ABSTRACT

Power systems are facing grand challenges from increasing dynamics and stochastics from both the generation and the demand sides. This has caused great difficulty in designing and implementing optimal control for the grid in real time. Tremendous efforts have been spent in the past on computational methods and advanced modeling techniques that provide faster and better situational awareness, based on measurements from advanced grid sensors, PMU as an example. However, as grid operators are heavily involved in the decision-making process, the entire procedure has not been made fully automated, limiting the potential of such applications. That is, not only does the 'grid' need to perceive faster, it also needs to think and act faster. Towards this end, sub-second autonomous control schemes need to be developed. Over the past years, the AI & System Analytics Group at GEIRI North America has built up an autonomous grid dispatch and control platform using deep reinforcement learning, the Grid Mind. Combined with Grid Eye, the grid monitoring and situational awareness platform, Grid Mind has demonstrated promise in helping address the pressing issues modern power systems faces. This talk will summarize this developmental effort while focusing on the key technologies utilized for the Grid Mind framework.

SPEAKER BIOSKETCH

Dr. Di Shi is a Principal Engineer and Department Head of the AI & System Analytics Group at GEIRI North America (GEIRINA). He also directs the Advanced Power System Lab. He received a Ph.D. degree in EE from Arizona State University (ASU). Dr. Shi serves as Editor of *IEEE Transactions on Smart Grid* and *IEEE Power Engineering Letters*, and the Vice Chair of the System Stem at Power System Engineering Research Center (PSERC). Prior to joining GEIRINA, he held various research positions at NEC Laboratories America (NECLA), Electric Power Research Institute (EPRI), and ASU. He also worked as (part-time) Principal/Senior Consultant for two consulting firms. Dr. Shi has published over 120 journal/conference papers. He is the inventor of over 30 US patents/patent applications. He received two Best Paper Awards in IEEE PES General Meeting 2017 and 2019, Championship in worldwide AI competition "2019 Learning to run a power network (L2RPN)", a Technology Commercialization Award from NEC Labs America in 2014, and the Grand Prix Award from ABU Robocon 2007.