Minitrack Introduction: Resilient Networks

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Abstract

This minitrack focuses on enhancing the reliability of future electric power infrastructure. Advanced technologies will require sophisticated methods for understanding how they can be incorporated into increasingly complex and dynamic infrastructure. The minitrack is comprised of papers that examine issues of resiliency and secure interoperability of future grid systems, testbeds that will demonstrate the robustness of advanced technologies, and the associated computational and communication challenges associated with operating the power system.

This minitrack is comprised of two paper sessions:

1. Testbeds and Synthetic Networks

Session Organizer and Chair: Mladen Kezunovic,
Texas A&M University (kezunov@ece.tamu.edu)

The combined cascading failure of electricity and other infrastructure networks greatly increases the discomfort, danger, and economic loss to society. There are considerable challenges in modeling and coordinating the important interactions (possibly including human, market, or economic factors) and quantifying the adverse interactions so that their risk can be estimated, mitigated, and controlled. It is also important to verify and quantify these interactions in large-scale testbeds. An essential part of the testbed design is creation of synthetic networks of various infrastructures that allow the scale and complexity to be faithfully represented, allowing evaluation of novel robust solutions.

The objective of this session is to describe new methods to analyze and quantify electric, gas, communications, or water network outages and their interactions with each other so that they can be better mitigated. Novel test approaches that are enabling physical and virtual testing of the interactions, as well as large scale synthetic networks that are creating realistic test environment are needed.

2. Data Analytics and Decision Support

Session Organizer and Chair: Le Xie,
Texas A&M University (le.xie@tamu.edu)

Power system operators now have an unprecedented wealth of data, coming from a variety of sources, such as demand response participants, synchrophasors, and enhanced supervisory control and data acquisition (SCADA) systems, which if managed properly, can provide opportunities to increase the efficiency, reliability, and system performance of the power system. With the increased adoption of grid modernization, demand response programs, and distributed generation that is often renewable and intermittent, system operators need to manage vast amounts of data, making big data analytics a requirement for future electrical energy systems.

This session includes technical papers presenting new approaches, methods, and applications related to big data analytics in planning, designing, and operating electric energy systems. This session will address some of the challenges and opportunities associated with big data in electrical energy systems, coming from a variety of sources, such as behavior data in demand response, phasor measurement units (PMUs), weather, and enhanced SCADA systems.

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