NM SMART Grid Center Student Research Spotlight
Presenters: Jeewon Choi, PhD Candidate, Mechanical Engineering, University of New Mexico (Research Goal 1)
Jacob Marks, Masters Student, Computer Science, New Mexico Tech (Research Goal 2)
Adnan Bashir, PhD Candidate, Computer Science, University of New Mexico (Research Goal 3)
Shubhasmita Pati, PhD Candidate, Electrical & Computer Engineering, New Mexico State University (Research Goal 4)

Date of Webinar: Wednesday, March 25, 2020

Time: Noon – 1:00 PM MT

Abstract

In this webinar, graduate students from the NM SMART Grid Center's four research goals will present on aspects of their current research.

Research Group 1: Jeewon Choi will present on the application of an event-triggered and finite-time control methods to the distributed secondary control of a microgrid. The proposed control strategy synchronizes the microgrid frequency to the nominal value, while sharing the active power among the distributed generators (DGs) of the microgrid based on their ratings. The event-triggered communication reduces the communication burden between the distributed secondary controllers. The finite-time control accelerates the synchronization, and reaches the steady state in a finite period of time. The performance of the proposed event-triggered finite-time frequency control subsequent to load changed and network graph changes is verified for an islanded 4-DG microgrid test system.

Research Group 2: Jacob Marks will present on Differential Privacy and its application in the Smart Grid. Protecting the privacy of Smart Meter users is an important issue with a number of proposed solutions. Differential Privacy is one such solution. The presentation will cover the basics of Differential Privacy and some of the proposed ways it could be used to protect user privacy.

Research Group 3: *Adnan Bashir* will present on a Django-based data bank that will allow the EPSCoR team to upload/share data and make it publicly available with MongoDB backend elastic search for metadata. This presentation will include a small brief about the technical aspects of the data bank followed by a demo (file uploading, downloading, searching).

Research Group 4: In the aftermath of disasters, damage to the electrical grid can dawdle the recovery effort and perpetuate human suffering. *Shubhasmita Pati* will present on the resiliency enhancement of the power grid in the event of natural disasters or cyber-physical threats. She will discuss on the challenges and the strategies for management of the grid with the objective of transferring maximum power from conventional and distributed energy resources (DERs) to the critical loads.

Speaker Bios

Jeewon Choi is currently a Ph.D student in the Mechanical Engineering Department at the University of New Mexico. She has received her B.S. in Mechanical and Automotive Engineering at Keimyung University, Korea, in 2015, and M.S. in Mechanical Engineering at the University of New Mexico, in 2018. Her research interests are in Power Systems, especially in the Smart/Microgrid area.

Jacob Marks is a Computer Science Masters student at New Mexico Tech. He has been working with Dr. Dongwan Shin (NMT) studying how differential privacy can be applied to the Smart Grid.

Adnan Bashir is a graduate student at University of New Mexico. He is pursuing his Ph.D in applied ML and data generation. Adnan is currently working with Dr. Trilce P. Estrada (UNM CS) on NM EPSCOR project. Before joining the EPSCoR team, he was working on blockchains, web malware analysis, censorship and social media graph analysis. Adnan holds a Masters in CS from UNM and Bachelors in EE from National University of Science and Technology Islamabad, Pakistan.

Shubhasmita Pati is a Ph.D student in Klipsch School of Electrical & Computer Engineering at New Mexico State University. She completed MS (2018) from New Mexico State University and B.Tech. (2012) from SOA University, India, both in Electrical Engineering. She is currently working on the resiliency considerations of the electricity grid in the event of natural disasters.