Centre for System Intelligence and Efficiency

You are cordially invited to CSIE,
Centre for System Intelligence and Efficiency Seminar on:

Digital Twins for Coordinated Control of Distributed Energy Resources

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Date: 31 October 2022 (Monday)
Time: 10:30 am - 11:15 am
Venue: Executive Seminar Room (S2.2-B2-53)
School of EEE

This event is co-sponsored by IEEE PES Singapore Chapter and chaired by A/P Xu Yan.
Light refreshment will be provided.

Abstract: Distributed Energy Resources (DERs) are playing an increasingly important role in supporting the delivery of ancillary services in power systems with massive integration of renewable resources. However, due to the significant differences in DERs' capability and characteristics, individual and uncoordinated responses from DERs could lead to a less effective overall response with undesirable traits, e.g. slow response, severe overshoots, etc. Therefore, the coordination of DERs is critical to ensure the desirable aggregated overall response.

This talk introduces a two-level control strategy that aims to achieve superior cumulative dynamic response of distributed DERs participating in ancillary service provision by combining a local control level with a distributed and coordinated control. The challenges in implementation of the control will be discussed. The coordinated control of DERs with conventional implementations for both, the centralized and distributed approaches present significant reliance on the real-time communications and the latency of the communication can severely compromise the overall coordinated control performance. Through the use of the Digital Twins (DT) of DERs, the real-time status of the DERs can be estimated and used for supporting the coordinated control actions. Two example DT-based implementations to realize coordinated control will be discussed and the significant mitigation of the reliance on real-time communications with satisfactory control performance will be demonstrated.

Speaker*:* Mazher Syed received his BE degree in Electrical and Electronics Engineering from Osmania University, India, in 2011, MSc degree in Electrical Power Engineering from Masdar Institute of Science and Technology, UAE, in 2013 and PhD degree in Electronic and Electrical Engineering from University of Strathclyde, Scotland in 2018. He is currently a Strathclyde Chancellor's Fellow (Lecturer) with the Institute for Energy and Environment in the Department of Electronic and Electrical Engineering at the University of Strathclyde. He also serves as the manager for the Dynamic Power Systems Laboratory at Strathclyde. He leads the International Energy Agency (IEA) ISGAN SIRFN Advanced Laboratory Testing Methods Task and is the Secretary of IEEE Task Force on Control of Distributed Resources in Energy Internet. He has led and contributed to innovative National, European and Industrial power system research projects with a strong publication record of over 70 peer-reviewed scientific papers. His research interests include demand side management, decentralized and distributed control, real-time controller and power hardware in the loop simulations, geographically distributed simulations and systems level validations.