ENERGY & POWER SEMINAR

Bio-inspired and AI DeepWalk Based Approach to Understand Cyber-Physical Interdependencies of Power Grid Infrastructure

Abstract

The occurrence of cyber and physical disturbances in power systems is increasing, leading to increased public focus on cyber-physical architectures. It has been observed that disturbances can propagate between cyber and physical systems, highlighting the need to study their interdependencies. We present an approach to improve the characterization of cyber-physical interdependencies through modeling techniques. These improved assessments of dependencies can then help optimize system design to improve functional resilience. To achieve this goal, we transform the cyber-physical architecture into a graph and apply bio-inspired network analysis using bipartite network methods to characterize the system during disturbances. Moreover, we apply a DeepWalk-based method to cluster the components based on their interdependencies. A WSCC-9 bus system is used for numerical study and quantification.

Shining Sun
PhD Student
Department of Electrical & Computer Engineering
Texas A&M University

Friday, October 13
11:30 am - 12:20 pm
244 ZACH

Biography

Shining Sun is a Ph.D. candidate in the Department of Computer Science and Engineering at Texas A&M University. Currently, she is a research assistant in the Electrical Engineering Department, working under Dr. Davis's research group. Her research primarily involves cyber-physical system analysis, risk analysis, and implementing corrective actions following power system disturbances. In 2023, she was honored with the Thomas Powell '62 Fellowship Award.