TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

TRANSFORMING ENGINEERING EDUCATION

ENERGY & POWER GROUP SEMINAR

A Graph Embedding-Based Approach for Automatic Cyber-Physical Power System Risk Assessment to Prevent and Mitigate Threats at Scale

Abstract

Cyber threats targeting power systems have been increasing sharply, with disturbances capable of propagating between cyber and physical layers, creating significant operational and security risks. Assessing these risks is crucial for analyzing the vulnerabilities of components within Cyber-Physical Systems (CPS). Node2Vec, an unsupervised feature-learning algorithm for graphs, is widely used in social network analysis and natural language processing due to its ability to derive latent variables from random walks in graph structures. By leveraging that, a graph embedding-based approach for cyber-physical risk analysis (GEACRA) is develop, which enables a structural assessment of CPS interdependencies and provides insights into potential vulnerabilities across interconnected components.

Shining Sun
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Friday, November 15
11:30 am
241 ZACH

Biography

Shining Sun is a third-year Ph.D. student in the Department of Electrical and Computer Engineering, under the supervision of Dr. Katherine Davis. She got her Bachelor's degree with a dual major in Electrical Engineering and Computer Engineering from the University of Missouri, Columbia, and her Master's degree from Texas A&M University. Prior to pursuing her Ph.D., she worked as a substation designer for secondary systems, which provided her with practical experience in cyber-physical system modeling and resilience. In her current research, Shining Sun is developing innovative methodologies for the detection and mitigation of potential vulnerabilities in power grids, leveraging advanced machine learning techniques and real-time data analytics. She has written several papers on system anomaly detection and risk analysis, supported by funding from the Department of Energy and Sandia National Laboratory.

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