Sowmya Acharya

Research Assistant
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Research Interests

My current work focuses on efficient compression of large datasets obtained from phasor measurement units. Optimization of power system operations, and processing of real-time measurement data for analysis and control applications are my primary research interests.

Education

Dec 2019 **Ph.D. in Electrical Engineering**, *University of Wisconsin - Madison, WI*
Advisor: Dr. C. L. DeMarco
GPA: 3.93/4.00

Aug 2014 **M.S. in Electrical Engineering**, *University of Wisconsin - Madison, WI*
GPA: 3.90/4.00

May 2012 **B.Tech. in Electrical Engineering**, *Veermata Jijabai Technological Institute, India*
GPA: 9.00/10.00

Experience

Research

2014–present **Research Assistant** *University of Wisconsin-Madison*
Efficient Compression of PMU data
Developing algorithms for PMU data compression by adapting image and video compression techniques and exploiting the spatial and temporal correlations in the measurements to obtain higher compression ratios.

2012–2014 **Master's Research** *University of Wisconsin-Madison*
Estimation of Topology Errors in Power Systems
Near real-time identification of power line outages through dynamic control of power systems and observer design.

Teaching

2012–2013 **Teaching Assistant** *University of Wisconsin-Madison*
Math 114: Algebra and Trigonometry (Fall '12, Fall '13)
Math 320: Linear Algebra and Differential Equations (Spring '13)

Professional Experience

Aug–Dec 2018 **Fellow Intern** *GE Global Research*
Cyberattack Detection; Load Model Validation
Evaluated and refined a cyberattack detection algorithm to detect and characterize replay attacks on wide area measurement system (WAMS) data. Contributed to parameter tuning and validation of composite load models for simulating fault-induced delayed voltage recovery.

Publications

Journal *Sowmya Acharya and C. L. DeMarco,* "Low-loss Image-based Compression for Synchrophasor Measurements". [*Under review in IEEE Transactions on Smart Grid*]

Conference *Sowmya Acharya and C. L. DeMarco,* "Enhancing Lossy Compression of PMU Measurements by Data Conditioning", ISGT North America 2020 [*Accepted*]

Conference *Philip Hart, Sowmya Acharya and Honggang Wang,* "Coherency-Based Detection Algorithm for Synchrophasor Cyberattacks", North American Power Symposium (NAPS 2019).

Conference *Sowmya Acharya and C. L. DeMarco,* "Exploiting Network-induced Correlation for Efficient Compression of PMU Data", North American Power Symposium (NAPS 2018).

Report *Sankar, Lalitha, Christopher DeMarco, Reetam Sen Biswas, Zhigang Chu, Andrea Pinceti, Sowmya Acharya, and Jong Min Lim,* "Synchrophasor Data-Analytics for a More Resilient Electric Power System," Power Systems Engineering Research Center, Final Project Report S-74, September 2019.

Poster *Sowmya Acharya and C. L. DeMarco,* "Topology Error Estimation in Power System Dynamic Models", IEEE PES T&D Conference and Exposition 2018.

Relevant Coursework

Advanced Power Systems Analysis, Linear Programming Techniques, Nonlinear Optimization, Optimal Control and Variational Methods, Online Control of Power Systems

Professional Development

Jun 2014 *Short Course:* Power System Operation in the Age of Smart Grid

Jun 2013 *Short Course:* Smart Grid Applications of WAMS

Professional Skills

MATLAB/Simulink, PowerWorld, Python, LaTeX

Leadership Positions

Member Graduate student representative to the *Committee on Women in the University* at the UW-Madison (2016 – present)

Member Appointed member of Shared Governance Committee in the Associated Students of Madison (2016 – present)

Mentor Mentoring undergraduate students in the ECE department of UW-Madison who are recipients of the *Reynolds Scholarship* (2016 – 2017)

Volunteer Actively helping with various events organized by the Carbone Cancer Center at the UW-Hospital