Pengzhi Gao

CONTACT INFORMATION

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Rensselaer Polytechnic Institute, Troy, NY 12180

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EDUCATION

Rensselaer Polytechnic Institute, Troy, NY

Ph.D., Electrical Engineering, August 2013 - Present

- Research areas: signal processing, machine learning, high-dimensional data analysis, smart grid.
- Advisor: Professor Meng Wang

University of Pennsylvania, Philadelphia, PA

M.S., Electrical Engineering, August 2011 - May 2013

- GPA: 3.74/4

Xidian University, China

B.S. (with honors), Electronic and Information Engineering, August 2007 - May 2011

- GPA: 91.4/100 Rank: 1st in 114

RESEARCH EXPERIENCE

Research Assistant August 2013 to present

ECSE Department,
Rensselaer Polytechnic Institute
Supervisor: Professor Meng Wang

- Analyzed the Phasor Measurement Unit (PMU) data (> 200 MB of data) to exploit the temporal and spatial correlations (low dimensionality) of the data.
- Proposed an identification method that can detect the cyber data attack in the power system. Tested our method on the actual PMU data from Central New York Power System.
- Developed an on-line algorithm to estimate the missing PMU data in real time manner. Built the corresponding action adapter in OpenPDC by C# code, reducing the computational time by 50%.

Summer Research Co-program Manager May 2016 to August 2016

ECSE Department,
Rensselaer Polytechnic Institute
Co-program Manager: Stephen M. Burchett

- Led a group of 3 undergraduates to build a wireless and real-time photovoltaic power monitoring system. The data acquisition was performed by the Arduino platform. Data communication was achieved by Bluetooth connection. And the monitoring interface was developed by Matlab.

Research Assistant May 2012 to May 2013

Litt Lab,
University of Pennsylvania
Supervisor: Professor Gershon Buchsbaum

- Analyzed the EEG data from IEEG Portal for epilepsy detection.
- Proposed a new dictionary for EEG dataset. Improved the reconstruction performance of the EEG data by 20%.

Research Intern December 2010 to May 2011

Internet Media Group,
Microsoft Research Asia
Supervisor: Senior researcher Feng Wu

- Analyzed the data collected from 54 sensors deployed in the Intel Berkeley Research Lab (150 MB of data) to exploit the temporal correlations in sensor readings. Developed a joint source and network coding scheme for approximate data gathering in wireless sensor network.

Publications

1. **P. Gao**, R. Wang, M. Wang, and J. H. Chow. "Low-rank Matrix Recovery from Noisy, Quantized and Erroneous Measurements." *submitted to IEEE Trans. Signal Processing*, 2017.
2. **P. Gao**, M. Wang, J. H. Chow, M. Berger, and L. M. Seversky. "Missing Data Recovery for High-dimensional Signals with Nonlinear Low-dimensional Structures." *submitted to IEEE Trans. Signal Processing*, 2016.
3. M. Wang, J. H. Chow, **P. Gao**, Y. Hao, W. Li and R. Wang. "Recent Results of PMU Data Analytics by Exploiting Low-dimensional Structures." *accepted to Bulk Power Systems Dynamics and Control Symposium (IREP)*, 2017.
4. **P. Gao**, R. Wang, and M. Wang. "Quantized Low-rank Matrix Recovery with Erroneous Measurements: Application to Data Privacy in Power Grids." *accepted to Asilomar Conference on Signals, Systems, and Computers, 2016.*
5. **P. Gao**, M. Wang, J. H. Chow, S. G. Ghiocel, B. Fardanesh, G. Stefopoulos, and M. P. Razanousky. "Identification of Successive "Unobservable" Cyber Data Attacks in Power Systems Through Matrix Decomposition." *accepted to IEEE Trans. Signal Processing*, 2016.
6. **P. Gao**, M. Wang, and J. H. Chow. "Matrix Completion with Columns in Union and Sums of Subspaces." *accepted to IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, 2015.
7. **P. Gao**, M. Wang, S. G. Ghiocel, J. H. Chow, B. Fardanesh, and G. Stefopoulos. "Missing Data Recovery by Exploiting Low-dimensionality in Power System Synchrophasor Measurements." *accepted to IEEE Trans. Power Systems*, 2015.
8. M. Wang, J. H. Chow, **P. Gao**, X. T. Jiang, Y. Xia, S. G. Ghiocel, B. Fardanesh, G. Stefopoulos, Y. Kokai, N. Saito, and M. P. Razanousky. "A Low-Rank Matrix approach for the Analysis of Large Amounts of Synchrophasor Data." *Proc. of Hawaii International Conference on System Sciences (Runner-up of Best Paper in Electric Energy Systems Track)*, 2015.
9. M. Wang, **P. Gao**, S. G. Ghiocel, J. H. Chow, B. Fardanesh, G. Stefopoulos, and M. P. Razanousky. "Identification of "Unobservable" Cyber Data Attacks on Power Grids." *Proc. of IEEE SmartGridComm*, 2014.
10. **P. Gao**, M. Wang, S. G. Ghiocel, and J. H. Chow. "Modeless Reconstruction of Missing Synchrophasor Measurements." *Proc. of IEEE Power & Energy Society General Meeting (selected in Best Conference Paper sessions)*, 2014.

Patents

1. Meng Wang, **Pengzhi Gao**, and Joe H. Chow. "A low-rank-based missing PMU data recovery method." Application No.: 62/445305, Filed January 12, 2017.

Honors and Awards

- Founders Award of Excellence (top 1%) 2015
- "Excellent Graduate" of Xidian University (top 1%) 2011
- National Scholarship (top 1%) 2010
- First prize of the College Academic and Technological Scholarship (top 2%) 2008-2010
- Excellent Student Awards (top 1%) 2008

Technical Skills

- Languages: C, C++, Java, Python, AMPL.
- Tools: MATLAB, R, XML, HTML, CPLEX, LaTeX.
- Operating Systems: Linux, Windows.