Anit Kumar Sahu

Contact Information

B-33, Porter Hall
Carnegie Mellon University
Pittsburgh, PA 15213

Mobile: +1-412-608-8890
E-mail: anits@ece.cmu.edu
Web: http://users.ece.cmu.edu/~anits

Research Interests

Statistical Inference in Networked Systems, Statistical Machine Learning, Information Theory, Distributed Inference

Education

Carnegie Mellon University — Pittsburgh, PA
PhD, Electrical and Computer Engineering — June 2013 - present
– GPA: 3.91/4.0

Indian Institute of Technology, Kharagpur — Kharagpur, India
B.Tech and M.Tech(Dual Degree),
Electronics and Communication Engineering, — Jul 2008 - May 2013
– GPA: 9.28/10.00

Industry Experience

Bosch RTC[1]: Machine Learning & Control Theory Research Intern — Pittsburgh, PA
Supervisor: Jon Francis — May 2016 - Aug 2016
Developed data-driven inference models for the evolution of different environmental modalities with occupancy count as a disturbance.
Designed smart control schema based on the data-driven models to provide for user comfort while keeping the energy constraint in mind.

Pipal Tech Ventures: Engineer Intern — Bangalore, India
Guide: Bhavani Shankar, Amit Baid. — July 2011 - Dec 2011
Developed and analyzed a system for smart phone user localization without using WiFi signals.

Qualcomm India: Summer Intern — Hyderabad , India
Supervisor: Subbarayudu Mutya. — May 2011 - Jul 2011
Developed a tool for automation in debugging and report generation for .isf files generated from devices built around qualcomm chipsets to resolve issues like RACH,No Service etc.

Academic Research Experience

Carnegie Mellon University — Pittsburgh, PA
Graduate Student Researcher — June 2013 - present
Developed a distributed sequential detection algorithm in a multi-agent networked setup; characterized the thresholds which guarantee specified error thresholds; quantified the performance in terms of network connectivity.
Developed distributed detection algorithms for composite hypothesis testing; established exponential decay for the probabilities of errors involved; quantified the exponent of decay
Developed a distributed non-linear recursive least squares algorithm and benchmarked its efficiency with that of the centralized algorithm.
Current research on online learning, multi-armed bandits and estimation in random fields.

Carnegie Mellon University — Pittsburgh, PA
Summer Research Intern — May 2012 - August 2012
Developed models for distributed linear prediction for correlated time-series and obtained convergence results for the proposed algorithm.

[1] Research and Technology Center

Indian Institute of Technology, Kharagpur Kharagpur, India

Undergraduate Researcher August 2011 - May 2013

Developed a fast guaranteed stable and accurate frequency estimation algorithm for time-series data.

Developed a multiplier less architecture based on distributed arithmetic for implementing a non-linear truncated LMS algorithm.

Publications

Journal Papers

J1 A.K. Sahu, S. Kar and J.M.F. Moura, Distributed Random Fields Estimation: Algorithms and Asymptotics, In Preparation, To be submitted to *IEEE Transactions on Signal Processing*.

J2 A.K. Sahu, S. Kar, J.M.F. Moura and H.V. Poor, Distributed Constrained Recursive Nonlinear Least-Squares Estimation : Algorithms and Asymptotics, Under Revision in *IEEE Transactions on Signal and Information Processing over Networks: Special issue on Inference and Learning over Networks*.

J3 A.K. Sahu and S. Kar, Recursive Distributed Detection for Composite Hypothesis Testing: Algorithms and Asymptotics, Under Revision in *IEEE Transactions on Information Theory*.

J4 A.K. Sahu and S. Kar, Distributed Sequential Detection for Gaussian Shift-in-Mean Hypothesis Testing, *IEEE Transactions on Signal Processing*. Vol:64, Issue 1, pp. 89-103, 2016.

Conference Papers

C1 S. Kar, R. Negi, M. Mahzoon and A.K. Sahu, Queue-based Broadcast Gossip Algorithm for Consensus, submitted to *54th Annual Allerton Conference on Communication, Control, and Computing, 2016*.

C2 A.K. Sahu, J. Francis, S. Munir, C. Shelton, A. Rowe and Christopher Martin, Inference from Environmental Sensor Time-Series for the Generation of Smart-Space Control Schema, submitted to *ACM BuildSys 2016*.

C3 A.K. Sahu and S. Kar, Distributed Composite Hypothesis Testing : Imperfect Communication, In Proceedings of *International Symposium on Information Theory, ISIT 2016*.

C4 A.K. Sahu and S. Kar, Distributed Generalized Likelihood Ratio Tests : Fundamental Limits and Tradeoffs, In Proceedings of *41st IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2016, Shanghai*.

C5 A.K. Sahu and S. Kar, Distributed Sequential Detection for Gaussian Binary Hypothesis Testing: Heterogeneous Networks, In Proceedings of *Asilomar Conference on Signals, Systems and Computers 2014*.

Teaching Experience

Carnegie Mellon University, Pittsburgh, PA

Teaching Assistant: 18202 Math. Found. of Electrical Engineering Fall 2015

Weekly two recitations, one tutorial and office hours for a sophomore-level course.

Teaching Assistant: 18202 Math. Found. of Electrical Engineering Spring 2016

Weekly two recitations, one tutorial and office hours for a sophomore-level course.

Indian Institute of Technology, Kharagpur

Teaching Assistant: Analog Communications Laboratory Autumn 2012

Teaching Assistant: Digital Signal Processing Laboratory Spring 2013

Academic Achievements Awards and Scholarships

- Awarded the Carnegie Institute of Technology Dean's Fellowship for the academic session 2013-14.
- Awarded the best M.Tech project award for my Master's Thesis at IIT Kharagpur.
- Letter of commendation from the Dean Undergraduate Studies, IIT Kharagpur for securing a perfect 10.0 GPA in my 9th semester.
- **Jagadish Bose National Science Talent Search**(JBNSTS) scholarship,2008
- Ranked **11th,9th,5th and 1st** in state in Regional Mathematics Olympiad**(RMO)** for four consecutive years from Grade 8 to Grade 11 in the years 2003,2004,2005 and 2006 & participated in Indian National Mathematics Olympiad **(INMO)** 2004,2005,2006 and 2007.

Skills and Coursework

Programming Languages and Tools: C, MATLAB, R, Python and Perl

Selected Course Projects:

Distributed Covariance Estimation in Gaussian Markov Random Fields
Information Dissipation in Cascaded Channels and Serial Computation
MMSE and Mutual Information as Measures of Information Dissipation

Relevant Courses Taken: Statistical Machine Learning, Estimation, Detection and Identification, Information Theory, Intermediate Statistics, Linear Systems, Real Analysis, Information flow in Networks, Compressive Sensing

Positions of Responsibility

Membership Chair, Indian Graduate Students Association, Carnegie Mellon University 2014-2015

Graduate Student Assembly Representative, Department of ECE, Carnegie Mellon University 2014-Present

References

Soummya Kar
Associate Professor
Department of Electrical and Computer Engineering
Carnegie Mellon University, Pittsburgh
E-mail: soummyak@ece.cmu.edu

José M. F. Moura
Professor
Department of Electrical and Computer Engineering
Carnegie Mellon University, Pittsburgh
E-mail: moura@ece.cmu.edu

Jon Francis
Research Scientist
Bosch Research& Technology Center
Pittsburgh
E-mail: jon.francis@us.bosch.com