Arpita Gang

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ML scientist working in the area of machine learning and optimization with 6+ years of active research experience in statistical machine learning, feature learning and model development for large scale data along with expertise in modeling optimization problems and mathematical analysis of the solutions.

RESEARCH INTERESTS

Statistical Machine Learning, Graph Machine Learning, Distributed Optimization, Distributed Learning, Signal Processing.

COMPUTER SKILLS

Python, Pytorch, Tensorflow, Keras, Numpy, Pandas, Hive, SQL, Matplotlib, LaTeX, MS Office, Git, C, MATLAB.

EDUCATION

Rutgers University — New Brunswick, NJ
Ph.D, ECE GPA: **3.92**/4 — 2017-2022
- Tentative Dissertation Title : *Representation Learning in Distributed Networks*
- Advisor: *Prof. Waheed U. Bajwa*
- Expected Graduation: *May 2022*

Indraprastha Institute of Information Technology — New Delhi, India
M.Tech, ECE GPA: **9.44**/10 — 2014-2016
- Thesis Title: *Discriminative Framework for Single Channel Source Separation*
- Advisor: *Prof. Pravesh Biyani*

National Institute of Technology — Assam, India
B.Tech, ECE GPA: **9.16**/10 — 2009-2013

WORK EXPERIENCE

Visa INC. — Austin, TX
Staff Machine Learning Scientist — June 2022 – Present
- Developing machine learning models for fraud detection in real time payments networks for various clients.
- Research and Development of graph neural network based models for financial fraud prevention and tracking.

Rutgers University — New Brunswick, NJ
Graduate Research Assistant — July 2018 – June 2022
- Developed fast converging algorithms for distributed principal components analysis.
- Developing a distributed autoencoder training algorithm for feature learning.
- Providing mathematical convergence guarantees of the algorithms.
- Performing proof of concept experiments using Python, Tensorflow and MPI.

Rutgers University — New Brunswick, NJ
Teaching Assistant — Sept. 2017 – June 2018
- Courses assisted: Digital Signal Processing, Principles of Electrical Engineering.
- Conducted labs and recitations.

Indraprastha Institute of Information Technology — New Delhi, India
Research Assistant — August 2016 – May 2017
- Worked on audio source separation in single channel case using supervised machine learning and deep learning techniques.
- Focused on automating the models so that they require minimal parameter tuning.

OTHER PROJECTS

- Feature prediction: Predicting missing features in a heterogenous dataset.
- Road Intersection Detection in outdoor environments using image and LIDAR data for autonomous vehicle exploration.
- Developed a text-dependent speaker verification system.

SELECTED COURSEWORK

Linear Algebra, Machine Learning, Convex Optimization, Real Analysis, Compressive Sensing, Stochastic Estimation and Control, Probability and Random Process, Quantum Information Science, Information Theory, Statistical Signal Processing,

Reinforcement Learning, Data Structures

JOURNAL PUBLICATIONS

- **A. Gang**, W.U. Bajwa, "FAST-PCA: A Fast and Exact Algorithm for Distributed Principal Component Analysis", arXiv preprint arXiv:2108.12373, Aug 2021.
- **A. Gang**, W. U. Bajwa, A linearly convergent algorithm for distributed principal component analysis, Signal Processing, Volume 193, 2022, 108408, ISSN 0165-1684, https://doi.org/10.1016/j.sigpro.2021.108408.
- **A. Gang**, B. Xiang and W. U. Bajwa, "Distributed Principal Subspace Analysis for Partitioned Big Data: Algorithms, Analysis, and Implementation," inIEEE Transactions on Signal and Information Processing over Networks, vol. 7, pp. 699- 715, 2021, doi: 10.1109/TSIPN.2021.3122297.
- Z. Yang, **A. Gang** and W. U. Bajwa, "Adversary-Resilient Distributed and Decentralized Statistical Inference and Machine Learning: An Overview of Recent Advances Under the Byzantine Threat Model, in IEEE Signal Processing Magazine, vol. 37, no. 3, pp. 146-159, May 2020.

CONFERENCE PUBLICATIONS

- M. Zulqarnain, **A. Gang** and W. U. Bajwa, "C-DIEGO: An Algorithm with Near-Optimal Sample Complexity for Distributed, Streaming PCA, 2023 57th Annual Conference on Information Sciences and Systems (CISS).
- **A. Gang**, H. Raja and W. U. Bajwa, "Fast and Communication-efficient Distributed PCA, 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Brighton, United Kingdom, 2019, pp. 7450-7454.
- **A. Gang**, P. Biyani, A. Soni "Towards Automated Single Channel Source Separation Using Neural Networks, Proc. Interspeech 2018, 3494-3498.
- **A. Gang**, P. Biyani "On Discriminative Framework for Single Channel Audio Source Separation, Proc. Interspeech 2016, 565-569.
- R. Ahuja, **A. Gang**, P. Biyani and S. Prasad, "A fast converging method for common mode sensor based impulse noise cancellation for downstream VDSL", 2016 24th European Signal Processing Conference (EUSIPCO), Budapest, 2016, pp. 310-315.

RELEASED CODE

- **A. Gang**, W.U. Bajwa, "Codebase – A Linearly Convergent Algorithm for Distributed Principal Component Analysis", GitHub Repository, https://github.com/INSPIRE-Lab-US/DSA-Distributed-PCA, Jan 2021.

AWARDS AND HONORS

- Silver Medal in B.Tech at NIT.
- Google Travel Grant for INTERSPEECH 2016.
- TA/GA Professional Development Fund from Rutgers University, 2018.
- Awarded the AnitaB GHC scholarship to attend the GHC 2020.
- Scholarship to attend CRA-WP Grad Cohort for Women Workshop, 2021.

MISCELLANEOUS

- Mentored two junior students at INSPIRE Lab, ECE, Rutgers University.
- Organizer of Signal and Information Processing (SIP) seminars in ECE dept. at Rutgers University from Sept 18-Apr. 19.
- Reviewer for International Conference on Acoustics, Speech and Signal Processing (ICASSP).
- Reviewer for Asilomar Conference on Signals, Systems, and Computers, 2021.
- Reviewer for SIAM Journal on Optimization.
- Reviewer for IEEE Transaction of Signal Processing.
- Reviewer for IEEE Transaction of Signal and Information Processing over Networks.
- Reviewer for Signal Processing Journal.