

Sanket Jantre

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Education

Michigan State University (MSU); East Lansing, MI 2017-2022

Ph.D. in Statistics

- Dissertation topic: *Variational Bayesian Inference for Sparse Deep Neural Networks: Theory and Computation*
- Advisors: Dr. Tapabrata Maiti and Dr. Shrijita Bhattacharya

Indian Institute of Technology (IIT), Kanpur; India 2012-2017

Master of Science in Economics

- Thesis topic: *Bayesian Quantile Regression Models for Longitudinal Data*
- Advisor: Dr. Mohammad Arshad Rahman

Bachelor of Technology in Computer Science and Engineering

Research Interests

Bayesian Statistics, Neural Networks, Probabilistic Machine Learning, Deep Learning, MCMC, Variational Inference, Posterior Consistency, Sparsity, Quantile Regression, Tensor Regression, Inverse Problems, Dimensionality Reduction

Publications

1. **Jantre, S.**, “Bayesian Quantile Regression for Longitudinal Count Data,” *to appear in the Journal of Statistical Computation and Simulation (2022+)*, arXiv:2204.02344.
2. Bailey, K., **Jantre, S.**, Lawrence, F., Hankenson, F., and DelValle, J., “Evaluation of Active Warming and Surgical Draping Practices for Perioperative Thermal Support in Laboratory Mice,” *to appear in the Journal of the American Association for Laboratory Animal Science (2022+)*.
3. Ether, N., **Jantre, S.**, Sharma, D., Leishman, D., Bailie, M., and Lauver, D., “Improving Corrected QT; Why Individual Correction is not Enough,” *Journal of Pharmacological and Toxicological Methods (2022)*, 113, pp. 107126, DOI:10.1016/j.vascn.2021.107126.
4. **Jantre, S.** and Di, Z., “Low-Rank Tensor Regression for X-Ray Tomography,” *28th IEEE International Conference on Image Processing (ICIP 2021)*, pp. 2833-2837, DOI:10.1109/ICIP42928.2021.9506199.
5. **Jantre, S.**, Bhattacharya, S., and Maiti, T., “Quantile Regression Neural Networks: A Bayesian Approach,” *Journal of Statistical Theory and Practice (2021)*, 15(68), DOI:10.1007/s42519-021-00189-w.

Manuscripts

1. **Jantre, S.**, Bhattacharya, S., and Maiti, T., “Structurally Sparse Bayesian Neural Networks: Spike and Slab Hierarchical Priors,” *In preparation*.
2. **Jantre, S.**, Madireddy, S., Bhattacharya, S., Maiti, T., and Balaprakash, P., “Sequential Bayesian Neural Subnetwork Ensembles,” *Under review*, arXiv:2206.00794.
3. **Jantre, S.**, Bhattacharya, S., and Maiti, T., “Layer Adaptive Node Selection in Bayesian Neural Networks: Statistical Guarantees and Implementation Challenges,” *Under revision*, arXiv:2108.11000.

Professional Experience

Givens Associate Program - Graduate Research Intern and Visiting Student

Argonne National Laboratory, Lemont, IL

June 2021-Aug 2022

- Implemented sequential deep ensemble models of sparse Bayesian neural networks.
- Demonstrated that our method outperforms baselines on a range of benchmarks in prediction accuracy, uncertainty estimation, and out-of-distribution (OoD) robustness.
- Presented the work at Summer Argonne Students Symposium 2021 and served as a lead author on a manuscript.
- Working on applying our proposed model on Large Hadron Collider jet data and nuclear fusion data.

Research Assistant

Center for Statistical Training and Consulting (CSTAT), MSU

Aug 2020-May 2021

- Served as a statistical consultant for graduate students, postdoctoral researchers, research staff, and faculty members
- Trained clients on data collection, data management, statistical modeling, and post-hoc inference methods.
- Worked in a team of 6 senior statisticians and 6 graduate research assistants to address clients' statistical needs.
- Collaborated to conduct statistical analyses on clients' experimental data and coauthored 3 manuscripts.

Givens Associate Program - Graduate Research Intern

Argonne National Laboratory, Lemont, IL

June 2020-Aug 2020

- Implemented a tensor-based linear regression model to perform the tomographic reconstruction and offered a flexible framework to incorporate prior knowledge in the form of regularization.
- Explored low-rank structure to reduce dimensionality and address ill-posed nature of X-ray tomography.
- Presented the work at Summer Argonne Students Symposium 2020 and served as a lead author on a publication.

Project Lead: Principal Component and Clustering Analysis Tool (PCCAT)

Statistics in the Community (STATCOM), MSU

Jan 2020-May 2020

- Led a team of 3 student developers to design an R-shiny web application for multivariate environmental data analysis
- Incorporated data preprocessing, univariate data exploration, principal component and clustering analyses steps to tailor the app according to the client's data analysis needs.
- The app is used by the Michigan Department of Environment, Great Lakes, and Energy for exploratory data analysis.

Teaching Experience

Teaching Assistant

Department of Statistics and Probability, MSU

Aug 2017-May 2020

- Instructed an undergraduate level course on statistical methods during the summer of 2019.
- Graded and tutored Ph.D. core courses on the theory of probability and an undergraduate course on R programming.
- Taught recitations for introductory level probability and statistics courses designed for undergraduate students.
- Worked in a team of 20 professionals involving several instructors, teaching assistants, and undergraduate learning assistants to aid the students in successful completion of their coursework.

Honors and Awards

Educator Award

Academic Year 2020-2021

- Recognized as a high-impact educator through the #iteachmsu initiative at MSU.

William L. Harkness Teaching Award

Academic Year 2018-2019

- Outstanding Graduate Student Teaching Award, Department of Statistics and Probability, MSU

Relevant Courses and Technical Skills

Statistics: Linear Models, Mixed Models, Statistical Inference, Probability Theory, Nonlinear Regression, Intro to Bayesian Analysis, Stochastic Analysis, Weak Convergence and Asymptotic Theory

Computer Science: Machine Learning, Data Mining, Natural Language Processing, Data Structures & Algorithms

Programming: R, Python, MATLAB, C, C++, Bash, SQL, HPC Platform, R-Shiny

Python ML Libraries: PyTorch (*proficient*), JAX and Tensorflow (*used before*).

Services

Graduate Student Representative, *College of Natural Sciences Student Advisory Council, MSU*

Aug 2020-May 2021

- Advised the dean on issues concerning undergraduate and graduate students within the college.

Vice President, *Statistics in the Community (STATCOM), MSU*

Aug 2020-May 2021

- Provided pro bono statistical consulting to local nonprofit, governmental, and community service organizations.