KSHEERA SAGAR K. N

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RESEARCH INTERESTS

Bayesian graphical models and their applications in cancer research.

EDUCATION

Purdue University   August 2018 − *May 2023 (expected)*
Ph.D., Department of Statistics
Advisor: Prof. Anindya Bhadra

Indian Institute of Technology Kharagpur, India   July 2013 − July 2018
Bachelor and Master of Science, Mathematics and Computing

PUBLICATIONS

1. **Sagar, K.**, Bhadra, A. A Laplace Mixture Representation of the Horseshoe and Some Implications. *IEEE Signal Processing Letters*, vol. 29, pp. 2547-2551, 2022, doi: 10.1109/LSP.2022.3228491.

2. **Sagar, K.**, Banerjee, S., Datta, J. and Bhadra, A. (2022+). Precision matrix estimation under the horseshoe-like prior–penalty dual. (*under revision, winner of a 2022 ENAR Distinguished Student Paper Award*). *arXiv preprint arXiv:2104.10750.*

3. **Sagar, K.**, Ni, Y., Baladandayuthapani, V. and Bhadra, A. (2022+). Individualized Inference using Bayesian Quantile Directed Acyclic Graphical Models. (*submitted*). *arXiv preprint arXiv:2210.08096.*

4. Bhadra, A., **Sagar, K.**, Banerjee, S. and Datta, J. (2022+). Graphical Evidence. (*submitted*). *arXiv preprint arXiv:2205.01016.*

AWARDS

- Bilsland Dissertation Fellowship, Spring 2023.
- Best Student Poster Award, IISA 2022 Conference, Student Poster Competition, December 2022.
- College of Science Graduate Student International Travel Grant, March and August 2022.
- ENAR distinguished student paper award, ENAR Spring Meeting, March 2022.
- Emily and Paul Kidwell Graduate Student Excellence Award, May 2021.
- Fredrick N. Andrews Fellow, Fall 2018 − Spring 2020.
- INSPIRE Fellow, Department of Science and Technology, India, Fall 2013 − Spring 2018.

RESEARCH AND TEACHING EXPERIENCE

Purdue University   August 2018 − present
Fredrick N. Andrews Fellow, Graduate research and teaching assistant

- Conceptualized a robust graphical model for individualized inference in precision medicine. Investigated patient-specific protein networks in lung cancer patients, inferred using the model.

- Developed an innovative method to compute marginal likelihood in Gaussian Graphical Models, and implemented it to infer a protein network with higher likelihood, in human immune system cells.

- Contributed a faster estimation technique to infer sparse precision matrices, by proposing a novel prior–penalty dual. Proved consistency of the estimate, in frequentist and Bayesian senses.

- Worked as a teaching assistant for the courses: Statistics and Society, Probability and Statistics for Business and Statistical Methods (graduate level), during the academic years 2020-21 and 2021-22.

Universität Bremen, Germany
May 2017 − June 2017

Summer Internship. Advisors: Christian Etmann, Jens Behrmann & Prof. Peter Maaß

- Worked on tumor typing by means of classification of mass spectra of lung cancer tissue.
- Performed a study by comparing ensembles of convolutional neural networks (CNN), with plain CNNs, for tumor typing, and studied the theory of generalization errors of classifiers.

TECHNICAL SKILLS

Proficient in R, MATLAB programming and in writing code optimized for time, memory and storage requirements, on large scale computer clusters. GitHub: https://github.com/sagarknk/.

TALKS AND PRESENTATIONS

1. Precision Matrix Estimation under the Horseshoe-like Prior–Penalty Dual.
   - *ENAR Spring Meeting, March 2022.*
   - *NISS Graduate Student Research Conference, June 2021.*
   - *WNAR Student Paper Presentations, June 2021.*

2. Individualized Inference using Bayesian Quantile Directed Acyclic Graphical Models.
   - *Poster presentation at ICSA Midwest and NIC-ASA Joint Fall Meeting , October 2022.*
   - *Contributed oral presentation at Joint Statistical Meetings, August 2022.*
   - *Poster presentation at ISBA World Meeting, June 2022.*

ACADEMIC SERVICE

- President, Statistics Graduate Student Organization, August 2022 − present.
- Reviewer, Statistical Analysis and Data Mining, October 2022 − present.
- Reviewer, Journal of Computational and Graphical Statistics (JCGS), May 2022 − present.
- Session Chair, 2nd Annual Graduate Student Research Conference, NISS GSN Event, May 2022.
- Member, Diversity and Inclusion Committee, Dept. of Statistics, January 2022 − present.
- Member, NISS outreach subcommittee, January 2022 − present.

COURSE PROJECTS

High Frequency Pair Trading
Spring 2020

Course: Machine Learning In Finance

- Proposed a pairs trading strategy motivated by simple perceptron, to exploit the statistical arbitrage arising from deviation of similarly behaving stocks. Applied the trading strategy on historical stock data of NYSE, to generate returns 6% higher than the traditional strategies.

Hierarchical Models for Influenza Forecasting
Fall 2019

Course: Bayesian Data Analysis

- Enhanced the flu forecasting ability of 'Dante' (Osthus and Moran, 2019), by proposing new mean and covariance functions, in the prior of model parameters, modeling flu at the state level.

Multitasking vs. Sequential completion of tasks
Fall 2018

Course: Design of Experiments

- Designed and conducted an experiment, to compare the performance of graduate students, involved in synchronous−asynchronous multitasking, against their sequential counterparts.
- Scored the participating students in a designed evaluation, and observed a significant difference in performance, between multitasking and sequential completion of tasks.
- Studied the concentration of subjects over time, using time series analysis of the score data.