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Tejasv Bedi

Department of Mathematical Sciences, FO 1.204
The University of Texas at Dallas
800 W Campbell Rd
Richardson, TX 75080, United States

E-mail: tejasv.bedi@utdallas.edu
Phone: (585) 755-8983
GitHub: <https://github.com/tejasvbedi95>

RESEARCH INTERESTS

Theory and methods:

Bayesian algorithms and modeling, Monte Carlo simulation methods, time series analysis, segmentation modeling and clustering, change-point detection, shape analysis, Gaussian processes and spatial statistics, experimental design and linear mixed models

Application:

Epidemiology, Tumor Pathology and imaging data modeling, count data and clinical trials

TECHNICAL SKILLS

Languages & Softwares:

R, C++ (High Performance Computing), SAS, Python, SPSS, MATLAB, L^AT_EX (Technical Writing)

Operating Systems:

Linux, macOS

EDUCATION

Doctor of Philosophy, Statistics Aug 2019 –
The University of Texas at Dallas, Richardson, TX
Advisor: Dr. Qiwei Li
GPA - 3.92/4.00

Master of Science, Applied Statistics Aug 2017 – May 2019
Rochester Institute of Technology, Rochester, NY
Advisor: Dr. Robert Parody
Thesis - Simulation-Based Inference on Mixture Experiments
GPA - 3.88/4.00

Bachelor of Science (Honors), Statistics Aug 2014 - May 2017
University of Delhi, New Delhi, India
First Division with Distinction

HONORS AND AWARDS

- First prize in poster competition at The Conference of Texas Statisticians (COTS-2020) Sep 2020
- Best Student Research Award in Methodology and Theory at UP-STAT 2019 conference Apr 2019

- Judge and mentor at ASA DataFest 2019, RIT Mar 2019
- RIT merit scholarship for graduate studies Aug 2017 – May 2019
- Appreciation letter from The Minister of Human Resources, The Government of India for Class XII Board Examinations May 2014

PUBLICATIONS

⁺**First**/Co-first author

Peer-reviewed Papers

1. Q. Li⁺, T. Bedi⁺, C. Lehmann, G. Xiao, Y. Xie, “Evaluating short-term forecasting of COVID-19 cases among different epidemiological models under a Bayesian framework”, *GigaScience*

CONFERENCES

Contributed Oral Presentations

1. “BayesSMEG: Bayesian Segmentation Modeling for Epidemic Growth Models”, Eastern North American Region Conference (**ENAR 2021**)
2. “Evaluating short-term forecasting of COVID-19 cases among different epidemiological models under a Bayesian framework”, NSF Student Conference on COVID 19 Modelling (**NSF 2021**)
3. “Evaluating short-term forecasting of COVID-19 cases among different epidemiological models under a Bayesian framework”, Data Science Conference on COVID-19 (**DSCC-19**)
4. “Simulation-based Inference on a Simplex-Lattice Design”, 8th Annual Conference of the Upstate New York Chapters of the American Statistical Association (**UP-STAT 2019**)

Contributed Poster Presentations

3. “Evaluating short-term forecasting of COVID-19 cases among different epidemiological models under a Bayesian framework”, The Conference of Texas Statisticians (**COTS 2020**)
4. “Evaluating short-term forecasting of COVID-19 cases among different epidemiological models under a Bayesian framework”, International Chinese Statistical Association Applied Statistics Symposium (**ICSA 2020**)

RESEARCH EXPERIENCE

Research Assistant supervised by Dr. Qiwei Li

BayesSMEG

Aug 2020 –

- Developed a multiple peak detection and segmentation modeling approach utilizing epidemiological dynamics under a Bayesian framework
- Designed and implemented a novel MCMC algorithm for model fitting and prediction utilizing High Performance Computing methods
- Conducted simulation studies and visualizations to compare performance with competitors
- Implemented external clustering measures (unsupervised learning) to demonstrate improved segmentation performance over competitive methods
- Working on developing a novel Reversible Jump MCMC to incorporate randomness in peak counts

BayesEpiModels

May 2020 – Feb 2021

- Implemented Bayesian stochastic growth and compartmental models for the analysis of COVID-19 daily report data
- Designed a program to perform Time-Series Cross-Validation to compare performance of six stochastic growth models, a stochastic SIR model and ARIMA model on US state-wise and country-wise COVID-19 data
- Performed data visualization using **GGPLOT2** to summarize the results
- Contributed in developing a **RShiny** dashboard to summarize results

Research Assistant supervised by Dr. Robert Parody

Aug 2018 – May 2019

- Derived a pivotal quantity to construct prediction intervals of response generated via simplex-lattice designs
- Developed a Monte Carlo simulation algorithm to optimize a maximax criterion in order to realize the theoretical pivotal quantity
- Implemented a pseudocomponent technique to drastically reduce algorithm complexity and program runtime
- Proved that the simulation-based pivotal quantity was over 100% more efficient than the Scheffe adaptation
- Implemented the method on real data and visualized the improved prediction bands using contour plots superimposed over simplex plots
- Provided tables of critical points under several model parameter settings

TEACHING EXPERIENCE

Teaching Assistant

Aug 2019 –

The University of Texas at Dallas, Richardson, TX

- STAT 6331 Statistical Inference I with Dr. Pankaj Choudhary
- STAT 4352 Mathematical Statistics with Dr. Swati Biswas
- STAT 3355 Data Analysis for Statisticians and Actuaries with Dr. Qiwei Li
- STAT 3360 Probability and Statistics for Management and Economics with Dr. Yuly Koshevnik
- STAT 2332 Introductory Statistics for Life Sciences with Dr. Kemelli Estacio-Hiroms
- MATH 2418 Linear Algebra with Dr. Luis Felipe Pereira
- MATH 2413 Differential Calculus with Dr. My Linh Nguyen

Teaching Assistant

Aug 2017 – May 2019

Rochester Institute of Technology, Rochester, NY

- STAT-631 Foundations of Statistics with Dr. Ernest Fokoue
- STAT-641 Applied Linear Models - Regression with Dr. Ernest Fokoue
- STAT-146 Introduction to Statistics II with Dr. Bernadette Lanciaux

Teaching Volunteer

Oct 2015 – Apr 2016

Department of ED Support, Make a Difference, India

- High-school level math courses

PROJECTS

Clinical Analysis of Cardiac Surgery and Percutaneous Coronary Interventions 2018

- Implemented logistic regression to predict death ratio of heart patients after PCIs
- Conducted ANOVA and post-hoc analysis to find the best surgical procedure
- Performed goodness-of-fit tests to measure model adequacy

Regression Analysis of Automobile Fuel Efficiency Data 2017

- Studied the effect of different technologies on fuel mileage over the span of 40 years
- Performed model transformations and variable selection procedures to fit the best model
- Implemented k fold cross-validation on testing data to optimize prediction error

Time Series Analysis of US Household Electricity Data 2015

- Estimated trend, seasonal and random components of monthly electricity expenditure over the span of 10 years
- Explored non-linear curve fitting procedures and performed data visualizations

PROFESSIONAL ACTIVITIES

Membership

- American Statistical Association (ASA)
 - Section on Bayesian Statistical Science
 - Section on Statistical Learning and Data Science
 - Section on Statistics in Epidemiology