Harris Quach

Statistics · PhD Student

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I am a senior PhD student developing dimension reduction methods for statistical applications, such as supervised learning and data visualization. My proficiencies include statistical modelling, estimation and inference, with experiences in generalized linear models, non-parametrics, optimization, simulation-based inference, and machine learning through my research. I am fluent in R, have a working knowledge of C++, and have worked in Python for past projects.

Education

PhD in Statistics, 2016 - Present

The Pennsylvania State University, *3.88/4.0 GPA*

Advisor: Dr. Bing Li, Verne M. Willaman Professor of Statistics

Research Interests: Sufficient Dimension Reduction (SDR)

M.Sc. in Statistics, 2015 - 2016

University of Toronto, *3.93/4.0 GPA*

Research Focus: Composite Likelihood, Simulation-based Inference

M.A. in Economics, 2014 - 2015

University of Toronto, *3.66/4.0 GPA*

Research Focus: Econometric Theory, Higher-Order Likelihood

B.Sc.in Mathematics, 2009 - 2014

University of Toronto, *3.72/4.0 GPA*

Fields of study: Analysis, Mathematical Statistics, Econometrics

Relevant Experience

Research Assistant, The Pennsylvania State University

Jan 2021 - Ongoing

- Working with Dr. Bing Li, Verne M. Willaman Professor of Statistics on sufficient dimension reduction methods for functional data analysis.

Instructor, The Pennsylvania State University

May 2018 - Ongoing

- Instructor of record for Introductory Probability (STAT414 World Campus), Elementary Statistics (STAT200), Elementary Probability (STAT318); develop materials for conducting inverted and conventional lectures

Graduate Student Consultant, The Pennsylvania State University

Spring 2019, Fall 2017

- Advised undergraduate, graduate and faculty researchers at the statistical consulting center;
- Advised projects include: *posterior predictive models for personalized athlete training; variable selection for protein folding; nonlinear regression for errors in chemical processes*

Research Assistant, University of Toronto

Summer 2014, Summer 2016

- Summer 2016: Worked with Dr. Nancy Reid, Canada Research Chair, on Indirect Inference and Approximate Bayesian Computation
- Summer 2014: Worked with Dr. Nancy Reid, Canada Research Chair, on Conditional Inference for air particulate matter

Programming Skills

Proficient: R, LaTeX

Basic: MATLAB, Python, C++ (via Rcpp), Linux, MS Office

Research & Projects

Generalized Forward Sufficient Dimension Reduction

In Process of Submission

R , GLMs, Non-parametrics, Classification, Parallel Computing

- Propose a sufficient dimension reduction method with a focus on ordinal and categorical responses in classification problems.
- Provide some theoretical guarantees on the effectiveness of our proposed method.
- Introduce a novel tuning procedure for sufficient dimension reduction in classification problems.

Forward SDR for Functional Data

2021 - Ongoing

R , Non-parametrics, Functional Data, RKHS

- Exploring extensions of forward regression methods to functional response and predictors.

SDR for Approximate Bayesian Computation

Fall 2018 - Project

R, MCMC, Bayesian and Simulation Inference, Parallel Computing

- Explored using sufficient dimension reduction to construct informative summary statistics, in parallel, for simulated inference and Approximate Bayesian Computation via MCMC.

Optimal Transport for Sufficient Dimension Reduction

Fall 2017 - Project

MATLAB, Copulas

- Explored applying optimal transport methods for remedying distributional violations in applications of inverse regression for sufficient dimension reduction.

Presentations

Generalized Forward SDR for Classification

2021 - March 5

Stochastic Modeling And Computation (SMAC) Seminar. Penn State

Accurate Confidence Intervals for Small Clustered Data

2017

The Annual Statistical Society of Canada Conference. Meeting (Winnipeg, Canada). (Oral Presentation accepted; Masters Work)

Composite Likelihood and Indirect Inference

2016

The 4th Annual Statistical Society of Canada Student Conference. Meeting (St. Catherines, Canada). (Poster Presentation; Masters Work)