Long Wang

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Skills

Programming	Python, R, MATLAB, SQL
Machine Learning	Stochastic Optimization, NNs, Representation Learning, Data Mining
Prob and Stats	MCMC, Bayesian, Nonparametric, Time Series
Leadership	Lead Instructor (3 times w/ 100+ students), Student Rep. (of dept. w/ 200 student)

Education

Johns Hopkins University *Baltimore, MD*

Ph.D. Applied Mathematics and Statistics May 2021

- *Thesis: Advances in System Identification and Stochastic Optimization* (Advisor: James Spall)

M.S.E. Computer Science May 2020

M.S.E. Applied Mathematics and Statistics May 2015

Cornell University *Ithaca, NY*

M.Eng. Financial Engineering, Operations Research and Information Engineering Jan 2014

Michigan State University *East Lansing, MI*

B.A. Finance, Eli Broad College of Business May 2012

- Magna cum laude | Add'l majors: Mathematics, Statistics and Probability

Experience and Projects

Precision Scientific Co., Ltd. *Beijing, China*

Clinical Trial Design May – Aug 2018

- Developed a hierarchical Bayesian model that determines the optimal dosage level based on toxicity and efficacy, and designed an adaptive randomization procedure for implementation in clinical trial
- Built a R Shiny app that allows real-time case collection, data analysis and dosage recommendation

Johns Hopkins University *Baltimore, MD*

Personal Curriculum Planning [JayPath] Jan – May 2020

- Developed a recommendation algorithm that generates the optimal course plans based on time conflicts, prerequisites, graduation requirements, and other user preferences
- Built a web client-server app with a front-end user-interface and a back-end database

Hopkins Program to Individualized Interventional Cardiology [inHealth] May – Aug 2016

- Developed prediction models for cardiovascular disease risk that adapt to individual information
- Built a R package that takes patient data, including clinical, demographic, and lab diagnostics, and computes risk of coronary and artery diseases

Cornell University *Ithaca, NY*

Impact of Option Market Maker's Activity on Stock Prices Sep – Dec 2013

- Developed a methodology to classify option transactions based on the minutely trading data
- Constructed regression models to capture contemporary and predictive effects based on estimated market maker's position, and proposed trading strategies based on the discovered correlations

Selected Publications

Sparse Solution Learning Using Gradient-Free Algorithms [Ongoing]

- Developed orthant-based proximal stochastic gradient-free algorithms for learning sparse solutions
- Performed adversarial attacks on MNIST, CIFAR-10 and ImageNet with L1 regularization

Simultaneous Parameter Learning and Model Selection [Submitted]

- Developed an algorithm that simultaneously learns the optimal model dimension and parameters
- Outperformed EM algorithm in learning Gaussian Mixture model with unknown number of components and standard k-means on clustering single-cell RNA sequence datasets

Optimal Efficiency Gradient-Free Algorithm Using Complex-valued Variables [ACC-in press, CISS-in press]

- Developed a gradient-free stochastic algorithm that uses only one function measurement per iteration
- Improved the rate of convergence of existing gradient-free methods (SPSA) to the optimal rate
- Applied the algorithm in model-free control problems, where the optimal controller is learned without any assumptions on the underlying model

Fast Second-order Stochastic Algorithm [NNLS-2019]

- Developed stochastic algorithms in the SPSA family than improve the per-iteration computational complexity from $O(p^3)$ to $O(p^2)$, which marks the fastest possible second-order stochastic Newton-type algorithms based on estimation of Hessian matrix
- Outperformed first-order methods on training NNs with NASA airfoil self-noise data

Computer Model Calibration and Prediction [JUQ-2018, arXiv-2020]

- Proposed the scaled Gaussian stochastic process (GaSP) that outperforms the predominant L2 and GaSP methods in both calibration and prediction
- Provided a computationally feasible approach in estimating the predictive distribution under the Bayesian paradigm

Data Integration of System with Subsystems [ACC-2017, ACC-2018]

- Developed a statistical model that integrates data from multiple sources to improve estimate accuracy
- Proved the theoretical properties of the maximum likelihood estimator (MLE)
- Applied the algorithm in structural engineering for shear wall reliability estimation and sensor networks for object location detection

Selected Honors and Awards

- Rufus S. Isaacs Graduate Fellowship, Johns Hopkins University 2018 – 2021
- Applied Mathematics and Statistics Research Fellowship, Johns Hopkins University 2019 – 2020
- Charles and Catherine Counselman Fellowship, Johns Hopkins University 2016 – 2017
- Professor Joel Dean Awards for Excellence in Teaching, Johns Hopkins University 2016
- L.C. Plant Scholarship, Michigan State University 2012