Zheng Yuan

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EDUCATION

Duke University, Durham, NC, US — ***August 2018 - May 2020***
Master of Science, Statistical Science — GPA: 3.71/4.00

Nankai University, Tianjin, China — ***August 2014 - July 2018***
Bachelor of Science, Statistics — GPA: 3.80/4.00, Graduated with Honors

Stanford University, CA, US — ***June - August 2017***
Summer Session — GPA: 4.00/4.00

RESEARCH PROJECTS

1. Model Selection through Leave-One-Out Cross Validation (with *Professor* Peter D. Hoff, Master's Thesis)
Department of Statistical Science, Duke University — ***January 2019-present***

- We propose a model selection procedure that combines Bayesian Information Criterion (BIC) with leave-one-out cross validation allowing for a further shrinkage on the dimensions of the model selected by leave-one-out cross validation. Numerical simulations with synthetic data show that the new procedure enjoys stable and better performance in terms of selecting the optimal model when the optimal model is not the largest model and even though the optimal model is sparse.
- We develop a level α hypothesis testing procedure for nested models based on leave-one-out cross validation prediction error which has been proved to possess asymptotically the same power with the optimal F-test under Gaussian linear model cases.
  Github: https://github.com/yzseven/Modified-BIC-Using-LOOCV.git

2. Construction and Inference of Continuous Dynamics Neural Networks (with *Professor* Xiuyuan Cheng)
Department of Mathematics, Duke University — ***June 2019-present***

- Continuous-depth residual networks, like continuous normalizing flows, have constant memory cost, adapt their evaluation strategy to each input, and can explicitly trade numerical precision for speed. We develop new reversible generative models that can train by maximum likelihood, without partitioning or ordering the data dimensions, and that produce a stable result.

3. Identifying Hand Gestures through Myographic Signals via ANN (with MSc Sam Viosin)
Department of Statistical Science, Duke University — ***April 2019***

- We develop a series of adaptive artificial neural networks (ANNs) for predicting hand gestures through nerve impulses detected by sensors placed on the forearms of a series of test subjects. Dimension reduction techniques are also used in the modeling process with models fitted using a subset of the principal components compared to their higher dimension counterparts.

4.Statistical Inference of the Area under the ROC Curve (with *Professor* Ying Wu)
School of Mathematical Sciences, Nankai University — ***September 2017 - June 2018***

- A Receiver Operating Characteristic (ROC) curve may be summarized by the area under it (AUC). This area has an additional interpretation. We proposed several methods of computing the AUC and established a multiple testing procedure based on AUC to make statistical inferences and tested its performance on clinical data sets.

RESEARCH INTERESTS

- Bayesian and frequentist methodology for high-dimensional and complex data
- Shrinkage estimation and model selection
- Low dimensional structure in high dimensional data
- Analysis of iterative algorithms - EM, Variational inference, Gibbs sampler
- Efficient training and inference for deep neural networks

EXPERIENCE

Tianjin Bureau of Statistics, China (Research Internship)
Data Scientist, Information & Service Center ***June - September 2016***

- Spearheaded engagements with a wide array of government agencies (economic, transport, social, agriculture) to analyze their data to support public policy making. Responsibilities included project scoping, data cleaning, visualization, statistical analysis and presentation of results.
- Systematized and tested recruitment frameworks and materials for all roles in the center, including data scientist, quantitative strategist and front-end developer.
- Helped develop centers operating policy for data management and statistical disclosure control.

AWARDS & HONORS

- Outstanding Graduation Thesis Award, Nankai University (2018)
- Junior Study Abroad Scholarship, Nankai University (2017)
- *Responsibility and Capability* Scholarship for Academic and Public Service Excellence, Nankai University (2017)
- The Samsung Undergraduate Scholarship in Statistics and Mathematics, Nankai University (2016)
- The Second Prize Scholarship (top 10%), Nankai University (2015)
- Merit Student, Nankai University (2015-2018)

SELECTED COURSES

Duke University:
- STA 831 Probability and Statistical Models
- STA 732 Statistical Inference
- STA 721 Linear Models
- STA 711 Probability and Measure Theory
- STA 601 Bayesian and Modern Statistics
- STA 561 Probabilistic Machine Learning
- STA 532 Theory of Inference
- STA 523 Statistical Programming
- STA 521 Predictive Modeling
- MATH 532 Basic Analysis II

Stanford University:
- Stats 202 Data Mining and Analysis
- Stats 219 Stochastic Processes
- EE 278 Introduction to Statistical Signal Processing

COMPUTER SKILLS

- **Proficient in:** R, Python, LATEX, R Markdown
- **Familiar with:** Matlab, C++
- **General :** Data Structures, Algorithm, Object Oriented Programming. Experience with the development of large object-oriented program architectures (in R and python).

LANGUAGES

English (fluent), Chinese (native)

LEADERSHIP

- Co-organized *Measure Theory and Statistics Student Seminar, Nankai University*
- Member of *School of Mathematical Sciences Student Committee*, Nankai University

TEACHING&MENTORING

Duke University Statistical Science, Teaching Assistant ***January 2020-May 2020***

Duke University Datathon Competition, Mentor ***November 2019***

Nankai University Math Mentoring, Mentor ***September 2016 - September 2017***