Hanbyul Lee

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Research Interests

Statistical learning, high-dimensional data analysis, missing data, information theory, network analysis, and statistical foundation of privacy

Education

Purdue University — IN, USA
PhD Candidate in Statistics — Aug. 2018 - Present

Seoul National University — Seoul, Korea
MS in Statistics — Mar. 2016 - Feb. 2018
BS in Statistics / BA in Media & Communication — Mar. 2011 - Feb. 2016

Publications

[Published]

"Support Recovery in Sparse PCA with Incomplete Data."
Hanbyul Lee, Qifan Song, Jean Honorio.
Advances in Neural Information Processing Systems (NeurIPS), 2022.
(Poster Presentation)

"On the Fundamental Limits of Exact Inference in Structured Prediction."
Hanbyul Lee, Kevin Bello, Jean Honorio.
IEEE International Symposium on Information Theory (ISIT), 2022.
(Oral Presentation)

"Ensemble of Deep Convolutional Neural Networks for Prognosis of Ischemic Stroke."
Youngwon Choi, Yongchan Kwon, Hanbyul Lee, Beom Joon Kim, Myunghee Cho Paik, and Joong-Ho Won.
International Workshop on Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries, 2017.
(**First place**, **Ischemic Stroke Lesion Segmentation (ISLES) Challenge**)

[Submitted]

"Support Recovery in Sparse PCA with Non-Random Missing Data."
Hanbyul Lee, Qifan Song, Jean Honorio.

[In-Preparation]

"Differentially-Private PCA with Incomplete Data."
Hanbyul Lee, Qifan Song, Jean Honorio, Jordan Awan.

"Matrix Completion with Non-Random Missing Data."
Hanbyul Lee, Qifan Song, Jean Honorio.

Research Experiences

PhD Student Researcher — Department of Statistics, Purdue University
Jan. 2022 - Present — Advisor: Jean Honorio, Qifan Song

- Suggested convex optimization method to solve sparse PCA on incomplete data and provided theoretical and experimental justification

Jan. 2021 - Dec. 2021 — Advisor: Jean Honorio

- Established fundamental limit bounds of exact inference in structured prediction under undirected graphical model

Jan. 2019 - Dec. 2020 Advisor: Faming Liang

- Estimated nonparametric finite mixture of regression models with sparse feed-forward neural networks

Master Student Researcher Department of Statistics, Seoul National University
Aug. 2016 - Feb. 2018 Advisor: Joong-Ho Won

- Developed word2vec model to classify news articles involving economic sentiment or not (Collaborative work with Bank of Korea)
- Studied local quadratic and linear approximation methods for optimization of SCAD-penalized Support Vector Machine (M.Sc. Thesis)
- Developed CNN model for image segmentation to predict post-treatment ischemic stroke

Honors and Awards

CIGP-Lynn Fellowship, Purdue Graduate School, 2018-2019

First place, **Ischemic Stroke Lesion Segmentation (ISLES) Challenge**, 19th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2016

National Scholarship for Science and Engineering, Korea Student Aid Foundation, 2011-2013

Graduate Coursework

- Probability Theory I, II (A+, A+)
- Differential Privacy (A+)
- Hands-On Learning Theory (A+)
- Bayesian Data Analysis (A)
- Stochastic Processes (A)
- Machine Learning in Dynamic System (A)
- Convex Optimization (A)
- Deep Learning in Statistics (A)

Teaching

STAT 301 - *Elementary Statistical Methods*, Purdue Univerisity

Exam Writer Fall 2022 - Spring 2023

Lab TA Fall 2019 - Spring 2022

STAT 519 - *Introduction to Probability Theory*, Purdue Univerisity

Grader Fall 2019

Technical Skills

Fluent `R, Python, MATLAB`
Moderate `C, SAS`