Jianliang He

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RESEARCH INTEREST

Large-scale Multiple Testing, High-dimensional Statistics, Reinforcement Learning Theory, Distribution-free Inference, In-Context Learning

EDUCATION

Fudan University, Shanghai 2020.9 - Present

Bachelor of Statistics

Department of Statistics and Data Science, School of Management

Core courses: Nonparametric, Statistical inference, Time series analysis, Linear regression, Stochastic process, Categorical data analysis, Multivariate analysis, Optimization, Econometric (Graduate).

PUBLICATION & PREPRINT

* stands for the alphabetical order or equal contribution.

1. Trambak Banerjeea*, Bowen Gang*, and **Jianliang He***. "Harnessing Collective Wisdom: Integrative Multiple Testing Using Binary Decision Sequences"(2023). Submitted to *Proceedings of the National Academy of Sciences*. arXiv:. Under review.

2. **Jianliang He**, Han Zhong, Zhuoran Yang. "Provable Generalized Function Approximation in Infinite-horizon Average-reward MDPs"(2023). Manuscript.

RESEARCH EXPERIENCE

Machine Learning Theory: Model Merging 2023.7 - Present

Research Intern, advised by Prof. Bowen Gang *Fudan University*

Reinforcement Learning Theory 2023.2 - Present

Research Intern, advised by Prof. Zhuoran Yang *Yale University*

† **General function approximation for average-reward RL**

- Propose novel complexity measures for model-free or model-based model under average-reward RL and develop algorithm FLOP with provable regret based on generalized lazy update strategy.
- Extend numerous existed function classes from episodic setting into average-reward one and demonstrate that these can all be captured through the proposed complexity measure.

† **LLM4Decision: Goal-Orianted RL**

Large-scale Multiple Testing: Synthesization and Integretation 2022.7 - Present

Research Intern, advised by Prof. Bowen Gang *Fudan University*

† **Large-scale Testing with Multiple Covariates**

- Estimate the conditional local false discovery rate (Clfdr) by implementing a deconvolution method, which invloves features extracted from multiple covariates through kernel PCA;
- Develop a mirror sequence filter for distribution-free false discovery rate (FDR) control based on pre-determined assessor to accommodate sophisticated scenarios with arbitrary estimators.

† **Integrative Multiple Testing**

- Provide a general framework to aggregate information from different agents with binary decisions, testing number and control levels, through the aggregated e-values.
- Construct local evidence for most popular multiple testing procedures to fit in the framework.

PROJECTS

Gene Regulatory Network Inference with Graphical Causality 2022.1-2022.10

Group Leader, technical Report, advised by Prof. Qinfeng Xu *Fudan University*

- Construct the gene regulatory network model using Bayesian model averaging. Introduce graphical causality relationship to justify the estimated edges obtained from KBoost algorithm;
- Outperform existing methods on the DREAM4 dataset with higher AUROC and AUPR scores and demonstrate the effectiveness in real gene expression data.

HONOR & FELLOWSHIPS

Research Grant of ¥10,000 (2022), ¥7,500 (2023), FDUROP 2022-2023

Outstanding Award, Fudan Undergraduate Research Opportunity Program (FDUROP) 2023

3^{rd} place, Group leader, International S&P Global Valuation Competition 2021

Third-class Scholarship for Outstanding Students, Fudan University 2021

TEACHING

Teaching Assistant, MANA130083.01 Nonparametric, Fudan University Spring 2022-2023

SKILLS & OTHERS

Programming: Python, R, Matlab, SQL, C/C++;
Language: Chinese, English (GRE score: 159+169+3.5);
Finance: Financial Modeling, Software (Capital IQ, Wind, etc.);
Interest: Photography, Texas Holdem.