Jianliang He

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RESEARCH INTERESTS

Statistical Machine Learning, Multiple Hypothesis Testing & Distribution-free inference.

EDUCATION

Fudan University, Shanghai 2020.9 - Present

B.S. in Statistics, School of Management.

PUBLICATIONS AND PREPRINTS

1. **He, J.**, Zhong, H., Yang, Z. (2024). "Sample-Efficient Learning of Infinite-Horizon Average-Reward MDPs with General Function Approximation". *International Conference on Learning Representations (ICLR).*
2. Banerjeea, T.*, Gang, B.*, **He, J.***. "Harnessing the Collective Wisdom: Fusion Learning using Decision Sequences from Diverse Sources" (2023). Under R&R at *Journal of the Royal Statistical Society, Series B (Statistical Methodology).* arXiv:2308.11026 [stat.ME].
3. "Large Language Model for Hierarchical Planning" (2024). with Chen, S., Zhang, F., Yang, Z.. In Submissian to *International Conference on Machine Learning (ICML).*

W1. "Large-scale Multiple Testing with Side Information" with Banerjeea, T., Gang, B.. *In progress.*

RESEARCH EXPERIENCE

Reinforcement Learning Theory 2023.2 - Present

Independent Research, Advisor: Prof. Zhuoran Yang Yale University

- General Function Approximation for Infinite-horizon Average-reward MDPs

- Introduced average-reward generalized eluder coefficients (AGEC) as complexity measures for AMDP problems in general function approximation, capturing almost all existing tractable AMDPs.
- Developed a novel unified algorithm—LOOP to solve both value-based and model-based problems in AMDPs, featuring a unique confidence set construction and a low-switching policy update scheme.

- Large Language Model for Hierarchical Planning

- Proposed a Planner-Actor-Reporter system to provide a general theoretical analysis framework for LLMs-empowered task planning. Demonstrated that LLMs planned via Bayesian Aggregated imitation learning.

Large-Scale Multiple Testing 2022.7 - Present

Independent Research, Advisor: Prof. Bowen Gang Fudan University

- Large-Scale Testings with Multiple Covariates

- Developed a mirror sequence filter to achieve valid false discovery rate (FDR) control beyond requirment of consistent estimators for effective error rate control in complex scenarios with multiple covariates.
- Presented a nonparametric estimation of conditional local false discovery rate (Clfdr) using a deconvolution approach, bulit upon features extracted from covariates using kernel PCA as the external feature decoder;

- Integrative Multiple Testing

- Proposed Integrative Ranking and Thresholding (IRT) framework to aggregate testing results from diverse sources, ensuring FDR control in the presence of heterogeneities (e.g control rate/method) across sources.

- Pioneered in constructing nonparametric decision-based evidence indices, measuring evidence against corresponding null hypotheses, which are generalized e-values and facilitate error rate control via e-BH procedure.

Gene Regulatory Network Inference 2022.1 - 2022.10
Independent Research, Advisor: Prof. Qinfeng Xu Fudan University

- Constructed gene regulatory network (GNR) using Bayesian model averaging (BMA). Introduced a graphical causality based approach to justify the regulatory relationship obtained from the standard KBoost approach.

HONORS AND FELLOWSHIPS

First Prize Scholarship for Outstanding Students (Top 1%), Fudan University 2022 - 2023
Research Grant of ¥10,000 (2022), ¥7,500 (2023), FDUROP 2022 - 2023
Outstanding Award, Fudan Undergraduate Research Opportunity Program (FDUROP) 2022
3^{rd} place, Group leader, International S&P Global Valuation Competition 2021

TEACHING

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

SKILLS & INTERESTS

Programming: Python, R, Matlab, SQL, C/C++, LaTeX.
Languages: Chinese (Native), English (GRE score: 159+169+3.5, TOFEL: 104).
Finance: Financial Modeling, Software (Capital IQ, Wind, etc.).
Interests: Photography, Texas Holdem.

Latest update: January 23, 2024.