PENGZHAN GUO

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RESEARCH INTERESTS

Parallel Computing, Stochastic Optimization, Data Mining, Machine Learning and their applications.

ACADEMIC POSITION

Assistant Professor *July 2022 - Present*
Data Science, Duke Kunshan University.

EDUCATION

Stony Brook University, Stonybrook *Nov 2018 - Nov 2021*
Ph.D. in Applied Mathematics & Statistics. Overall GPA: 3.87/4.0
Stony Brook University, Stonybrook *Aug 2017 - Dec 2018*
M.S. in Applied Mathematics & Statistics. Overall GPA: 4.0/4.0
Suzhou University of Science and Technology, Suzhou *Aug 2013 - Jun 2017*
B.S. in Applied Mathematics and Statistics. Overall GPA: 3.6/4.0

RESEARCH GRANTS

National Natural Science Foundation of China (Young People, PI) *2025-27*
Kunshan Supercomputing Center Grant *2022-Present*
DKU Zuchongzhi Center Grant *2022-23*
DKU Start-up Grant *2022-24*

AWARDS AND HONORS

Best Paper Award for TMC21, award for the best research paper in the conference *2021*
Travel Award for ICDM19, award for accepted conference presentations *2019*
IACS Travel Scholarship, providing up to $2000 for outstanding researchers *2019*
Chinese National Scholarship, academic excellence *2016*

RESEARCH PROJECT

My research project is including methodology and applications in machine learning and data mining.

Methodology in Machine Learning and Data Mining
Weighted Aggregating Stochastic Gradient Descent for Parallel Deep Learning

- Investigated the stochastic optimization problem for deep learning to enable introduction of a scalable parallel computing algorithm under Tensorflow.
- Reformulated the objective function for the stochastic optimization and designing efficient parallel communication rule.

Applications in Machine Learning and Data Mining
Long-term Career Path Recommendation

- Designed a case-based framework combined with reinforcement learning and Markov Chain method to find the long-term career path under different situations.
- Achieved reasonable and stable performance on big data in real world.

Dynamic Taxi Route Recommendation

- Applied a self-check mechanism in traditional reinforcement learning method, theoretically and numerically prove the efficiency of the method.
- Deployed a deep neural network to enable the model ability to automatically adjust the parameter based on real situation.

PUBLICATIONS

Journal and Conference ranking: The ranking was created by the Australian Computing Research and Education Association (CORE). A, A, B, C, and other, where A* is the best.*

Conference Paper

———————————————————***Under Review***———————————————————

- **Pengzhan Guo**, Keli Xiao and Jingyuan Yang. 2024. LLM-Enhanced Reinforcement Learning with Performance-Aware Adaptive Exploration. ***In Submission to ICDM2024***. (Core Ranking: A*)
- **Pengzhan Guo**, Keli Xiao and Jingyuan Yang. 2024. Long-Term Decision-Making for Social Benefit: A Performance-Weighted multi-agent Reinforcement Learning Approach. ***In Submission to The 34th WORKSHOP ON INFORMATION TECHNOLOGIES AND SYSTE 2024***.

———————————————————***Published***———————————————————

- **Pengzhan Guo**, Keli Xiao, Hengshu Zhu and Qingxin Meng. 2023. Preference-Constrained Career Path Optimization: An Exploration Space-Aware Stochastic Model. In ***Proceedings of the 23rd IEEE International Conference on Data Mining (ICDM 2023)***, IEEE, Shanghai, China, 120-129. (Core Ranking: A*)
- **Pengzhan Guo**, Zeyang Ye and Keli Xiao. 2019. A Weighted Aggregating SGD for Scalable Parallelization in Deep Learning. In ***Proceedings of the 19th IEEE International Conference on Data Mining (ICDM 2019)***, IEEE, Beijing, China, 1072-1077. (Core Ranking: A*)

Journal Paper

———————————————————***Under Review***———————————————————

- **Pengzhan Guo**, Keli Xiao and Qingxin Meng. 2024. Preference-Constrained Career Path Optimization: An Exploration Space-Aware Stochastic Model. ***In Submission to IEEE Transactions on Knowledge and Data Engineering (TKDE)***. (Core Ranking: A*)
- **Pengzhan Guo** Zeyang Ye and Keli Xiao. 2024. An Integrated Theory and Solution for the Decision Point Recommendation Challenge. ***IEEE Transactions on Knowledge and Data Engineering (TKDE)***(Core Ranking: A*).
- **Pengzhan Guo**, Keli Xiao and Jingyuan Yang. 2024. Adaptive Performance-Weighted Multi-Agent Reinforcement Learning for Decision Points Recommendation. ***In Submission to Management Science***. (UTD 24)

———————————————————***Published***———————————————————

- **Pengzhan Guo** and Keli Xiao. 2024. From Efficiency to Equity: A Multi-User Paradigm in Mobile Route Optimization. ***Electronic Commerce Research and Applications***(Accepted, Impact Factor: 5.9).
- **Pengzhan Guo**, Keli Xiao, Zeyang Ye, Hengshu Zhu and Wei Zhu. 2022. Intelligent Career Planning via Stochastic Subsampling Reinforcement Learning. ***Scientific Reports (SR)***, *Accepted*. (Impact Factor: 4.379)
- **Pengzhan Guo**, Keli Xiao, Zeyang Ye and Wei Zhu. 2021. Route Optimization via Environment-Aware Deep Network and Reinforcement Learning. ***ACM Transactions on Intelligent Systems and Technology (TIST)***. (Impact Factor: 4.654)
- **Pengzhan Guo**, Zeyang Ye, Keli Xiao and Wei Zhu. 2020. Weighted Aggregating Stochastic Gradient Descent for Parallel Deep Learning. ***IEEE Transactions on Knowledge and Data Engineering (TKDE)***. (Core Ranking: A*; Impact Factor: 6.977)
- **Pengzhan Guo** and Hailin Jin. 2017. Groemer Wallen Measure of Asymmetry for Reuleaux Polygons. ***Journal of Geometry***, Springer, 879-884. (Impact Factor: 0.85)

RESEARCH TALKS

- P. Guo, Suzhou Area Youth Mathematicians 4th Annual Workshop, "Career Path Recommendation," Suzhou. (October 2023).
- P. Guo, The 2023 ACM SIGKDD Conference (Session: The 4th International Workshop on Talent and Management Computing), "Preference-Constrained Career Path Recommendation: A Stochastic Search Method," Online. (August 2023).
- P. Guo, The 2021 ACM SIGKDD Conference (Session: International Workshop on Talent and Management Computing), "Customizable Long-Term Career Path Recommendation: A Stochastic Search Method," Online. (August 2021).
- P. Guo, Stony Brook University College of Business Research Seminar, "Intelligent Career Planning," Online. (April 2021).
- P. Guo, The 2020 INFORMS Annual Meeting (Session: Data Science Workshop), "Customizable Career Path Recommendation with Multi-Criteria Stochastic Optimization," Online. (November 2020).
- P. Guo, Stony Brook University Applied Mathematics & Statistics Joint QF-STAT PhD Webinars, "Customizable Career Path Recommendation with Multi-Criteria Stochastic Optimization," Online. (October 2020).
- P. Guo, The 2019 IEEE International Conference on Data Mining (Session: Distributed & High Performance Data Mining), "A Weighted Aggregating SGD for Scalable Parallelization in Deep Learning," IEEE, Beijing, China. (November 2019).

PROFESSIONAL ACTIVITIES

Journal Article Review

- **IEEE Access**
- **PeerJ Computer Science**
- **Electronic Commerce Research and Applications**
- **IEEE Transactions on Neural Networks and Learning Systems (TNNLS)**
- **IEEE Transactions on Knowledge and Data Engineering (TKDE)**

Conference Paper Review

- **SIGIR**: The 46th International ACM SIGIR Conference on Research and Development in Information Retrieval (2022, 2023)
- **KDD**: ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (2021, 2020)
- **ICDM**: IEEE International Conference on Data Mining (2021, 2020)
- **CIKM**: ACM International Conference on Information and Knowledge Management (2022, 2021, 2020)
- **WSDM**: ACM International Conference on Web Search and Data Mining (2021)

SKILLS

Programming languages Python, Matlab, C, C++, R, SAS, LaTex