

吕沈欢



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教育经历

南京大学，计算机科学与技术系，直博
导师：周志华 教授 2017.09–2022.12

中国科学技术大学，统计系，学士
保研免试进入南京大学计算机系直接攻博 2013.09–2017.06

研究兴趣

我目前的研究兴趣主要包括深度学习理论。具体地说，我对以下研究方向感兴趣：

- 深度森林**：主要关注深度森林所涉及的一些结构和部件的理论分析，并通过这些分析启发新型深度森林算法设计
- 深度神经网络**：主要关注深度神经网络的过参数化现象，从理论上解释过参数化和过拟合风险之间的关系

项目情况

主持国家自然科学基金青年基金项目 2024.01–2026.12
“面向特征变化的深度森林理论方法研究” (62306104)

主持中国博士后科学基金特别资助 (站前) 2022.12–2024.11
“特征增广机制下的不可微深度学习理论研究” (2023TQ0104)

参与国家自然科学基金创新群体项目 2020.01–2024.12
“面向开放动态环境的机器学习” (61921006)

参与国家自然科学基金重点项目 2017.01–2021.12
“新型深度学习模型与方法的研究” (61751306)

参与科技部国家重点研发计划“云计算与大数据”专项项目 2018.05–2021.04
“大数据分析的理论基础和技术方法” (2018YFB1004300)

发表论文

- [1] [Shen-Huan Lyu](#), Yi-Xiao He, and Zhi-Hua Zhou. Depth is More Powerful than Width in Deep Forest. In: Advances in Neural Information Processing Systems 35 (**NeurIPS'22**), pp. 29719-29732, New Orleans, Louisiana, US, 2022. (**CCF A**, 本文被评为 **Oral**)
- [2] [Shen-Huan Lyu](#), Liang Yang, and Zhi-Hua Zhou. A Refined Margin Distribution Analysis for Forest Representation Learning. In: Advances in Neural Information Processing Systems 32 (**NeurIPS'19**), pp. 5531-5541, Vancouver, British Columbia, CA, 2019. (**CCF A**)
- [3] [Shen-Huan Lyu](#), Lu Wang, and Zhi-Hua Zhou. Improving Generalization of Deep Neural Networks by Leveraging Margin Distribution. **Neural Networks**, 151: 48-60, 2022. (**中科院 1 区 & CCF B**)
- [4] [Shen-Huan Lyu](#), Yi-He Chen, and Zhi-Hua Zhou. A Region-based Analysis for Feature Concatenation in Deep Forests. **Chinese Journal of Electronics**, 31(6):1072-1080, 2022. (**CCF A**)
- [5] 吕沈欢, 陈一赫, 姜远. 基于交互特征的多标记深度森林.《**软件学报**》, 35(4):1934-1944, 2024. (**CCF A**)
- [6] Yu-Chang Wu, [Shen-Huan Lyu](#), Haopu Shang, Xiangyu Wang, and Chao Qian. Confidence-aware Contrastive Learning for Selective Classification. In: Proceedings of the 41st International Conference on Machine Learning (**ICML'24**), in press, 2024. (**CCF A**)
- [7] Yi-Xiao He, Dan-Xuan Liu, [Shen-Huan Lyu](#), Chao Qian, and Zhi-Hua Zhou. Multi-Class Imbalance Problem: A Multi-Objective Solution. **Information Sciences**, in press, 2024. (**中科院 1 区 & CCF B**)
- [8] Yi-He Chen, [Shen-Huan Lyu](#), and Yuan Jiang. Improving Deep Forest by Exploiting High-order Interactions. In: Proceedings of the 21st IEEE International Conference on Data Mining (**ICDM'21**), pp. 1030-1035, Auckland, NZ, 2021. (**CCF B**)
- [9] Yi-Xiao He, [Shen-Huan Lyu](#), and Yuan Jiang. Interpreting Deep Forest through Feature Contribution and MDI Feature Importance. **ACM Transactions on Knowledge Discovery from Data**, 2024. (**CCF B**)
- [10] Qin-Cheng Zheng, [Shen-Huan Lyu](#), Shao-Qun Zhang, Yuan Jiang, and Zhi-Hua Zhou. On the Consistency Rate of Decision Tree Learning Algorithms. In Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (**AISTATS'23**), pp. 7824-7848, Valencia, ES, 2023. (**CCF C**)

投稿论文

- [11] [Shen-Huan Lyu](#), Yi-Xiao He, and Baoliu Ye. BODTs: Boosted Oblique Decision Trees via Feature Concatenation. under review.
- [12] Shen-Huan Lyu, Jin-Hui Wu, Qin-Cheng Zheng, and Baoliu Ye. Depth is More Powerful than Tree Size and Width in Forests. under review.
- [13] Qin-Cheng Zheng, Shao-Qun Zhang, [Shen-Huan Lyu](#), and Zhi-Hua Zhou. Theoretical Investigation on Inductive Bias of Isolation Forest. under review.
- [14] Wenxuan Zhou, Zhihao Qu, Shen-Huan Lyu, Miao Cai, and Baoliu Ye. Mask-Encoded Sparsification: Overcoming Biased Gradients for Communication-Efficient Split Learning. under review.

学术服务

国际学术会议程序委员会成员 (Program Committee Member):

- ICML: 2021-2024
- NeurIPS: 2020-2024
- AAAI: 2019, 2022, 2023
- IJCAI: 2020-2024
- ICLR: 2021, 2023
- AISTATS: 2019, 2022

国际学术期刊审稿人 (Reviewer):

- Artificial Intelligence (AIJ)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- ACM Transactions on Knowledge Discovery from Data (TKDD)
- Machine Learning
- Neural Networks

荣誉奖励

- [1] 中国博士后科学基金第 5 批特别资助, 北京, 2023
- [2] 江苏省人工智能学会优博, 南京, 2023
- [3] 江苏省卓越博士后计划, 南京, 2023
- [4] 南京市人工智能产业人才兴智计划奖学金, 南京, 2019
- [5] 南京大学研究生学业奖学金 一等奖, 南京, 2017-2019
- [6] 南京大学博士新生校长奖学金, 南京, 2017
- [7] 南京大学研究生英才奖学金 二等奖, 南京, 2022
- [8] 中国科学技术大学优秀学生奖学金 银奖, 合肥, 2014, 2016