吕沈欢

河海大学计算机与软件学院

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教育经历

南京大学，计算机科学与技术系，直博　　*2017.09–2022.12*

导师：周志华 教授

中国科学技术大学，统计系，学士　　*2013.09-2017.06*

保研免试进入南京大学计算机系直接攻博

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] Shen-Huan Lyu, Jin-Hui Wu, Qin-Cheng Zheng, and Baoliu Ye. The Role of Depth, Width, and Tree Size in Expressiveness of Deep Forest. In: Proceedings of the 27th European Conference on Artificial Intelligence **(ECAI'24)**, in press, 2024. **(CCF B)**

[7] 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**)

[8] 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**)

[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**, in press, 2024. (**CCF B**)

[10] Wenxuan Zhou, Zhihao Qu, Shen-Huan Lyu, Miao Cai, and Baoliu Ye. Mask-Encoded Sparsification: Overcoming Biased Gradients for Communication-Efficient Split Learning. In: Proceedings of the 27th European Conference on Artificial Intelligence **(ECAI'24)**, in press, 2024. **(CCF B)**

[11] 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**)

[12] Yanyan Wang, Jia Liu, Shen-Huan Lyu, Zhihao Qu, Bin Tang, and Baoliu Ye. Identifying Key Tag Distribution in Large-Scale RFID Systems. In: IEEE/ACM 32nd International Symposium on Quality of Service (**IWQoS'24**), in press, 2024. (**CCF B**)

[13] 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**)

[14] Guangfei Qi, Zhihao Qu, Shen-Huan Lyu, Ninghui Jia, and Baoliu Ye. Personalized Federated Learning with Feature Alignment via Knowledge Distillation. In: Proceedings of

the 21st Pacific Rim International Conference on Artificial Intelligence **(PRICAI'24)**, in press, 2024. **(CCF C)**

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] 香江学者计划，北京，2024
[2] 江苏省青年科技人才托举工程，南京，2024
[3] 中国博士后科学基金第 5 批特别资助，北京，2023
[4] 江苏省人工智能学会优博，南京，2023
[5] 江苏省卓越博士后计划，南京，2023
[6] 南京市人工智能产业人才兴智计划奖学金，南京，2019
[7] 南京大学研究生学业奖学金 一等奖，南京，2017-2019
[8] 南京大学博士新生校长奖学金，南京，2017