Shen-Huan LYU │ Ph.D.

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Education

2017 - 2022: **Nanjing University (NJU)**

Ph.D. in Computer Science

Department of Computer Science & Technology

Supervisor: Prof. Zhi-Hua Zhou

2013 - 2017: **University of Science and Technology of China (USTC)**

B.Sc. in Statistics

Department of Statistics

Research Interests

My current research interests mainly include Machine Learning and Data Mining. More specifically, I am interested in the following topics:
- **Ensemble Learning**
- **Learning Theory and Optimization**

Publications

*: Equal Contribution

Conference Papers

[ICML 2024]: 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)**

[AISTATS 2023]: 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 22nd International Conference on Artificial Intelligence and Statistics (AISTATS'23)**, pp. 7824-7848, Valencia, ES, 2023. **(CCF C)**

[NeurIPS 2022]: **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, US, 2022. **(CCF A, Oral)**

[ICDM 2021]: Yi-He Chen*, **Shen-Huan Lyu***, and Yuan Jiang. Improving Deep Forest by Exploiting High-order Interactions. In: **Proceedings of the 21th IEEE International Conference on Data Mining (ICDM'21)**, pp. 1030-1035, Auckland, NZ, 2021. **(CCF B)**

[NeurIPS 2019]: **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, CA, 2019. **(CCF A)**

Journal Papers

[JOS 2024]: **Shen-Huan Lyu**, Yi-He Chen, and Zhi-Hua Zhou. Interaction Representations Based Deep Forest Method in Multi-Label Learning. **Journal of Software**, 35(4):1934-1944, 2024. **(CCF A in Chinese)**

[TKDD 2024]: 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)**

[ISJ 2024]: 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. **(CAS Q1 & CCF B)**

[NNJ 2022]: **Shen-Huan Lyu**, Lu Wang, and Zhi-Hua Zhou. Improving Generalization of Neural Networks by Leveraging Margin Distribution. **Neural Networks**, 151:48-60, 2022. **(CAS Q1 & CCF B)**

[CJE 2022]: **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 in Chinese)**

Preprints

[Draft]: **Shen-Huan Lyu**, Yi-Xiao He, Baoliu Ye. BODTs: Boosted Oblique Decision Trees via Feature Concatenation. under review.

[Draft]: **Shen-Huan Lyu**, Jin-Hui Wu, Qin-Cheng Zheng, Baoliu Ye. The Role of Depth, Width, and Tree Size in Expressiveness of Deep Forest. under review.

[Draft]: Qin-Cheng Zheng, Shao-Qun Zhang, **Shen-Huan Lyu**, Zhi-Hua Zhou. Theoretical Investigation on Inductive Bias of Isolation Forest. under review.

Academic Service

Program Committee Member of Conferences:
- ICML: 2021 - 2024
- NeurIPS: 2020 - 2024
- AAAI: 2019, 2022, 2023
- IJCAI: 2020 - 2024
- ICLR: 2021, 2023
- AISTATS: 2019, 2022

Reviewer of Journal:
- Artificial Intelligence (AIJ)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- 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 (MLJ)

Honors and Awards

[1]: Excellent Doctoral Dissertation of Jiangsu Artificial Intelligence Society, Jiangsu, 2023.

[2]: Artificial Intelligence Scholarship in Nanjing University, Nanjing, 2019.

[3]: Presidential Special Scholarship for first-year Ph.D. Student in Nanjing University, Nanjing, 2017.

[4]: The Second Class Academic Scholarship in Nanjing University, Nanjing, 2020.

[5]: The University Silver Prize Scholarship for Excellent Student in University of Science and Technology of China, Hefei, 2014-2016.

Teaching Assistant

[1]: C++ Programming. (With Prof. Hao Hu; For Undergraduate Students, Spring, 2019)

[2]: LAMDA Machine Learning Summer Seminar. (For New Students in LAMDA, Summer, 2018)

[3]: Introduction to Machine Learning. (With Prof. Zhi-Hua Zhou; For Undergraduate Students, Spring, 2018)

[4]: LAMDA-1 Theory Seminar. (Topics: Forest Theory, Neural Network Theory, Generalization Theory, and Diversity; For Students in LAMDA-1, Spring, 2022)