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🌐 <https://scholar.google.com/citations?user=JkOe0rEAAAAJ>

💻 Research Interests: Machine Learning, Data Mining, Pattern Recognition



Employment History

- 2024 – Present 📚 **Associate Professor**, Nanjing University of Aeronautics and Astronautics.

Education

- 2019 – 2024 📚 **Ph.D., Southeast University.**
Major: Software Engineering. Supervisor: Prof. Xin Geng.
- 2016 – 2019 📚 **M.Sc., China University of Mining and Technology.**
Major: Computer Application Technology. Supervisor: Prof. Shifei Ding.
- 2012 – 2016 📚 **B.Sc., China University of Mining and Technology.**
Major: Information Security.

Awards

- 2025 📚 Outstanding Doctoral Dissertation. Southeast University, 2025.
- 2024 📚 Science and Technology Award (Second Prize), Jiangsu Information Technology Application Society, 2024.
📘 High-impact paper. China National Knowledge Infrastructure (CNKI), 2024.
- 2019 📚 Outstanding Master's Thesis Nomination. Jiangsu Association of Artificial Intelligence, 2019.

Academic Services

- Editorial Board 📚 Scientific Reports.
- Guest Editor 📚 Electronics, Frontiers in Artificial Intelligence, Frontiers in Big Data.
- Journal Reviewer 📚 TKDE, TMM, TCYB, TOMM, RA-L, IET-IPR, MLJ, DMKD, KAIS, FCS, etc.
- Conference Reviewer 📚 NeurIPS, ICML, ICLR, CVPR, ICCV, ECCV, AAAI, IJCAI, KDD, ACM MM, etc.

Selected Publications

Journal Articles

- 1 Y. An, H. Xue, **X. Zhao**, N. Xu, P. Fang, and X. Geng, “Leveraging bilateral correlations for multi-label few-shot learning,” *IEEE Transactions on Neural Networks and Learning Systems*, vol. 36, no. 4, pp. 6816–6828, 2025. DOI: 10.1109/TNNLS.2024.3388094.
- 2 **X. Zhao**, Y. An, L. Qi, and X. Geng, “Scalable label distribution learning for multi-label classification,” *IEEE Transactions on Neural Networks and Learning Systems*, vol. 36, no. 7, pp. 13 232–13 246, 2025. DOI: 10.1109/TNNLS.2024.3475469.
- 3 **X. Zhao**, Y. An, N. Xu, L. Qi, and X. Geng, “Interactive fusion label enhancement for multi-label learning,” *ACM Transactions on Knowledge Discovery from Data*, vol. 19, no. 7, 142:1–142:23, 2025. DOI: 10.1145/3744571.

- 4 X. Zhao, L. Qi, Y. An, and X. Geng, "Delving into generalizable label distribution learning," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 47, no. 10, pp. 8708–8724, 2025. DOI: 10.1109/TPAMI.2025.3581552.
- 5 X. Zhao, Y. An, N. Xu, and X. Geng, "Variational continuous label distribution learning for multi-label text classification," *IEEE Transactions on Knowledge and Data Engineering*, vol. 36, no. 6, pp. 2716–2729, 2024. DOI: 10.1109/TKDE.2023.3323401.
- 6 Y. An, H. Xue, X. Zhao, and J. Wang, "From instance to metric calibration: A unified framework for open-world few-shot learning," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 45, no. 8, pp. 9757–9773, 2023. DOI: 10.1109/TPAMI.2023.3244023.
- 7 X. Zhao, Y. An, N. Xu, and X. Geng, "Continuous label distribution learning," *Pattern Recognition*, vol. 133, p. 109 056, 2023. DOI: 10.1016/J.PATCOG.2022.109056.
- 8 N. Zhang, S. Ding, J. Zhang, and X. Zhao, "Robust spike-and-slab deep boltzmann machines for face denoising," *Neural Computing and Applications*, vol. 32, no. 7, pp. 2815–2827, 2020. DOI: 10.1007/S00521-018-3866-6.
- 9 W. Bian, S. Ding, N. Zhang, J. Zhang, and X. Zhao, "Combined filtering and dbm reconstructing for fingerprint enhancement," *Journal of Software*, vol. 30, no. 6, pp. 1886–1900, 2019. DOI: 10.13328/j.cnki.jos.005421.
- 10 S. Ding, P. Du, X. Zhao, Q. Zhu, and Y. Xue, "BEMD image fusion based on PCNN and compressed sensing," *Soft Computing*, vol. 23, no. 20, pp. 10 045–10 054, 2019. DOI: 10.1007/S00500-018-3560-8.
- 11 S. Ding, W. Du, X. Zhao, L. Wang, and W. Jia, "A new asynchronous reinforcement learning algorithm based on improved parallel PSO," *Applied Intelligence*, vol. 49, no. 12, pp. 4211–4222, 2019. DOI: 10.1007/S10489-019-01487-4.
- 12 S. Ding, X. Zhao, X. Xu, T. Sun, and W. Jia, "An effective asynchronous framework for small scale reinforcement learning problems," *Applied Intelligence*, vol. 49, no. 12, pp. 4303–4318, 2019. DOI: 10.1007/S10489-019-01501-9.
- 13 S. Ding, X. Zhao, J. Zhang, X. Zhang, and Y. Xue, "A review on multi-class TWSVM," *Artificial Intelligence Review*, vol. 52, no. 2, pp. 775–801, 2019. DOI: 10.1007/S10462-017-9586-Y.
- 14 N. Zhang, S. Ding, J. Zhang, and X. Zhao, "Deep belief network based on noisy data and clean data," *Journal of Software*, vol. 30, no. 11, pp. 3326–3339, 2019. DOI: 10.13328/j.cnki.jos.005574.
- 15 X. Zhao, S. Ding, Y. An, and W. Jia, "Applications of asynchronous deep reinforcement learning based on dynamic updating weights," *Applied Intelligence*, vol. 49, no. 2, pp. 581–591, 2019. DOI: 10.1007/S10489-018-1296-X.
- 16 S. Ding, X. Zhao, H. Xu, Q. Zhu, and Y. Xue, "NSCT-PCNN image fusion based on image gradient motivation," *IET Computer Vision*, vol. 12, no. 4, pp. 377–383, 2018. DOI: 10.1049/IET-CVI.2017.0285.
- 17 X. Zhao and S. Ding, "Research on deep reinforcement learning," *Computer Science*, vol. 45, no. 7, pp. 1–6, 2018. DOI: 10.11896/J.ISSN.1002-137X.2018.07.001.
- 18 X. Zhao, S. Ding, Y. An, and W. Jia, "Asynchronous reinforcement learning algorithms for solving discrete space path planning problems," *Applied Intelligence*, vol. 48, no. 12, pp. 4889–4904, 2018. DOI: 10.1007/S10489-018-1241-Z.

Conference Proceedings

- 1 Y. An, X. Zhao, and H. Xue, "Learning to learn from corrupted data for few-shot learning," in *Proceedings of the International Joint Conference on Artificial Intelligence, Macao, China, 2023*, pp. 3423–3431. DOI: 10.24963/IJCAI.2023/381.

- 2 X. Zhao, Y. An, N. Xu, J. Wang, and X. Geng, "Imbalanced label distribution learning," in *Proceedings of the AAAI Conference on Artificial Intelligence, Washington, DC, USA, 2023*, pp. 11 336–11 344. DOI: 10.1609/AAAI.V37I9.26341.
- 3 X. Zhao, L. Qi, Y. An, and X. Geng, "Generalizable label distribution learning," in *Proceedings of the ACM International Conference on Multimedia, Ottawa, Ontario, Canada, 2023*, pp. 8932–8941. DOI: 10.1145/3581783.3611693.
- 4 X. Zhao, Y. An, N. Xu, and X. Geng, "Fusion label enhancement for multi-label learning," in *Proceedings of the International Joint Conference on Artificial Intelligence, Vienna, Austria, 2022*, pp. 3773–3779. DOI: 10.24963/IJCAI.2022/524.
- 5 Y. An, H. Xue, X. Zhao, and L. Zhang, "Conditional self-supervised learning for few-shot classification," in *Proceedings of the International Joint Conference on Artificial Intelligence, Montreal, Quebec, Canada, 2021*, pp. 2140–2146. DOI: 10.24963/IJCAI.2021/295.