Aoran Wang

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Education

University of Luxembourg — Esch-sur-Alzette, Luxembourg
PhD in Computer Science (Focus: Machine Learning for Dynamical Systems) — *Dec. 2020 – Nov. 2024*

Karlsruhe Institute of Technology — Karlsruhe, Germany
Master of Science (Major: Autonomous Driving); GPA: 3.9/4.0 — *Oct. 2015 – Sep. 2019*

Tongji University — Shanghai, China
Bachelor of Engineering (Major: Structural Mechanics); GPA: 3.9/4.0 — *Sep. 2011 – Jun. 2015*

Skills

Languages: Python (advanced), C/C++ (advanced), HTML/CSS, MATLAB, Visual Basic, LaTex.

Developer Tools: Linux, Git, Docker, Google Cloud Platform, VS Code, Visual Studio, PyCharm, Slurm.

Libraries: PyTorch, TensorFlow, JAX, Scikit-Learn, Jupyter, pandas, NumPy, Matplotlib, CUDA.

Techniques: Convolutional Neural Networks, Graph Neural Networks, Variational Autoencoder, Bi-level Optimization, Active Learning, AI4Science, Dynamical Systems, Generative AI, Reservoir Computing, Graph Theory.

Publications

- Wang, A., and Pang, J.. (2025). Guided Structural Inference: Leveraging Priors with Soft Gating Mechanisms. Proceedings of the 42th International Conference on Machine Learning (ICML 2025). (To Appear)
- Wang, A., and Pang, J.. (2024). Structural Inference of Dynamical Systems with Conjoined State Space Models. The Thirty-eighth Annual Conference on Neural Information Processing Systems (NeurIPS 2024). (Link to paper.)
- Wang, A., and Pang, J.. (2024). Benchmarking Structural Inference Methods for Interacting Dynamical Systems with Synthetic Data. The Thirty-eight Conference on Neural Information Processing Systems Datasets and Benchmarks Track (NeurIPS 2024 Datasets and Benchmarks Track). (Link to paper.)
- Wang, A., and Pang, J.. (2024). Structural Inference with Dynamics Encoding and Partial Correlation Coefficients. The Twelfth International Conference on Learning Representations (ICLR 2024). (Link to paper.)
- Wang, A., Tong, T.P., and Pang, J.. (2023). Effective and Efficient Structural Inference with Reservoir Computing. Proceedings of the 40th International Conference on Machine Learning (ICML 2023). (Link to paper.)
- Wang, A., and Pang, J.. (2023). Active Learning based Structural Inference. Proceedings of the 40th International Conference on Machine Learning (ICML 2023). (Link to paper.)
- Wang, A., and Pang, J.. (2022). Iterative Structural Inference of Directed Graphs. Advances in Neural Information Processing Systems 35 (NeurIPS 2022). (Link to paper.)
- Hu, H., Wang, A., Sons, M. and Lauer, M.. (2020). ViPNet: An End-to-End 6D Visual Camera Pose Regression Network. IEEE 23rd International Conference on Intelligent Transportation Systems (ITSC 2020). (Link to paper.)

Projects

LLM4EDUKG | *Python, Git, Unix Shell, VS Code* — *Mar. 2024 – Jun. 2024*

- Assembled the first public dataset featuring four educational knowledge graphs, detailing knowledge components and their prerequisite relationships.
- Developed and assessed the capability of pre-trained large language models to interpret and reason over the dataset.
- Documented the development pipeline and disseminated the project via GitHub and a dedicated project website.

StructInfer | *Python, Slurm, Git, Unix Shell, VS Code* — *Dec. 2022 – Apr. 2024*

- Engineered and generated observation trajectories for dynamical systems across various dimensions.
- Conducted a comprehensive evaluation of 13 structural inference methods, assessing accuracy, scalability, data efficiency, and robustness.
- Published benchmark results and datasets, making them accessible via GitHub and a project-specific website.

Experience

Shanghai AI Laboratory Shanghai, China

Researcher *May. 2025 – Present*

- Conducted research on multi-modal large models to advance scientific discovery across disciplines.
- Developed and evaluated multi-modal physics benchmarks to assess model reasoning and generalization.
- Explored algorithmic methods for scientific discovery, including symbolic regression and equation learning.

Squirrel AI Hybrid: Shanghai and remote

Research Intern *Feb. 2024 – Apr. 2025*

- Developed recommendation system models for K-12 education using spatio-temporal graphs, enhanced by integrated database solutions to improve learning outcomes.
- Pioneered techniques to address missing data in educational records, utilizing spatio-temporal similarities to ensure data integrity and reliability.
- Initiated and led the LLM4EDUKG benchmark project, evaluating the reasoning abilities of pre-trained large language models on domain-specific knowledge graphs.
- Investigated the integration of domain knowledge into large language models using GraphRAG, developed a simulation environment to model student behavior.

University of Luxembourg Esch-sur-Alzette, Luxembourg

Doctoral Researcher (PhD Student) *Dec. 2020 – Nov. 2024*

- Explored structural inference in dynamical systems through deep learning, contributing to advancements in modeling complex systems.
- Created StructInfer, a pioneering open benchmark for evaluating structural inference methods across disciplines, ensuring objectivity and reproducibility.
- Published research at premier AI conferences including NeurIPS 2022, ICML 2023, and ICLR 2024, and contributed as a reviewer at leading AI venues.

Karlsruhe Institute of Technology Kalrsruhe, Germany

Student Assistant *Dec. 2019 – Mar. 2020*

- Engineered an innovative visual localization technique using Graph Neural Networks and OpenCV to enhance the precision of monocular camera-based navigation in autonomous vehicles.
- Successfully presented and published the outcomes of the visual localization research in a peer-reviewed conference.
- Investigated combinatorial approaches to hierarchical visual localization, broadening the scope of research and uncovering potential advancements in the domain.

Robert Bosch GmbH Renningen, Germany

Research Intern *Apr. 2018 – Aug. 2018*

- Organized and delivered a tutorial on AUTOSAR for the research team, initiated communication with the director.
- Pioneered the development of a diagnosis system using an extended Kalman filter for an autonomous electric vehicle prototype's electric propulsion system.
- Explored the integration of modern AI methods into self-driving cars for diagnostic purposes.

Rewards

- College-level Excellence, 2011-2015
- Outstanding Graduates of Tongji University, 2015
- Travel Grant, NeurIPS 2022, ICML 2023, ICLR 2024
- Top Reviewer, NeurIPS 2023, NeurIPS 2024
- DAAD AInet Fellow

Interests

Indoor Sports: Fitness, Badminton, Table Tennis.

Outdoor Sports: Snorkeling, Sky Diving, Hiking, Skiing, Surfing.

Arts: Photography, Classical Music, Jazz Music.