Size Wang

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Committed to integrating cutting-edge AI research with cross-domain expertise to deliver practical, scalable, and high-impact applications.

Education

Beihang University Beijing, China

Master of Science in Artificial Intelligence *Sep. 2023 – Jun 2026 [Expected]*

Admire Lab. Supervisor: Prof. Wenjun Wu | GPA: 3.83/4.00

Research Interest: Multi-agent Reinforcement Learning, Large Language Models, Multi-agent Path Finding.

Teaching Assistant: B230031002 The Principles and Practices of Swarm Intelligence (Spring 2024, Spring 2025).

Beihang University Beijing, China

Bachelor of Science in Artificial Intelligence *Sep. 2019 – Jun 2023*

Outstanding graduate of Class 2023 (Top 5%) | GPA: 3.81/4.00 (Top 10%)

Bachelor's Thesis: Self-organizing algorithm for swarm unmanned vehicles based on multi-agent reinforcement learning.

Awarded Outstanding Bachelor's Thesis (Top 1%)

Work Experience

Machine Learning Engineer Intern Jun 2025 – Present

Advertiser Mechanism Group, JD.com, Inc. (JINGDONG) *Beijing, China*

- **Pioneered the application of Multi-Agent Reinforcement Learning in e-commerce auto-bidding systems** by formulating the problem as a decentralized partially observable Markov decision process (Dec-POMDP), demonstrating transferable framework design capability across domains.
- Engineered modular components: 1) State representation with real-time market/advertiser data fusion 2) Dynamic bid adjustment action space 3) Dual-objective reward function balancing advertiser ROI and platform revenue.
- Proposed Independent Learners training method with advertiser-specific reward shaping, implementing parameter sharing and prioritized experience replay to enhance training efficiency in decentralized environments.
- A/B testing demonstrated a **1% increase in platform income** compared to baseline auto-bidding models, validating the effectiveness of the proposed approach.

Research Experience

Multi-agent Path Finding Research Jan. 2025 – Present

Admire Lab, Beihang University *Beijing, China*

Large Language Models for MAPF Framework

- Applied Large Language Models (LLMs) to Multi-Agent Path Finding (MAPF), investigating their planning capabilities. Identified limitations in existing workflow designs for MAPF, where LLMs underperformed due to mismatched problem formulation and inability to interpret spatial information from textual prompts.
- Developed an advanced workflow incorporating step-by-step planning and reset mechanisms, **aligning with the Markovian nature of the problem**. Achieved a **27% improvement in success rate.**
- Innovatively integrated a **graph neural network-powered neural algorithmic reasoner with LLMs**, creating a hybrid model to capture spatial information. Boosted solving efficiency with a **50% increase in success rate.**
- Independently engineered the project in Python, enabling efficient LLM deployment. Designed and executed comprehensive comparative experiments across diverse environmental scenarios, optimizing performance and validating the solution's robustness and generalization capability.
- Published in 2025 International Joint Conference on Neural Networks (Second author).

Multi-agent Reinforcement Learning Research Mar. 2023 – Present

Admire Lab, Beihang University *Beijing, China*

Hierarchical Consensus-Driven MARL Framework

- Proposed a novel self-supervised consensus mechanism for MARL that **achieves global coordination through local observations without labeled data**, addressing the limitations of centralized training frameworks.
- Designed a hierarchical consensus layer embedded in Actor networks, dynamically aligning agent decisions and improving coordination. Achieved **33% higher cumulative rewards** and **10% faster training convergence**.
- Implemented the framework in Python, developing a modular simulation environment for predator-prey, rendezvous, and navigation tasks. Optimized policies via systematic ablation studies.
- Published in 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (Third author).

Physics-Informed MARL

- Developed **multi-layer safety mechanisms integrating potential fields with MARL** enhanced collision avoidance in dynamic environments by **40%**.
- Published in IEEE Robotics and Automation Letters (Third author).

Sim2Real Deployment & Benchmark

- Built a **Webots-based MARL benchmark for e-puck robots, integrating real-world constraints** (e.g., communication delays, sensor noise) to bridge simulation-to-reality gaps.
- Led **ROS-based Sim2Real experiments for unmanned vehicles**, parsing motion-capture data to deploy MARL policies in real-time control pipelines.

RGB-D Video Salient Object Detection Research Jul. 2022 – Nov. 2022
Vision and Learning Lab, University of Alberta (CSC funded research internship) *Edmonton, AB, Canada*

RGB-D Video Salient Object Detection Dataset and Benchmark

- Created the DViSal dataset, **the first RGB-D video salient object detection dataset**, containing 207 videos, 175,442 RGB-D pairs, and 7,117 annotated frames. Established a benchmark for RGB-D video salient object detection, enabling future research in the field.
- Designed **a data collection and annotation pipeline**, filtering low-resolution and misaligned frames, and independently generated scribble annotations using Python for efficient and accurate labeling.
- Published in 2023 Conference on Neural Information Processing Systems (Third author).

Publications

1. Feng P, **Wang S**, Cao Y et al. Neural Algorithmic Reasoners Informed Large Language Model for Multi-Agent Path Finding[C]. 2025 International Joint Conference on Neural Networks (IJCNN).
2. Feng P, Shi R, **Wang S**, et al. Lyapunov-Informed Multi-Agent Reinforcement Learning for Multi-Robot Cooperation Tasks[J]. IEEE Transactions on Automation Science and Engineering. (Accepted)
3. Feng P, Liang J, **Wang S**, et al. Hierarchical Consensus-Based Multi-Agent Reinforcement Learning for Multi-Robot Cooperation Tasks[C]. 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2024: 642-649.
4. Feng P, Shi R, **Wang S**, et al. Safe and efficient multi-agent collision avoidance with physics-informed reinforcement learning[J]. IEEE Robotics and Automation Letters, vol. 9, no. 12, pp. 11138-11145, Dec. 2024, doi: 10.1109/LRA.2024.3487491.
5. Li J, Ji W, **Wang S**, et al. Dvsod: Rgb-d video salient object detection[J]. Advances in Neural Information Processing Systems (NeurIPS), 2023, 36: 8774-8787.

Honors, Awards and Scholarship

- Outstanding graduate of Beihang University **(Top 5%)**, 2023
- Outstanding Bachelor's Thesis of Beihang University **(Top 1%)**, 2023
- Merit Student of Beihang University **(Top 1%)**, 2021, 2023
- Meritorious Winner **(Top 6%)**, COMAP's Interdisciplinary Contest In Modeling (ICM), 2022
- National Second Prize **(Top 3%)**, Chinese Undergraduate Mathematical Contest in Modeling, 2021
- China Scholarship Council (CSC) funded Research Internship at University of Alberta (5400 CAD), 2022
- Beihang B.S. Scholarship for Outstanding Performance in study (2000 CNY/year), 2021, 2022, 2023
- Beihang B.S. Scholarship for Outstanding Performance in academic competition (2000 CNY/year), 2022, 2023
- Beihang M.S. Scholarship for Outstanding Freshmen (5000 CNY), 2023

Technical Skills

Programming Languages: Python, C/C++, SQL, JavaScript, HTML/CSS
Developer Tools: Git, Docker, VS Code, Visual Studio, PyTorch, ROS, LaTeX
Operating Systems: Linux, MacOS, Windows
Languages: Mandarin (Native), English (IELTS 7.5)

Leadership / Extracurricular

President of Student Union in ShiE college, Beihang University Oct 2020 – Sep 2021

- Organized large-scale campus events (New Year's Gala and Sports Festival) for 800+ attendees.

Volunteer Operation Manager in a non-profit organization for online tutoring Mar 2020 – Jul 2020

- Co-led a team of 100+ volunteer tutors, delivering 10,000+ hours of free online classes to 600+ primary and secondary students across Mainland China during COVID-19. The project was featured on CCTV-1 (China Central Television General Channel) evening news.