Xianliang Li

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Education

University of Chinese Academy of Sciences *Sep. 2022 - Jun. 2025*
Master's Degree in Computer Science
Advisors: Assoc. Prof. Sheng Xu

Sun Yat-Sen University *Sep. 2018 - Jun. 2022*
Bachelor's Degree in Physics
Advisor: Assoc. Prof. Shangfei Liu

Publications

* - equal contribution

4. **On the Performance Analysis of Momentum Method: A Frequency Domain Perspective**
Xianliang Li*, Jun Luo*, Zhiwei Zheng, Hanxiao Wang, Li Luo, Lingkun Wen, Linlong Wu, Sheng Xu
Submitted to The Thirteenth International Conference on Learning Representations (ICLR), 2025.

3. **Time-of-Arrival Simultaneous Sensor and Target Localization with Dynamic Optimal Sensor Placements.**
Xianliang Li, Sheng Xu, K. C. Ho.
Submitted to IEEE Transactions on Aerospace and Electronic Systems, 2024.

2. **Systematical Sensor Path Optimization Solutions for AOA Target Localization Accuracy Improvement with Theoretical Analysis.**
Sheng Xu, Bing Zhu, **Xianliang Li**, Xinyu Wu, Tiantian Xu.
IEEE Transactions on Vehicular Technology, 2024.

1. **3D Source Tracking Using a Position-unknown AOA Sensor with Measurement Drift and UAV Moving Direction Optimization**
Rongrong Xu, Sheng Xu, Bing Zhu, **Xianliang Li**, Mingxue Cai.
IEEE International Conference on Real-time Computing and Robotics, 2024.

Research Experience

On the Performance Analysis of Momentum Method: A Frequency Domain Perspective *Mar. 2024 - Present*
Team Leader

- Presented a frequency domain analysis framework that interprets the momentum method as a time-variant filter for gradients.
- Proposed Frequency Stochastic Gradient Descent with Momentum (FSGDM), a heuristic optimizer that dynamically adjusts the momentum filtering characteristic with an empirically effective dynamic magnitude response.

Path Optimization and Target Localization Problems using TOA/AOA Sensors *Jul. 2023 - Present*
Advisor: Assoc. Prof. Sheng Xu, *Shenzhen Institute of Advanced Technology* and Prof. K. C. Ho, *University of Missouri*

- Derived theoretical performance enhancements using position-unknown sensors with inter-sensor measurements.
- Developed a new, effective, and fast-converging algorithm based on SPSA and Adam for optimal sensor placement, with theoretical analysis supporting improved performance.
- Designed a compound localization framework for real-world applications.
- Submitted two journal papers and one conference paper.

A Wheel-track Transformation Mobile Platform *Nov. 2023 - Apr. 2024*
Advisor: Assoc. Prof. Sheng Xu, *Shenzhen Institute of Advanced Technology*

- Participated in developing a control module of the wheel-track robot using the PX4 flight controller and the Maxon controller.
- Gained knowledge and skills in hardware and robotic systems.

N Body Gravitational Simulation of Giant Planets in the Solar System *Nov. 2021 - Apr. 2022*
Advisor: Assoc. Prof. Shangfei Liu, *Sun Yat-sen University*

- Undergraduate Thesis.
- Reproduced the formation process of Uranus and Neptune in the solar system using REBOUND.

Technical Skills

Programming: MATLAB, Python, C/C++.
DevOps and AI Framework: Git, PyTorch.
Language: Cantonese, Mandarin, English.