Fengxiaoxiao Li
Tel: +65 80993697 E-mail: lfxxmaster@163.com

Education Background:

University of Electronic Science and Technology of China (UESTC) 08/2021-07/2025
BEng in Aircraft Control and Information Engineering; GPA: 3.78/4.00; Ranked 4/22

National University of Singapore (NUS) 08/2025-07/2026
MSc in Mechanical Engineering , GPA: 4.63/5.00; Personal Web: Web of Li Fengxiaoxiao
Currently research in the Multi-Agent Robotic Motion (MARMot) Laboratory

Academic Experience

Multi-Objective Optimization for MAS based on Deep Reinforcement Learning 09/2025-03/2026
Advisor: Asst. Prof. Guillaume Sartoretti, National University of Singapore

- Investigated the Multi-Objective Multiple Traveling Salesman Problem (MOMTSP) under a **zero-shot generalization** setting, aiming to learn diverse and high-quality Pareto-optimal routing strategies for multi-robot systems
- Proposed **CAMO**, a conditional neural solver for the multi-objective MTSP, which leverages conditional edge embeddings and global graph features to model interactions between preference information and task structure
- Designed a **Agent/Node-selection collaborative decoder** to enable efficient synchronous decision-making, breaking sequential dependencies and improving scalability in large combinatorial search spaces
- Experimental results show that CAMO significantly outperforms heuristic multi-objective baselines, including NSGA-III and MOEA/D, as well as DRL-based baselines such as MO-PARCO, especially on high-dimensional objective settings and Achieved a dramatic improvement in inference efficiency, reducing solution time from hours to seconds compared with traditional optimization pipelines
- Validated the proposed method through Pareto-front visualization, benchmark comparisons, and real-world deployment on a ROS-based mobile robot platform
- Paper submitted to **IROS 2026: Fengxiaoxiao Li***, Xiao Mao*, Mingfeng Fan, Yifeng Zhang, Yi Li, Tanishq Duhan, Guillaume Sartoretti. *CAMO: A Conditional Neural Solver for the Multi-objective Multiple Traveling Salesman Problem*. arXiv:2603.19074, 2026.

Prescribed-Time Time-Varying Formation Tracking Control for Multi-Agent Systems Based on Event-Triggered Mechanism and Neural Networks 05/2024-06/2025
Advisor: Asst. Prof. Zhiqiang Li, University of Electronic Science and Technology of China

- Designed prescribed-time consensus control protocols for high-order multi-agent systems, using neural networks to optimize agent dynamic modeling, and constructed Lyapunov functions to rigorously prove system stability and analyze convergence properties
- Developed leader-follower event-triggered conditions, where neural networks adaptively adjust triggering thresholds, significantly reducing inter-agent communication frequency while ensuring time-varying formation control within the prescribed time
- Proposed a neural network-based cooperative strategy for multi-agent systems to enhance formation control performance. Implemented simulations in Simulink, integrating event-triggered mechanisms and neural networks to improve formation accuracy and robustness
- Solved high-order linear systems intelligently by combining the finite difference method and Runge-Kutta algorithm (ode45), leveraging neural networks to accelerate computation and generate event-triggered time-varying formation state evolution plots
- Validated the system's adaptability in complex environments, where neural networks effectively compensated for communication noise and external disturbances, substantially reducing bandwidth usage while enhancing anti-interference capability and task execution efficiency

Deep Learning-based Pneumonia Detection in Chest X-ray Images 07/2024-09/2024

Advisor: Dr. Teoh Teik Toe, Nanyang Technological University

- Selected 5,216 images from Kaggle datasets and performed undersampling to address imbalanced classes
- Built a 4-layer convolutional neural network (CNN) in Python with TensorFlow, trained and tested the CNN model 150 times, and achieved a final accuracy of 95.63%
- Deployed the residual network (ResNet), the Random Forest, and the Logistic Regression and compared the performance of these models with the CNN model for further optimization

All-terrain Foldable Multi-legged Exploration Robot 03/2023-07/2023

Advisor: Prof. Zhenwei Wang, University of Electronic Science and Technology of China

- Drew and simulated the shape module of the hexapod robot using ProE with the adoption of the inward contraction hexapod structure for the overall multi-legged robot, analyzed the model of the foot robot on Solidworks, and designed the system with a triangular gait to maintain balance and stability of the body
- Selected the 57 stepper motor TB6600 as the drive and programmed on Arduino-UNO based on a motor control module coupled to an Arduino module to control the motor using the common anode stepper motor wiring method and control the moving speed of the foot robot and the steering function through the control of the step length
- Equipped the robot with a monocular camera, used OpenCV to implement the detection program and build the visual training environment based on the PyTorch framework, established a target object data model relying on tools such as Spyder in anaconda and carrying component packages such as the everywhereml
- Extracted the feature vectors of the images as the dataset, built and trained a convolutional neural network-based obstacle recognition model with the dataset containing 14,000 obstacle images, realized an obstacle recognition accuracy of 0.968 after 200 iterations and an accuracy of 0.970 on the test set with 300 different obstacle images, and converted the codes into C++ format to be deployed on ESP32-CAM to realize the intelligent image recognition and communication
- Integrated hardware devices such as power supplies and development boards on the top design platform of the robot and fabricated all components using 3D printing to realize a compact and lightweight design

Honors & Awards:

- 2022.10 UESTC Outstanding Student Scholarship
- 2023.10 UESTC Outstanding Student Scholarship
- 2024.10 UESTC Outstanding Student Scholarship
- 2023.10 UESTC Yunhui Specialized Scholarship for Top 7% Students (Ranked 35/800+ teams)
- 2024.07 NTU AI Lab Summer Research Program Distinction Winner (Top 2% recognition)
- 2024.10 IEEE Xtreme 18.0 Programming Competition Top 15.6% Global (Ranked 907/5,800+ teams)
- 2025.05 Second Prize, 6th National Undergraduate Thesis Competition (Aeronautics & Astronautics Category)
- 2025.06 First Prize, National Graduation Design Competition for University UAV-related Majors
- 2025.06 Recipient of the Innovation Award, Endeavor Award, and Contribution Award for outstanding performance and contributions,2025 UESTC Class of 2025 Graduate Awards

Professional Skills:

Programming language: C++, **Python**, MATLAB, LaTeX, Markdown

Software & Tools: **MATLAB-Simulink**, SolidWorks, Altium Designer, **Pytorch**, **ROS**

Technical Writing: Research Papers, Technical Documentation, Patent Drafting

RL Algorithms**:** DQN, PPO, SAC, DDPG, A3C, MADDPG

Interests & Hobbies:

Table Tennis, Football, Swimming, Running, Reading (AI, Robotics, Sci-Fi)