JUN XIANG

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EDUCATION

PhD of Mechanical Engineering, University of California,San Diego/San Diego State University Expected 2025
Advisor: Professor Jun Chen, Professor Sonia Martínez GPA: 3.5
Master of Automotive Engineering, Clemson University 2019 - 2021
Area of Study: Autonomous Vehicle GPA:3.7
Bachelor of Mechanical Engineering, North Carolina State University 2015 - 2019

SKILLS

Programming: python, C++, MATLAB
Tools TensorFlow, PyTorch, CANdb++, CanKing, Arduino, AirSim, CarSim, Simulink
Machine Learning CNN, LSTM, GAN, transformer, CLIP, foundation model, Q-learning, GMM

EXPERIENCE

Research Assistant August 2021 - Present
UC San Diego/San Diego State University *San Diego, CA*

- Proposed novel hybrid A* search algorithm for multi-agent path planning in a large-scale dynamic environment. The proposed hybrid A* ensures the timely execution of online activities while preserving optimality.
- Proposed heuristic estimation using computer vision techniques for accelerating A* search algorithm.
- Proposed 3D trajectory prediction framework leveraging GAN, convolutional mechanism, attention, CAVE, LSTM, transformer, GNN, and mixture model.
- Proposed Reinforcement Learning-based method for drone navigation by finding the constrained shortest path in a risky environment.
- Collected trajectory data from the drone swarms with the motion tracking system and created a drone dataset.
- Managed Ubuntu/Linux system, deep learning environment(CUDA, Conda), and GPUs for the lab.

Research Assistant August 2019 - August 2021
Collaborative Robotics and Automation Laboratory (CRA Lab) *Greenville, SC*

- Applied Reinforcement Learning to find a control policy to control the vehicle's acceleration during the car following to maximize ride comfort. A paper has been published on SAE WCX.
- Applied GANs to predict pedestrian motion with the dataset from the Lyft Motion Prediction for Autonomous Vehicles Challenge and Waymo Motion Prediction Challenge.
- Applied CNNs to determine passenger's emotion and recognize passenger's command by passenger's voice.
- Collected data such as fuel efficiency, speed, and brake history from real autonomous vehicles with CAN.

Image Recognition Engineer Intern June 2019 - August 2019
Toshiba-APG Intelligent Drive Lab *China*

- Worked on the Toshiba Visconti platform, creating dictionaries for dictionary learning.
- Applied deep learning network to screen and classify pictures of the rear view of the vehicles.
- Performed testing and calibration for vehicle electronics such as sensors, radars, and cameras.

Mechanical Engineer Intern July 2017 - September 2017
Yuco Optics Corporation *Bohemia, NY*

- Designed and drew parts of the laser machine for manufacturing with SolidWorks.

PUBLICATIONS

1 Xiang, J., Chen, J. (2024) Imitation Learning-based Convex Approximations of Probabilistic Reachable Sets, In AIAA Aviation 2024. (Submitted)

2 Xiang, J., Chen, J. (2024) Learning-accelerated A* Search for Risk-aware Path Planning, In AIAA SCITECH 2024. (Accepted)

3 Xiang, J., Chen, J. (2023). Data-driven high-fidelity probabilistic trajectory learning in terminal airspace, IEEE Transactions on Intelligent Transportation Systems. (Submitted)

4 Xiang, J., Xie, J.F., Chen, J. (2023). Landing Trajectory Prediction and Safety Verification for UAS Based on Generative Pre-trained Transformer, Journal of guidance, control, and dynamics. (Submitted)

5 Xiang, J., Liu, Y.C., Chen, J. (2022). Hybrid Strategy with Multi-scale A* for Dynamic Planning of Multi-agent Drone Traffic, Journal of guidance, control, and dynamics.

6 Xiang, J., Essick, D., Bautista, L.G., Xie, J.F., Chen, J. (2023). Landing Trajectory Prediction for UAS Based on Generative Adversarial Network, In AIAA SCITECH 2023 Forum

7 Xiang, J., Amaya, V., Chen, J. (2022). Dynamic Unmanned Aircraft System Traffic Volume Reservation Based on Multi-Scale A* Algorithm. In AIAA SCITECH 2022 Forum (p. 2236).

8 Xiang, J., Guo, L. (2022). Comfort Improvement for Autonomous Vehicles Using Reinforcement Learning with In-Situ Human Feedback (No. 2022-01-0807). SAE Technical Paper.

9 Gault, J., Xiang, J., Chen, J. (2023). Safe Path Planning of UAV Based on Reinforcement Learning in Probabilistic Environments, In AIAA SCITECH 2023 Forum

PROFESSIONAL ACTIVITIES

Society Memberships

- Student member, AIAA(2022-present)

Publication Reviews

- IEEE Robotics and Automation Letters (RA-L)
- 2022 IEEE 17th International Conference on Control Automation (ICCA)
- IEEE Transactions on Intelligent Transportation Systems (ITS)
- IEEE Transactions on Automation Science and Engineering (TASE)
- 2023 AIAA SciTech
- MDPI Sensors

Conference Attendance

- AIAA SCITECH Forum (January 2022)
- SAE WCX(April2022)
- AIAA SCITECH Forum (January 2023)