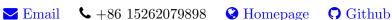
# Shiyao Sang



### Education

2020 - 2022	Master of Science in Computer Science University of Wollongong, NSW, Australia (QS World Ranking 167)
2020 - 2022	Master of Engineering in Computer Technology Central China Normal University, Wuhan, China (211 Project University)
2014 - 2018	Bachelor of Engineering in Computer Science and Technology Huaivin Institute of Technology Jiangsu China

## Research Interests

- Large Model Modelling (LMM) in Multi-Agent Systems
- Deep Reinforcement Learning for Multi-Agent Decision-Making
- Human-Machine Symbiosis and Social Robotics

# Research and Projects

# Next-Generation Planning Decision Framework Development July 2024 - Present

- Contributed to the design and implementation of a novel planning decision-making framework, focusing on communication modules, mapless planning, lateral sampling, and performance optimization.
- Proposed and validated a convex space exploration method for trajectory generation at intersections without high-definition maps, enhancing mapless planning capabilities.
- Led the development of Adaptive Cruise Control (ACC) trajectory generation and addressed key challenges in ramp curvature speed limits and path convergence efficiency.
- Explored hybrid planning approaches by integrating rule-based and learning-based methods for city NOA scenarios, and investigated end-to-end planning architectures.
- Strengthened expertise in advanced planning algorithms, including MCST parallel search, CT-CBS, and two-stage end-to-end planning frameworks.

### Hybrid Network Communication Middleware (RIMAOS2C) May 2023 - August 2024

- Designed a hybrid middleware for L4-level Robotaxi systems, focusing on efficient communication and dynamic protocol switching.
- Optimized data flow to reduce redundancy and improve cross-domain communication consistency.
- Deployed on Robotaxi domain controllers, supporting over 300 km of autonomous driving tests
- Outcome: Manuscript under review at IEEE International Conference on Robotics and Automation (ICRA) 2025.

### State Transition Model for Educational Robots

April 2021 - April 2022

- Developed a multi-turn dialogue system based on mathematical problem-solving models.
- Implemented multi-channel collaborative control on the NAO robot platform, enhancing interactive tutoring capabilities.
- Utilized Azure Cognitive Services for language understanding and control flow optimization.
- Thesis: "Design and Implementation of an Educational Robot's State Transition Model for Mathematics Homework Tutoring."

### RIMA Service Robot Development

October 2016 - June 2018

- Developed RIMA, a service robot with navigation and conversational abilities using ROS.
- Designed a multi-layer chatbot system with REST API and Azure Bot integration.
- Proposed the RIMA markup language for dynamic knowledge base updates and semantic processing.
- Thesis: "A Multi-Layer Architecture for Intelligent Chatbots in IoT Robots: Design and Implementation."

# **Professional Experience**

# Middleware Development Engineer & Decision Planning Engineer March 2023 – Present

Chery Automobile Co., Ltd., Shanghai, China

- Developed middleware and decision-making algorithms for L3 and L4 autonomous systems
- Extended Cyber RT middleware to improve cross-platform compatibility and support real-time applications.
- Designed adaptive trajectory planning methods for unmapped intersections.

### C++ Software Engineer

July 2022 - January 2023

Cowa Technology Co., Ltd., Shanghai, China

- Developed security encryption for remote driving systems.
- Designed streaming speed measurement tools using OpenCV and EasyOCR.
- Implemented speech synthesis and audio processing modules to enhance user interaction.

### **Publications and Patents**

### **Under Review**

• S. Sang, "Service Discovery-based Hybrid Network Robotic Middleware for Efficient Communication," *ICRA 2025*.

### **Patents**

- "A Streaming Media Speed Measurement Tool Based on Timestamp Differences." (Granted)
- "An Encryption Scheme for Remote Driving Based on Signature Exchange." (Pending)
- "A Software Architecture for Mapping Signals to Topics in SOME/IP Service." (Pending)
- "An Adaptive Trajectory Generation Method for Intersections Without High-Precision Maps." (Pending)

## Technical Skills

- Programming Languages: C++, C#, Python
- Robotics: ROS, Cyber RT, Distributed Middleware
- Machine Learning Frameworks: TensorFlow, PyTorch
- Algorithms: Deep Reinforcement Learning (DQN, Q-Learning), Path Planning (A\*, D\*, RRT), Multi-Agent Systems
- Technical Tools: OpenCV, YOLO, EasyOCR

## **Awards and Honors**

- Silver Award, 2017 Zhongxing Cup Pan-Pearl River Delta University Students Computer Competition
- Second Prize, 2017 China Engineering Robot Competition
- Third Prize, 2018 Microsoft Imagine Cup Global Student Technology Competition (Suzhou Regional Finals)
- Excellence Award, Fifth Jiangsu Province Science University Student Humanities Knowledge Competition

# Languages

• Chinese: Native

• English: Intermediate