Steven **Gong**

ACT, Australia

hailong.gong@anu.edu.au tommygong08.github.io tommygong08 hailong-gong

Education

The Australian National Unversity *ACT, Australia*

Master of Computing *Feb. 2024 - Dec. 2025 (Expected)*

- Specialization: Artificial Intelligence

Beijing Institute of Technology *Beijing, China*

Bachelor of Computer Science and Technology *Sep. 2018 - Jun. 2022*

- Courses: Computer Vision, Artificial intelligence, Discrete Mathematics, Combinatorics, Probability-and-Statistics, Object-oriented programming, Computer Networks, Relational Database, Compiler Principle, Software Engineering.

Work Experience

Shenzhen Image Technology Co., Ltd *Shenzhen, China*

Computer Vision Algorithm Engineer *Mar. 2023 - Dec. 2023*

- Designed and optimized algorithms for Automatic Optical Inspection (AOI) System in order to detect defects in PCB boards.

Beijing Institute of Technology *Beijing, China*

Research Assistant *Jul. 2022 - Jan. 2023*

- Researched on trajectory prediction of autonomous driving and decision-making for connected-and-automated vehicles.

ByteDance, Quality Lab *Beijing, China*

Algorithm Engineer Intern *Oct. 2021 - Feb. 2022*

- Optimized reinforcement learning algorithms of client automation test tool, solving the pain points during software testing.
- Improved the efficiency and quality of automated testing tools, including test coverage, and problem interception rate.

Publications

Journal Paper

· **Leveraging Multi-Stream Information Fusion for Trajectory Prediction in Low Illumination Scenarios: A Multi-channel Graph Convolutional Approach** ***HaiLong Gong*** *, ZiRui Li, Chao Lu, GuoDong Du, JianWei Gong*, IEEE Transactions on Intelligent Transportation Systems. (T-ITS)

Conference Paper

· **Towards Online Risk Assessment for Human-robot Interaction: A Data-driven Hamilton-Jacobi-Isaacs Reachability Approach,** ***HaiLong Gong*** *, ZiRui Li, Chao Lu, JianWei Gong*, 26th IEEE International Conference on Intelligent Transportation Systems (ITSC2023)

· **Towards Safe, efficient and Co-operative Decision-making for CAVs in Mixed Autonomy: An Attention-Enhanced Graphic Reinforcement Learning Approach** ***HaiLong Gong*** *, ZiRui Li, RunHao Zhou, Qi Liu, Chao Lu, JianWei Gong*, The 4th Symposium on Management of Future Motorway and Urban Traffic Systems 2022 (MFTS 2022).

· **Fast and Accurate: Perception System of a Formula Student Driverless Car** ***HaiLong Gong*** *, Yunji Feng, TaiRan Chen, ZuoOu Li, YunWei Li*, 2022 6th International Conference on Robotics, Control and Automation (ICRCA 2022).

· **Real-time Motion Planning and Control for a Formula Student Driverless Car** *TaiRan Chen,* ***HaiLong Gong*** *, XinYu Gao, ChenRui Huang, Xiang Li, ShaoKun Yang, YunJi Feng*, Annual Conference of Society of Automotive Engineers of China, 2020.

Skills

Languages Python, C/C++, Java, Golang
Software Develop: QT, HTML, CSS, Relational Databases, Data Structures, Algorithms
Tools for AI: Pytorch, OpenCV
Others: Linux, Git, Docker, CI/CD

Academic Projects

Multi-Source Sensor Fusion-based Trajectory Prediction

Beijing, China

Instructor: Professor Gong Jianwei, Associate Professor Chao Lu — *May. 2022 - Jan. 2023*

- Worked as a research assistant and proposed an interactive scenarios trajectory prediction model based on multi-stream heterogeneous data fusion to improve accuracy.
- Designed a novel ST-GCN-based embedding method to temporally and spatially generate features of both traffic participants' trajectories and instantaneous speed. Propose a novel LSTM-based image feature extraction method to realize self-adapted attention capture.
- Adopted the multi-stream heterogeneous data that can be plugged and used, with strong flexibility and versatility.

Multi-vehicle Control Based on Graph Neural Network in Mixed Traffic Scenarios

Beijing, China

Instructor: Professor Gong Jianwei, Associate Professor Chao Lu — *May. 2022 - Jan. 2023*

- Carried out research on safe, efficient, and cooperative decision-making for mixed-autonomy traffic with connected and autonomous vehicles (CAVs).
- Designed and introduced a graph attention mechanism in the framework to gain more rewards for the agents in the reinforcement learning environment.
- Designed a comparative experiment to conduct the traffic efficiency and results show that the combination of Graph Neural Network and Deep Reinforcement learning can improve travel efficiency.

Research on the Algorithm for the Safe Autonomy

Northeastern University, USA (Remote)

Instructor: Assistant Professor Lili Su — *Jul. 2021 - Sep. 2021*

- Researched the efficient algorithm to accurately and quickly detect abnormal human driving mode switches with formal assurance and improved trajectory prediction by effectively fusing the run-time information shared by surrounding autonomous vehicles.
- Reproduced the LSTM, CS-LSTM, and MultiEncoder-SingleDecoder Transformer model to conduct the vehicle trajectory prediction and applied the information sharing to judge the abnormal manned vehicle behavior.
- Proposed that the model reasoning time should be shortened to improve real-time performance and usability and plan to use the lightweight models or improved information-sharing algorithms to shorten the prediction time of abnormal vehicle behaviors to less than 100ms.

Design of Car Perception System for Formula Driverless Vehicle

Beijing, China

Project Leader; Instructor: Associate Researcher, Jie Cao, BIT — *Nov. 2020 - Jun. 2021*

- Proposed a fast, accurate, and large-scale perception system of a formula student driverless car, including object detection, point cloud segmentation, and point cloud cluster.
- Applied PP-YOLO to make cones detection, GPF algorithm to segment the ground, and Euclidean cluster to extract the cones
- Conducted the data fusion of binocular cameras and LIDAR to effectively reduce the noise, eliminated the influence of environmental factors including light weather, and obtained stable sensory results.

Honors

2020	**Champion**, Formula Student Autonomous China (FSAC), Nation Level	*China*
2021	**1st Prize**, ByteDance Summer Camp	*Beijing, China*
2021	**1st Prize**, "Century Cup" Extracurricular Academic Competition, School Level	*Beijing, China*
2022	**Excellent Oral Presentation** , 2022 6th International Conference on Robotics and Machine Vision	*Xiamen, China*
2012	**2nd Class Scholarship**, Beijing Institute of Technology	*Beijing, China*
2019	**3nd Class Scholarship**, Beijing Institute of Technology	*Beijing, China*
2020	**3nd Prize**, 17th "Century Cup" Competition, City Level	*Beijing, China*
2021	**3nd Prize**, "Century Cup" Extracurricular Academic Competition, School Level	*Beijing, China*