Xiaoming Chen

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Education

Hunan University, Hunan, China 08/2022 – 06/2025 (expected)

- Master in Intelligent Vehicles Motion Planning, College of Mechanical and Vehicle Engineering
- GPA: 3.74 / 4.0, Rank: top 5%, President's First Prize Scholarship, IELTS: 6.5

Tiangong University, Tianjin, China 08/2018 – 06/2022

- B.Eng. in Mechatronic Engineering
- GPA: 3.8/4.0, Rank: 1 / 63, Merit Graduates (top 5%), President's First Prize Scholarship (2019 – 2022)

Experience

Trajectory Planner for Parking or Unstructured Environments 09/2022 – 05/2024

National Natural Science Foundation Project, Advisor: Prof. Bai Li

- Developed a real-time trajectory planner with accurate obstacle-avoidance constraints for operation in tiny parking spaces cluttered with obstacles
- Achieved a **90.19% reduction in average runtime** compared to the baseline approach and demonstrated superior performance in runtime and cost when compared to mainstream methods (H-OBCA, LIOM, and STC)
- Authored a Chinese the state-of-the-art survey paper [3] and a Chinese research paper [2] indexed by EI. Currently have another paper under review [1]

Tusimple Inc., Beijing, China: Planning Algorithm Intern 07/2023 – 01/2024

Reference Line Smoothing via ADMM Solver

- Implemented a lane smooth algorithm based on the ADMM solver to address drift in subsequent trajectory planning caused by unsmooth map reference lines, solving a horizon length of 50 (150-200m) within 3ms, 5x faster than other mainstream algorithms
- Cooperated with path planning, map and prediction modules with robustness and stability

Pre-research Project: Global Optimization Solver via Information-Geometric Optimization (IGO) algorithms

- Implemented a global optimization parameter solver based on the IGO framework in a single Gaussian distribution
- Developed a simulation platform to evaluate the trajectory score, utilizing Bezier curves to restore sampled control vectors to trajectories, and calculate gradients based on particles with high scores and rankings

2022 Trajectory Planning Competition of Automated Parking (TPCAP) 07/2022 – 10/2022

- Achieved **2nd place (2 / 63)** in the 25th lEEE International Conference on Intelligent Transportation Systems (ITSC) 2022 TPCAP finals

Publications

[1] **Xiaoming Chen**, Yueshuo Sun, Tantan Zhang*, Xinwei Wang, Shengjian Xiong, and Kai Cao, "An Anytime Trajectory Optimizer for Accurately Parking an Autonomous Vehicle in Tiny Spaces," in ***IEEE Transactions on Vehicular Technology***, under review

[2] **Xiaoming Chen**, Bai Li, Lili Fan, and Youmin Zhang, "Motion Planning Methods for Automated Parking: A Comprehensive Review," in ***Control and Information Technology***, In Chinese

[3] **Xiaoming Chen**, Bai Li, Lili Fan, Yazhou Wang, Tantan Zhang, Youmin Zhang, and Dongpu Cao, "High-Performance Trajectory Optimization for Automated Parking via Half-Space Constraining Theory," in ***Journal of Mechanical Engineering***, In Chinese

Selected Awards

- Textile Vision Scholarship (top 0.1%) 2021
- First Prize in National University Student Internet of Things Design Competition 2021
- First Prize in Discrete Industry Automation at the China Intelligent Manufacturing Challenge 2021
- First Prize in Mathematical Contest In Modeling 2020
- First Prize in National Undergraduate Mechanical Innovational Competition 2020

Skills

Programming Languages: C/C++, Python, MATLAB, …
Tools and Frameworks: ROS, Linux, Git, CMake LaTeX, Docker,…