Mingyi Wang

College of Control Science and Engineering, Zhejiang University
mingyi.wang@zju.edu.cn — +(86) 18888915807 — Personal Homepage

Education

Zhejiang University — Zhejiang, China
Master in Control Engineering — Sept. 2022 – June 2025

- College of Control Science and Engineering
- **Advisors:** Prof. Guang Li and Prof. You Wang

Zhejiang University — Zhejiang, China
Bachelor of Automation — Sept. 2018 – June 2022

- College of Control Science and Engineering
- Cumulative GPA: 3.90/4.00 (**Top 10%**)

RESEARCH INTERESTS

Autonomous Driving, Planning, Motion Prediction, Robotics

SELECTED PUBLICATIONS

1. **Wang, M.**, Zou, H., Liu, Y., et al. (2024). "A Simple and Effective Multi-agent Joint Prediction Method for Autonomous Driving". *2024 China Automation Congress (CAC).*
   Link: Indexed by EI, awaiting publication
   Synopsis: We study a simplified yet effective joint prediction methodology for multi-agent trajectory generation in autonomous driving applications, enhancing the accuracy of agent interaction modeling.
2. Li, H., **Wang, M.**, Gao, H., Zhao, S., Li, G., & Wang, Y. (2023). "Hybrid Silent Speech Interface Through Fusion of Electroencephalography and Electromyography". *2023 Conference of the International Speech Communication Association (INTERSPEECH).*
   Link: https://www.isca-archive.org/interspeech_2023/li23l_interspeech.html
   Synopsis: We develop a hybrid Silent Speech Interface (SSI) that fuses EEG and sEMG signals using sequence-to-sequence models and multi-task losses to decode silent speech. Our method achieves a complementarity between speech intention and muscle activity, validated by a 7.22% character error rate (CER) on a silent speech dataset across eight speakers.
3. Zhang, Z., Zou, Z., Li, X., **Wang, M.**, Wang, Y., & Guan, X., et al. (2023). "Path Planning for Autonomous Driving with Curvature-considered Quadratic Optimization". *2023 IEEE Intelligent Vehicles Symposium (IV).*
   Link: https://ieeexplore.ieee.org/abstract/document/10354696
   Synopsis: We propose an improved quadratic programming approach for path planning in autonomous driving that optimizes path smoothness and curvature using the Frenét frame, enhancing comfort and safety in urban environments.
4. Zou, Z., Zhang, Z., Lu, Z., Li, X., **Wang, M.**, & Wang, Y., et al. (2023). "Discrete States-Based Trajectory Planning for Nonholonomic Robots". *2023 IEEE International Conference on Robotics and Biomimetics (ROBIO).*
   Link: https://ieeexplore.ieee.org/abstract/document/10354696
   Synopsis: We propose a Discrete States-based Trajectory Planning (DSTP) algorithm for autonomous nonholonomic robots, improving trajectory smoothness, efficiency, and control through optimized multi-variable representation and L-BFGS-B optimization, validated by simulation and real-world experiments.
5. Lu, Z., **Wang, M.**, Yu, S., Wu, Y., Wang, Y., & Li, G. (2023). "Camera-Lidar-Based Terrain Multi-type Classification Using Both Spatial and Histogram Features of Lidars". *2023 3rd International Conference on Computer, Control and Robotics (ICCCR).*
   Link: https://ieeexplore.ieee.org/document/10193860
   Synopsis: We study a Lidar-camera fusion system for terrain classification in off-road robots, leveraging multiple optical channels in Lidars and depth-enhanced images to classify various terrain types. Our approach achieves a 99.47% accuracy across diverse terrains, demonstrating its robustness and efficiency.

RESEARCH EXPERIENCE

★ West Lake University AutoLab Hangzhou, China
*Research focus on **GPT-style Trajectory Generation*** May 2024 — Present

- **Summary: Visiting Student at West Lake University AutoLab advised by PI. Kaicheng Yu, jointly cultivated with Udeer AI Robotics Lab**
- **Improve the MotionLM (Waymo sim agent approach) from scatch:** Tokenized vehicle motion using acceleration data and used a **Predict Next Token paradigm** to restore vehicle motion states and generate scene-consistent motion trajectories. Developed a model with only 2.6M parameters, making it lightweight, memory efficient, and capable of predicting scene-consistent trajectories for over 100 vehicles simultaneously. Initially for traffic flow simulation, it also supports downstream tasks like planning and trajectory prediction.
- **Mitigating Out-of-Distribution Issues by Reinforcement Learning:** Extend traditional policy-based Reinforcement Learning (RL) by incorporating a Value function prediction using the Advantage Actor-Critic (A2C) framework. This mitigates OOD issues and improves sample efficiency and stability by evaluating states.
- **Improved Results in the WOMD Sim Agent Challenge:** Increased baseline performance from 68 (2024 Challenge) to 71, and further to 73 with reinforcement learning enhancements.

★ DJI Automotive – Planning and Control Department Shenzhen, China
*Research focus on **Learning Based Planning*** August 2023 — February 2024

- **Summary: Joined the Planning and Control Department as an intern, mentored by Lu Zhang.**
- **Planning Model Development:** Developed a planning model inspired by trajectory prediction, utilizing perceptual inputs and trajectory prediction techniques to generate planned paths and cost maps for downstream routing and evaluation. Successfully launched the PnP model.
- **Trajectory Quality Improvement:** Improved planning trajectory quality by incorporating navigation information through Conditional Prediction, effectively eliminating multimodal trajectory issues in intersection scenarios.
- **Recognition and Award:** Awarded "Sprint Star" for outstanding performance in the planning and decision-making department, becoming the first intern to receive this honor independently.

★ Luoteng Technology – Planning Department Hangzhou, China
*Research focus on **Trajectory Optimization, Robotics*** September 2022 — July 2023

- **Trajectory Optimization for Spherical Robots in Unstructured Environments:** Based on DSTP, I was the first to incorporate kinematic constraints of spherical robots into trajectory optimization modeling. Using a discrete state optimization framework and the L-BFGS optimizer, I transformed the constraint problem into a soft constraint problem and performed optimization. This approach ultimately generated real-time, high-quality trajectories.

AWARDS

- 2019 First-Class Scholarship of Zhejiang University
- 2019 Zhejiang Provincial Government Scholarship
- 2020 First Prize in the 12th National College Student Mathematics Competition
- 2020 Zhejiang University Kindness Scholarship (Awarded for outstanding contributions made during volunteer teaching in Qinghai)
- 2022 Outstanding Graduate of Zhejiang Province

PERSONAL

- **Programming:** Proficient in Python, PyTorch, C++, ROS, and Linux.
- **Soft skills:** Responsible, team-oriented, with a positive and optimistic attitude towards challenges.