Zinuo Chang

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Education

Georgia Institute of Technology Aug 2023 – May 2025
Master of Science in Electrical and Computer Engineering GPA: *4.0/4.0* *Atlanta, GA*

Zhejiang University Sep 2019 – Jun 2023
Bachelor of Engineering in Ocean Engineering and Technology GPA: *3.86/4.0* *Hangzhou, China*

- Honor: Zhejiang Outstanding Graduate (Top 5%), Zhejiang Provincial Government Scholarship (Top 2%)

Research Experience

Discretization Invariant Diffusion Model for Motion Planning May 2025 – Present
Advisor: Dr. Yongxin Chen *Atlanta, GA*

- Developing a diffusion model that learns the distribution of previously successful trajectories to serve as the prior for motion planning
- Training the model in function space through Gaussian Process perturbation and Fourier Neural Operator (FNO) to achieve discretization invariance

Parallel KL-Proximal Gaussian Variational Inference Motion Planning Mar 2024 – Apr 2025
Advisor: Dr. Yongxin Chen *Atlanta, GA*

- Proposed a KL-Proximal algorithm for Gaussian Variational Inference, enabling stable and scalable trajectory optimization under uncertainty, and extending to nonlinear systems via statistical linearization regression
- Implemented Gaussian Belief Propagation and CUDA-based parallel collision checking over sparse factor graphs, achieving over 97% runtime reduction compared to the GVIMP baseline
- Validated the method on WAM, PR2 and Franka manipulators in ROS/MoveIt, demonstrating robust motion planning across diverse, high-DOF scenarios

Path Planning and Tracking Control for Unmanned Surface Vehicle Sep 2022 – Jun 2023
Advisor: Dr. Yulin Si *Hangzhou, China*

- Developed heuristic algorithms for efficient path planning through densely deployed turbines in offshore wind farms
- Designed a model predictive control (MPC) algorithm for real-time trajectory tracking of the USV under environmental disturbances
- Conducted field experiments in a real lake environment, validating the performance of the proposed algorithm

Multi-robots Teleoperation Formation Control Apr 2021 – Jul 2022
Advisor: Dr. Zheng Chen *Hangzhou, China*

- Designed a formation control and obstacle avoidance algorithm for efficient multiple robots system control
- Simulated and analyzed different formation strategies using CoppeliaSim to evaluate coordination performance

Publications and Patents

- Hongzhe Yu, **Zinuo Chang**, Yongxin Chen. "Stochastic Motion Planning as Gaussian Variational Inference: Theory and Algorithms", *IEEE Transactions on Robotics, In Revision.* [Arxiv Link]
- **Zinuo Chang***, Hongzhe Yu* (co-first author), Patricio Vela, Yongxin Chen. "Efficient Iterative Proximal Variational Inference Motion Planning", *Robotics and Autonomous Systems, Under review.* [Arxiv Link]
- Haocai Huang, **Zinuo Chang**, Sitong Shen, Shujin Liu. 2022. A Multi-sensor and Highly Extensible Four-thrusters Underwater Detection Robot. CN Patent Application CN115535197A, filed October 2022.

Projects

Unmanned Ground Vehicle for Object Identification and Delivery May 2022 – Oct 2022

- Designed the chassis and robotic arm of a UGV, using Raspberry Pi for QR code and object recognition, and STM32 to control the vehicle and arm for autonomous object pickup and placement

Autonomous Underwater Robot for Target Recognition and Navigation Dec 2021 – Jun 2022

- Designed and assembled a fully submerged AUV with STM32 for low-level motion control and Raspberry Pi for trajectory tracking and target recognition

Technical Skills

Programming: Python, C/C++, Matlab
Software: ROS, Pytorch, MoveIt, CoppeliaSim, SolidWorks
Hardware: Raspberry Pi, STM32, Arduino