YIWEN YING

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ACADEMIC EXPERIENCES

Southern University of Science and Technology **2022.08-2026.06**

Information Engineering, Department of Electronic and Electrical Engineering

- **GPA: 94.52/100 | 3.92/4.0 | 80% credits A/A+ Rank: 2/43 English: CET6 - 604**
  Calculus (96+94) Linear Algebra (95) Probability and Statistics (97) C Programming (98) Data Structures and Algorithm Analysis (95) AI and Machine Learning (98) FPGA Design (97) Mobile Robot Navigation and Control (94) Robotic Motion and Control (93)

RESEARCH EXPERIENCES

➢ RCV LAB	Dept. of EE, SUSTech	Supervisor: Prof. **Hong Zhang**	2023.06-Present
➢ FAST LAB	Coll. of CSE, ZJU	Supervisor: Prof. **Fei Gao**	2025.01-Present
➢ CV-AI LAB	Dept. of EE, THU	Supervisor: Prof. Liangrui Peng	2024.08-2024.11

- **MfNeuPAN: Proactive End-to-End Navigation in Dynamic Environments via Direct Multi-Frame Point Constraints, first-author submission to 2025 IEEE International Conference on Robotics and Biomimetics (IEEE ROBIO 2025).**

Overview: A proactive, end-to-end local planning framework for efficient navigation in complex dynamic environments by incorporating predictive collision avoidance, addressing the inefficiencies of reactive, static obstacle avoidance strategies.

Contributions: The proposed method leverages multi-frame sensory data and employs DBSCAN clustering in conjunction with nearest-neighbor matching for accurate obstacle state estimation. Gaussian Mixture Models are utilized to predict obstacle trajectories. Inspired by NeuPAN, a deep unfolded network extracts latent obstacle features, which are integrated into a Model Predictive Control trajectory optimization module for dynamic obstacle avoidance.

Results: The generated trajectories are shorter and more efficient compared to baselines. Ablation studies validate the optimality and necessity of each proposed component.

- **DiCoIK: Generating Diverse and Collision-free Inverse Kinematics Solutions for Mobile Manipulators via Diffusion, proposed first-author submission to IEEE Robotics and Automation Letters (IEEE RA-L).**

Overview: A novel framework for solving the inverse kinematics (IK) problem of mobile manipulators, enabling efficient path planning with comprehensive coverage of the solution space and enhanced applicability through the incorporation of nonlinear constraints.

Contributions: A diffusion-based framework incorporates Transformer mechanisms, with optimization using the L-BFGS algorithm to generate desired IK solutions.

Results: Expanded the coverage of the solution space, encompassing the reachable workspace. Incorporated environmental representations into the inference process, enabling collision avoidance. The accuracy of the solutions is improved from the decimeter to the millimeter level.

- **SD-Loc: Global Localization in Challenging Semi-Dynamic Environment, proposed submission to 2026 IEEE International Conference on Intelligent Robots and Systems (IEEE IROS 2026).**

Overview: A re-localization algorithm by loss-weight registration for SLAM in semi-dynamic environments such as warehouses and parking lots, resulting in improved accuracy.

Contributions: Real-world experiments have been implemented, and the automatic generation and automated execution of simulation experiments have been achieved.

Results: While existing methods largely fail in semi-dynamic scenarios, the proposed approach achieves a re-localization success rate of approximately 60%.

- **Fully Automatic Task-Oriented Air-Ground Cooperative Robot System, selected as National Undergraduate Training Program for Innovation and Entrepreneurship**

Overview: An autonomous task-oriented system integrating UAV and wheeled robots.

Contributions: Developed a visual perception system for the UAV using RGB cameras, Intel RealSense D435i, OpenMV, and K210 for accurate environmental awareness. Implemented a UWB-localized, A*-guided wheeled robot on STM32 and stepper motors. Constructed a ground control station and wireless communication system for real-time monitoring and coordination.

Results: The system demonstrated target recognition and synchronized air-ground operations.

- **Multiple Projects in Computer Vision**

Universal Delivery Robot – Pressed the elevator button itself, instead of using a receiver in each elevator. Utilized the OCR-RCNN-based button recognition system to recognize the button. Funded by Guangdong Tech Innovation Program. Cooperative research with MeiTuan.

Precise 3D Reconstruction System from Object Images – Enhanced DUSt3R with ROI focus and gradient descent optimization for accurate, smooth 3D modeling from images.

Sign Language Translation System – Built ViT-based model with speech synthesis for translation from RGB video to speech. Recognized as an outstanding project by the Dept. of EE.

RESEARCH INTERESTS

My research interests focus on **learning-based robot motion planning**. Have comprehensive capabilities in full-stack robotics development including perception, planning and control, with expertise in the field of motion planning, SLAM, machine learning, and computer vision. My programming expertise spans Python, C++, and MATLAB.

HONORS & AWARDS

- 2024, **Student Model of Excellence**, SUSTech. (Top 7 among all undergraduates, 4000±)
- 2023, **Outstanding Student**, SUSTech. (Top 489 among all undergraduates, 3700±)
- 2024, **Outstanding Student Scholarship Second Prize**, SUSTech. (Top 15%)
- 2023, **Outstanding Student Scholarship Second Prize**, SUSTech. (Top 15%)
- 2023, **First Prize**, Guangdong Province, National University Math Competition. (Top 7%)
- 2024, **Outstanding Project**, Dept. of EE., SUSTech. (Top 5 out of 107, individual)
- 2024, **National Class 1 Athlete** (Mass Category), Women’ s 50m Freestyle Swimming.

SOCIAL WORK

- President of the Student Union, Dept. of EE., SUSTech
- Peer Mentor of Undergraduate Course, Signal and System, Dept. of EE., SUSTech