Yinglong (Albert) Miao

Piscataway, NJ • (+1) 702 890-6464 • yinglongmiao3@gmail.com •
linkedin.com/in/yinglong-miao • https://ylmiao541.github.io

Experienced robotics researcher and developer with 7+ years of experience in **robotic manipulation**, **task and motion planning**, **motion planning** and **deep learning**. Proven track record in designing, deploying, and optimizing vision-based robotic manipulation algorithms, ML-driven motion planning algorithms, and deep learning applications (RL, variational autoencoder, etc.). Skilled in Python, C++, ROS, MoveIt, Mujoco, and Pytorch, with a passion for solving real-world challenges and driving innovation.

WORK EXPERIENCE

PRACSYS Group • Rutgers University   09/2020 – 11/2024
Researcher

- Co-developed a modular robotic software architecture in ROS in **Python**, integrating task planning, real-time motion planning, and computer vision for object retrieval tasks in simulation (**Mujoco**) and the real world. Experienced with **Language Segment Anything Model** for language-prompted object segmentation and scene understanding.
- Designed and implemented a novel **Task and Motion Planning** algorithm to reconstruct occluded objects on a shelf using RGB-D images, achieving theoretical completeness and over 90% success rate with realistic objects.
- Established seamless communication of **Python** scripts through **ROS** with the Motman SDA10F controller, enabling smooth trajectroy execution on physical robots.
- Participated in the IROS 2020: Open Cloud Robot Table Organization Challenge. Implemented a motion planning pipeline in **Python** using **MoveIt** for autonomous pick-and-place tasks given **RGB-D images** for a UR5 robot.

Siemens • Berkeley   05/2021 – 08/2021
Advanced Robotics Internship • Internship

- Designed and implemented a **task and motion planning** pipeline using **ROS** and **MoveIt** in **Python** for precise handling of COVID-19 testing strips in flexible workspaces using a UR5 manipulator with RGB-D images.
- Programmed motion planning functions with **MoveIt** and **TRAC-IK** in Python for collision avoidance and efficient inverse kinematics in flexible environments.
- Calibrated dual RGB-D cameras for improved spatial perception and performed pose estimation using Aruco markers to ensure accurate testing strip manipulation.
- Accelerated test strip development by 2-3x, improving quality, reliability, and scalability while reducing technician dependency.
- Collaborated with a multidisciplinary team, including partners from Baxim BioMedical Inc. and Siemens Healthineers, under the guidance of project supervisors.

Advanced Robotics and Controls Lab • UC San Diego   10/2018 – 09/2020
Researcher

- Developed a **learning-based kinodynamic motion planning** algorithm in **C++** using **PyTorch**, integrating deep learning with RRT and MPC. Achieved 3x speed improvements over state-of-the-art methods while maintaining trajectory optimality.
- Implemented an **active continual learning framework** for motion planning using deep neural networks (MPNet) in **PyTorch**, reducing training data requirements by up to 75%.

EDUCATION

M.Sc. in Computer Science

Rutgers University • New Brunswick, NJ, US • GPA: 3.94/4.00   09/2020 - 05/2025

NSF NRT SOCRATES program, *09/2022 – 08/2024*

M.Sc. in Computer Science

University of California, San Diego • San Diego, CA, US • GPA: 4.00/4.00   09/2020

Graduation Thesis: Towards End-To-End Learning-Based Algorithms in Motion Planning

B.Sc. in Computer Science with Honours, First Class

The Chinese University of Hong Kong • Hong Kong • GPA: 3.76/4.00   07/2018

ELITE Stream & Intelligent Science Stream, Dean's List, Department Admission Scholarship, Talent Development Scholarship

PROJECTS

CVAE for Sampling-based Motion Planning   09/2020 - 12/2020

Course project at Rutgers University. Applied **Conditional Variational Autoencoder** for sampling-based motion planning, enabling learning of conditional distribution by user inputs.

PUBLICATIONS

Resolution Complete In-Place Object Retrieval given Known Object Models   07/2023

International Conference on Robotics and Automation

Safe, occlusion-aware manipulation for online object reconstruction in confined spaces   09/2022

The International Symposium of Robotics Research

Online object model reconstruction and reuse for lifelong improvement of robot manipulation   05/2022

International Conference on Robotics and Automation

ICRA 2022 Outstanding Manipulation Paper Award-Finalist

Efficient and high-quality prehensile rearrangement in cluttered and confined spaces   05/2022

International Conference on Robotics and Automation

MPC-MPNet: Model-Predictive Motion Planning Networks for Fast, Near-Optimal Planning under Kinodynamic Constraints   07/2021

IEEE Robotics and Automation Letters

Motion planning networks: Bridging the gap between learning-based and classical motion planners   02/2021

IEEE Transactions on Robotics

Active continual learning for planning and navigation

ICML 2020 Workshop on Real World Experiment Design and Active Learning

SKILLS

Programming and tools: Python, C/C++, Jupyter Notebooks, ROS, MoveIt, PyTorch, OMPL, Mujoco, PyBullet, Pandas, OpenCV

Algorithms: Task and Motion Planning, Trajectory Optimization, Kinodynamic Motion Planning