Yinglong MIAO

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SUMMARY: 7+ years experience | Motivated AI, Machine Learning, and Robotics Engineer.

EDUCATION

M.Sc. Computer Science - Rutgers University, New Brunswick, NJ   **Sep 2020 - May 2025**
GPA: 3.94/4.00 | NSF NRT SOCRATES Traineeship | Advisor: Dr. Kostas Bekris

M.Sc. Computer Science - University of California, San Diego, CA   **Sep 2020**
GPA: 4.00/4.00 | Thesis: Towards End-To-End Learning-Based Algorithms in Motion Planning
ML on Geometrical Data (A+), Computer Vision I (A), Probabilistic Reasoning & Learning (A+), Neural Networks / Pattern Recognition (A+), Convex Optimization Algorithms (A)

B.Sc. Computer Science *First Class* - Chinese University of Hong Kong, Hong Kong   **Jul 2018**
Major GPA: 3.76/4.00 | ELITE Stream & Intelligent Science Stream | Dean's List
Thesis: Reinforcement Learning in a Real-Time Fighting Game
Matrix Analysis and Computations (A), Web-scale Information Analytics (A)

SKILLS

Machine Learning: Neural Networks, CNN, LSTM, RL, Generative AI, Agentic AI, LLM
Machine Learning Frameworks: Google Gemini API, PyTorch, TensorFlow, Pandas
Programming and Tools: Python (NumPy, SciPy, etc.), C++, Linux, Docker, GitHub, MySQL, ROS, OpenCV, MuJoCo, PyBullet, MoveIt, OMPL

WORK EXPERIENCE

Research Assistant - PRACSYS GROUP, RUTGERS UNIVERSITY   **Sep 2021 - Nov 2024**
- Developed a modular robotic software framework in **ROS** (**Python**), integrating task planning, motion planning, and computer vision for object retrieval in simulation and the real world. Applied Language Segment Anything Model for Language-Prompted Object Segmentation and Scene Understanding.
- Developed a **Task and Motion Planning algorithm** leveraging RGB-D cameras and 3D object reconstruction for occlusion-aware manipulation, achieving 90% success rate with realistic objects.
- Contributed to the IROS 2020 Open Cloud Robot Table Organization Challenge. Developed a **motion planning pipeline** for pick-and-place tasks and used **Docker** for containerization and deployment.
- Maintained codebase using **GitHub**, managing version control, branching, and collaboration.

Advanced Robotics Intern - SIEMENS, BERKELEY   **May 2021 - Aug 2021**
- Designed and implemented task and motion planning pipelines in **Python** using **ROS** and **MoveIt** for a UR5 manipulator, enabling collision-free and automated manipulation of COVID-19 test strips.
- Calibrated dual RealSense RGB-D cameras and performed pose estimation using ArUco markers, improving accuracy and reliability. Used **OpenCV** for image processing and surveillance applications.
- Conducted experiments and performance evaluation, accelerating test strip development by 2-3×.
- Collaborated with multidisciplinary teams, including partners from Baxim BioMedical Inc. and Siemens Healthineers, to deliver real-world robotic automation solutions.

Research Assistant - ADVANCED ROBOTICS AND CONTROLS LAB, UCSD   **Oct 2018 - Sep 2020**
- Developed an end-to-end **learning-based motion planning** algorithm with parallel computation in **C++** and **Python** using **PyTorch**, achieving 3× speed improvement over state-of-the-art methods.
- Implemented **active continual learning** in **Python** for motion planning using deep neural networks (MPNet), reducing training data requirements by up to 75%.

AI & Robotics Projects

Medical Assistant – Google Gen AI Intensive Course Capstone April 2025
- Designed a **multi-agent** healthcare chatbot integrating **Google's Gemini API**, enabling users to inquire about medical topics and search for providers through natural language interactions.
- Implemented **Retrieval-Augmented Generation (RAG)** using **ChromaDB vector database** with cosine similarity, enhancing the chatbot's domain-specific knowledge retrieval.
- Integrated **function calling** mechanisms with **document (API) understanding**, enabling the chatbot to execute API calls for real-time doctor information retrieval via the CMS dataset API.
- Utilized **few-shot prompting** to guide the chatbot's API interactions, reducing syntax errors and improving response accuracy.
- Participated in Google's 5-Day Generative AI Intensive course, gaining hands-on experience with LLMs, embeddings, agent design, and MLOps practices for deploying generative AI applications.

CVAE for Sampling-based Motion Planning Sep 2020 - Dec 2020
- Designed and trained a Conditional Variational Autoencoder in **PyTorch** to generate motion planning samples conditioned on progress, mimicking expert path distributions to improve planning efficiency.

Deep learning for 3D Collision Checking Jan 2019 - Mar 2019
- Implemented Siamese Network with PointNet in **PyTorch** (**Python**) for collision checking on 3D point clouds, achieving 90%+ accuracy on complex objects.

Awards

Outstanding Manipulation Paper Award-Finalist, IEEE Robotics and Automation Society **2022**

Publications

[1] D. Nakhimovich, **Y. Miao**, and K. E. Bekris, "Resolution complete in-place object retrieval given known object models," in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, IEEE, 2023, pp. 3714–3720.

[2] **Y. Miao**, R. Wang, and K. Bekris, "Safe, occlusion-aware manipulation for online object reconstruction in confined spaces," in *The International Symposium of Robotics Research*, Springer, 2022, pp. 268–284.

[3] R. Wang, **Y. Miao**, and K. E. Bekris, "Efficient and high-quality prehensile rearrangement in cluttered and confined spaces," in *2022 International Conference on Robotics and Automation (ICRA)*, IEEE, 2022, pp. 1968–1975.

[4] S. Lu, R. Wang, **Y. Miao**, C. Mitash, and K. Bekris, "Online object model reconstruction and reuse for lifelong improvement of robot manipulation," in *2022 International Conference on Robotics and Automation (ICRA)*, IEEE, 2022, pp. 1540–1546.

[5] L. Li, **Y. Miao**, A. H. Qureshi, and M. C. Yip, "Mpc-mpnet: Model-predictive motion planning networks for fast, near-optimal planning under kinodynamic constraints," *IEEE Robotics and Automation Letters*, vol. 6, no. 3, pp. 4496–4503, 2021.

[6] A. H. Qureshi, **Y. Miao**, A. Simeonov, and M. C. Yip, "Motion planning networks: Bridging the gap between learning-based and classical motion planners," *IEEE Transactions on Robotics*, vol. 37, no. 1, pp. 48–66, 2020.

[7] A. H. Qureshi, **Y. Miao**, and M. C. Yip, "Active continual learning for planning and navigation," in *ICML 2020 Workshop on Real World Experiment Design and Active Learning*, 2020.

Teaching Experience

Teaching Assistant - Rutgers University, UCSD
- Led recitations, graded assignments, and mentored students in algorithms, AI, robotics, and data science courses.