

KAITIAN CHAO

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github.com/Beethoven-Q

PROFESSIONAL SUMMARY

Kaitian Chao is a first-year Master's student in Robotics at the University of Pennsylvania, specializing in learning, control, and 3D computer vision. He has extensive experience in deep learning and robotics research, with projects spanning robotic fish modeling and control, F1tenth autonomous driving, robot arm fine-manipulation, diffusion models, and large language models, all aimed at advancing AI-driven capabilities. His passion lies in leveraging cutting-edge AI and vision technologies to develop super-intelligent robotics and software that can significantly enhance productivity.

EDUCATION

University of Pennsylvania

August 2024 - May 2026

Master's, Robotics

- Machine Perception
- Control and Optimization with Applications in Robotics
- F1/10 Autonomous Racing Cars
- Learning in Robotics
- Advanced Robotics
- Introduction to Robotics

ShanghaiTech University

September 2020 - July 2024

Bachelor's, Electrical Engineering

GPA: 3.73

- Stochastic Processes
- Introduction to Communication Systems

University of California - Berkeley

August 2022 - May 2023

Certification, Electrical Engineering and Computer Science

GPA: 3.96

- Designing, Visualizing and Understanding Deep Neural Networks
- Introduction to Machine Learning
- Feedback Control Systems
- Optimization Models in Engineering
- Data Structures

PROFESSIONAL EXPERIENCE

Penn Aerial Robotics

Philadelphia, PA, USA

Software and Algorithm Engineer

October 2024 - Present

- Work in software and algorithm team to design autonomous control, perception and machine learning algorithm for the UAV plane.
- Participated in the SAE Aero Design West 2025 competition, achieving 2nd place nationally with the team; successfully completed 3 takeoffs and 1 full flight sequence, lifting over 110 lbs in total payload.

ShanghaiTech University

Shanghai, China

Undergraduate Researcher

October 2023 - October 2024

- Developed a general and effective method for the dynamic modeling of robotic fish in the background flow environment, utilizing the Domain Adversarial Meta Learning algorithm to achieve flow-agnostic and adaptive modeling.
- Designed and trained deep reinforcement learning policy to enable robust control of robotic fish swimming with different flow conditions.
- First author of a paper on learning-based dynamic modeling of robotic fish in flow environment, currently under review for the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2025)

University of California - Berkeley

Berkeley, CA, USA

Undergraduate Researcher

May 2023 - April 2024

- Optimized systems based on Witsenhausen's Counterexample, using neural networks to explore control, communication, and estimation trade-offs. Designed quantization strategies that set a new benchmark record.

ShanghaiTech University*Undergraduate Researcher***Shanghai, China***May 2023 - September 2023*

- Fine-tuned the pretrained large language model in different ways using Parameter-Efficient Fine-Tuning (PEFT), and evaluated their performance under different benchmarks.
- Participated in training a Reward Model with the Llama 2 style training method, using Baichuan-13B as the base model for future RLHF training.

ShanghaiTech University*Undergraduate Researcher***Shanghai, China***October 2021 - April 2022*

- Explored possibility of using a designed power relay module to extend multiple-load charging function for wireless chargers; designed compensation circuit network for power relay module using ADS.
- Tested our module in the laboratory to acquire better parameters; published two papers at IEEE conference with our research findings.

PROJECTS & OUTSIDE EXPERIENCE

Last mile of fine-grained manipulation with skill models from imitation learning**Philadelphia, PA, USA***January 2025 - Present*

- Developing a modular framework that decouples global planning from precise manipulation
- Designed a plug-and-play fine-manip module—comprising a pool of imitation-learned skill models and an intelligent skill selector—that integrates with foundation models with minimal fine-tuning, outperforming current methods in dexterous manipulation.

F1Tenth Autonomous Racing Car*Team leader***Philadelphia, PA, USA***January 2025 - Present*

- Led a team to develop and deploy a complete autonomous driving system on a 1/10-scale F1 racing car
- Our project integrates LiDAR- and vision-based perception with SLAM, particle filtering for mapping/localization, reactive algorithms and RRT* for obstacle-avoidance path planning, and MPC for optimal control
- Additionally, we employ reinforcement and imitation learning to optimize racing strategies, covering the full development lifecycle from sensor integration to real-time planning and control in preparation for the F1TENTH competition.
- [Link to project](#)

Dynamic Pick-and-Place Motion Planning with 7-DOF Franka Emika Panda robot arm**Philadelphia, PA, USA***November 2024 - December 2024*

- Developed an end-to-end pipeline for real-time 7-DOF robot to pick and place static and dynamic blocks using ROS and Gazebo framework. Implemented motion planning using Geometric Inverse Kinematic and bi-directional RRT for tight and fast control.

Stable Diffusion Model Implementation for Image Synthesis**Berkeley, CA, USA***April 2023 - May 2023*

- Led team to implement a simplified stable diffusion model by combining a Variational AutoEncoder with a common diffusion model to develop a demo to generate car images.

SKILLS

Skills: Python, Pytorch, ROS2, Gazebo, Pybullet, Java, C/C++, MATLAB, C#, Unity, Git, Machine learning, Deep reinforcement learning, 3D computer vision, SLAM, NERF, Excel/Numbers/Sheets

Languages: Chinese, English