Yiyang Shao

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EDUCATION

University of California, Berkeley Berkeley, California
Exchange Program 2024.8–Present
University of Science and Technology of China Hefei, China
B.S. in Modern Mechanics. Overall GPA: 3.74 / 4.3 (Ranking: 5 / 63) 2021.9–Present

Selected Coursework: **11 A+** (Mathematical Analysis, Linear Algebra, Theoretical Mechanics, Thermotics, Mechanics, Statistical Thermodynamics, Viscous Fliud Dynamics, Mechanics of Fluids in Porous Media, Mechanical Design Basis, etc), **18 A** (Computer Vision, Probability Theory and Mathematical Statistics, Function of Complex Variable, Elementary Fluid Mechanics, etc), **6 A-**

EXPERIENCE

UC Berkeley, Hybrid Robotics Group 2024.8-present
• Robot locomotion control research with Prof. Koushil Sreenath.
• Focus on locomotion control for humanoid robots using reinforcement learning, imitation learning and model predictive control.
Robomaster at USTC (Robotics Team & Club) 2022-2024
• Developed state estimation and optimal control for a wheeled-bipedal robot, 3D SLAM and navigation for an omnidirectional robot, and object detection and motion prediction for autonomous shooting.

Research Projects

Humanoid Whole Body Control Via Text Command
• Developed a whole body controller for a humanoid robot through text command, based on the teacher-student framework.
• Teacher policies are trained using reinforcement learning to track captioned reference motion from HumanML3D.
• A text-conditioned student policy is then distilled from the teacher policies using behavior cloning and finetuned through reinforcement learning to transit between motions.
• The result policy demonstrates capability to perform sequential motions based on text commands.VIDEO
Learning for Safe Multiple Heterogeneous Quadcopter Control via Generalizable Barrier Certificate
• Developed a heterogeneous safe controller for quadcopters with generalizable barrier certificate.
• Simultaneously learn the control barrier function and constrained control policy.
• Online system identification from observation history for heterogeneous adaptation. VIDEO
Geometry Variation Model Predictive Control For Bipedal Robot
• Geometry representation of system dynamic, invariant to coordinate system and free from singularity.
• Variation-based linearization of system dynamic to ensure the discretized system is energy-conserving.
• Enable stable walking of a bipedal robot.VIDEO
State Estimation and control of a bipedal robot
• Developed a robust state estimation and high-performance control algorithm for a wheeled-bipedal robot.
• Detect slipping based on the velocity difference of wheels' contact points with the ground in the inertial frame to adjust covariance in state estimation Kalman filter.
• Designed LQR controller based on whole-body dynamics.VIDEO
SLAM and navigation of a omnidirectional robot
• Develop a navigation system for a mobile robot to navigate through uneven terrain.
• Enhance localization frequency and accuracy by integrating lidar, IMU, and encoder data using a Kalman filter.
• Analyze terrain traversability through point cloud segmentation.VIDEO

SKILLSET

Expertise	Deep Reinforcement Learning, Optimal Control, SLAM, Motion Planning
Programming	Python, C++/C, PyTorch, Matlab, Mathematica
Tool	ROS/ROS2, OpenCV, Git, Linux, Docker
Language	Mandarin, English (TOEFL 107)

AWARDS

Grand Prize of Zhou Peiyuan Mechanics Competition at Provincial Level	Jun 2023
1st Prize of RoboMaster 2023 The RoboMaster University Championship	Apr 2024
1st Prize of RoboMaster 2023 RoboMaster University League	Jun 2024
1st Prize of 2023 Mitsubishi Electrical and Automation Contest Eastern Region	Jun 2023
1st Prize of 2023 SLAMTEC SLAM Autonomous Driving Challenge	Aug 2023
2nd Place of 2023 USTC Artificial Intelligence Innovation Contest	Sep 2023
JAC NIO Scholarship	Oct 2022