He Yin

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Education

UNIVERSITY OF CALIFORNIA, BERKELEY | PhD in Controls | Cum. GPA: 3.9 / 4.0
Mechanical Engineering | May 2021 | Berkeley, U.S.
Dissertation: Robustness in nonlinear and learning based control
Advisors: Andy Packard & Murat Arcak
Major: Controls. Minors: Learning & Optimization

HARBIN INSTITUTE OF TECHNOLOGY | Bachelor of Science | Cum. GPA: 3.7 / 4.0
Mechanical Engineering | July 2016 | Harbin, China

Experience

AMAZON ROBOTICS, PERSONAL ROBOTICS GROUP | Applied Scientist II/III
July 2022 – Current | Sunnyvale, U.S.

Vision Language Action Model For Humanoid Robot Navigation | PyTorch & IsaacLab

- ✏ Led the navigation team in developing VLA-based humanoid navigation; built the pipeline for collecting and annotating expert demonstration data, and improved model performance through supervised fine-tuning, outperforming both the expert policy and the baseline VLA. Also actively explored video-action-model-based approaches for navigation.

Reinforcement Learning Based Whole Body Control for Humanoid Robot | PyTorch & IsaacLab & IsaacGym

- ✏ Developed whole-body control policies for Unitree G1 spanning locomotion with robust sim-to-real transfer and natural movement, object reaching with real-time payload estimation and human-like manipulation (e.g., knee bending for low objects), and motion tracking via a teacher-student distillation pipeline trained on retargeted human demonstrations.

Navigation, motion planning, and autonomous exploration for wheeled robots | C++

- ✏ Navigation & Motion Planning: Developed a real-time navigation and motion planning framework for wheeled robots using Model Predictive Control (MPC) and path planning methods, generating dynamically feasible and collision-free trajectories under kinematic and environmental constraints.
- ✏ Autonomous Exploration: Designed a probabilistic active loop closure (ALC) algorithm that models loop closure as a stochastic event and optimizes exploration policies to reduce pose graph uncertainty, significantly improving mapping accuracy and exploration efficiency, leading to a peer-reviewed publication.

TUSIMPLE, INC | Research Scientist II
June 2021 – July 2022 | San Diego, U.S.

Designed and implemented an advanced Model Predictive Control based framework for semi truck control and lateral trajectory generation. | C++

- ✏ Identified a lightweight yet high-fidelity semi-truck model for control design, developed non-quadratic costs to differentiate safe-region regulation from boundary behavior, implemented a line-search SQP solver for nonlinear MPC, and used recursive least squares for online model-mismatch identification.

Skills

ROBOTICS

VLA • RL based Whole Body Control for Locomotion, General Motion Tracking • Teacher-Student Training • SLAM • Kalman Filter • RRT • A* • MPC • iLQR • DDP
System ID • LPV / Robust Control • Control Barrier Function • Reachability Analysis • Nonlinear Lyapunov Control

PROGRAMMING

Deep Learning Framework:
IsaacLab • IsaacGym • PyTorch • TensorFlow • Numpy

Proficient:
C++ • Python • Julia • MATLAB & Simulink • LaTeX

OPTIMIZATION

SQP • SDP • Sum of Squares • Gradient Descent • Heavy-ball Method • Newton's Method • Interior Point Method • ADMM

TOOLS/PLATFORMS

Git • Docker • ROS

Awards

- Brockett-Willems Outstanding Paper Award, Systems & Control Letters 2021
- Graduate Division Block Grant Award, UC Berkeley 2018

Courses

Intro. to Machine Learning • Deep Reinforcement Learning • Convex Optimization and Approximation • Applied Dynamic Programming • Nonlinear Systems • Experiential Advanced Control Design •Advanced Control Systems •System Theory

Intern Project Mentorship

- Mentored Jing Liang on 3D map reconstruction project, providing guidance on architecture design and collaborating on memory optimization and performance improvement strategies; co-authored two research paper submitted to IROS 2025 & ICRA 2026.
- Led technical mentorship for Amanda Adkins on articulated scene modeling using dynamic Gaussian splatting, conducting comprehensive literature analysis to define project scope and facilitating twice-weekly strategic discussions; expected IROS submission by March 2026.
- Co-advised Zichao Hu on vision-aided whole-body control for humanoid object pushing, providing specialized technical consultation on reward function engineering, neural architecture optimization, and experimental methodology; expected IROS submission by March 2026.

Selected Publications

- ✏ R. Xian*, J. Liang, H. Yin, X. Qi, D. Manocha, "GaussianSSC: Triplane-Guided Directional Gaussian Fields for 3D Semantic Completion", Submitted to ICRA 2026.
- ✏ J. Liang*, H. Yin, X. Qi, J.J. Park, M. Sun, R. Madhivanan, D. Manocha "ET-Former: Efficient Triplane Deformable Attention for 3D Semantic Scene Completion From Monocular Camera", IROS 2025.
- ✏ H. Yin*, J.J. Park, M. Almeida, M. Labrie, J. Zamiska, R. Kim, "Probabilistic Active Loop Closure for Autonomous Exploration", ICRA 2024.
- ✏ H. Yin*, P. Seiler, M. Jin, M. Arcak, "Imitation Learning with Stability and Safety Guarantees", IEEE Control Systems Letters, 2021.
- ✏ F. Gu*, H. Yin*, L. El Ghaoui, M. Arcak, P. Seiler, M. Jin, "Recurrent Neural Network Controllers Synthesis with Stability Guarantees for Partially Observed Systems", AAAI 2022.
- ✏ N. Junnarkar, H. Yin, F. Gu, M. Arcak, P. Seiler, "Synthesis of Stabilizing Recurrent Equilibrium Network Controllers", submitted to IEEE CDC 2022.
- ✏ H. Yin*, P. Seiler, M. Arcak, "Stability Analysis using Quadratic Constraints for Systems with Neural Network Controllers", IEEE Transactions on Automatic Control, 2021.
- ✏ Z. Ul Abdeen, H. Yin, V. Kekatos, M. Jin, "Learning Neural Networks under Input-Output Specifications", IEEE ACC 2022.
- ✏ K. Schweidel, H. Yin, S. Smith, M. Arcak, "Safe-by-Design Planner-Tracker Synthesis", Annual Reviews in Control, 2022.