

Qianzhong Chen

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EDUCATION

Stanford University

Stanford, CA

Master of Science in Mechanical Engineering

Sept. 2023-June 2025(expected)

University of Illinois Urbana-Champaign (UIUC)

Champaign, IL

Zhejiang University (ZJU)

Hangzhou, Zhejiang, China

Bachelor of Science in Mechanical Engineering (Joint Program)

Sept. 2019-June 2023

PUBLICATION

- **Q. Chen**, S. Cheng and N. Hovakimyan, "Simultaneous Spatial and Temporal Assignment for Fast UAV Trajectory Optimization Using Bilevel Optimization," in IEEE Robotics and Automation Letters, vol. 8, no. 6, pp. 3860-3867, June 2023, doi: 10.1109/LRA.2023.3273399.

RESEARCH EXPERIENCE

Research on Autonomous Unmanned Aerial Vehicles (UAV)

Champaign, IL

Research Assistant, Advanced Controls and Research Laboratory, UIUC

Jan. 2022-Apr. 2023

Supervisor: Dr. Naira Hovakimyan, Professor of Mechanical Science and Engineering Department, UIUC

- Developed a collision-free bilevel trajectory optimization system with optimal waypoints' temporal and spatial assignment for autonomous quadrotor's motion planning based on convex optimization, increasing the computational efficiency by 150%. The work has been published on IEEE RA-L and presented on IROS 2023
- Deployed the trajectory optimization program together with path planning system on Nvidia TX2 onboard computer

Neural Radiance Fields (NeRF) Based end-to-end Ground Robot Navigation and Control Research

Stanford, CA

Research Assistant, Multi-Robot Systems Lab, Stanford University

Nov. 2023-Now

Supervisor: Dr. Mac Schwager, Associate Professor of Aeronautics and Astronautics Department, Stanford University

- Developed a framework that combine NeRF with differentiable simulator to train end-to-end autonomous robot visual navigation policy
- Trained an end-to-end autonomous robot navigation and control policy with differentiable RL algorithm by leveraging NeRF's detailed 3D spatial information and differentiability, improving the absolute trajectory error by 8% compared with major vision-slam algorithms.

Auto-tuning Bipedal Robot MPC Controller under Challenge Terrian with DiffTune

Champaign, IL

Research Assistant, Advanced Controls and Research Laboratory, UIUC

Feb. 2024-Now

Supervisor: Dr. Naira Hovakimyan, Professor of Mechanical Science and Engineering Department, UIUC & Dr. Quan Nguyen, Assistant Professor of Aerospace and Mechanical Engineering, USC

- Developed a legged robot MPC controller auto-tuning framework that conducts sensitivity analysis on bipedal robot's stance force over MPC parameters. Auto-tuning MPC decreased the control smooth loss and tracking loss by 60% compared to hand-tuned MPC.
- Trained an actuator net with real sensor data that maps MPC solution to real ground reaction force to decrease sim-to-real error. The actuator net is included in the auto-tuning differentiation chain.

Aerial Vision and Dialog Navigation with LLM

Santa Cruz, CA

Research Assistant, Eric AI Lab, UCSC

June 2024-Now

Supervisor: Dr. Xin (Eric) Wang, Assistant Professor of Computer Science and Engineering, UCSC

- Developed a drone navigation framework that uses multi-model LLM to process satellite image and human instruction simultaneously, generating a detailed and formal flight plan.
- Developed an image processing pipeline that segment the image and selects the interested area, then convert the image into structure vectors format for better visual understanding.

COURSES

- Robot Autonomy, Machine Learning, Advanced Feedback Control, Artificial Intelligent, Deep Neural Networks for Computer Vision, Introduction to Robotics, Haptics Design and Control

PROFESSIONAL EXPERIENCE

Unitree Robotics

Hangzhou, Zhejiang, China

Robot Control Engineer Intern

May 2023-Aug. 2023

- Designed and developed the novel data-driven quadrupedal robot locomotion and controls framework using C++ and Python that increases the robot payload by 15% compared with traditional model-based control framework:
 - Built the deep reinforcement learning robot locomotion and controls policy in Isaac Gym environment with Pytorch
 - Developed an auto deployment tool using C++ including 3 subsystems (communication, state estimation, model inference)
- Developed the quadrupedal robot state estimator based on data-driven Extended Kalman Filter, increasing the estimation accuracy by 23%

GEELY Automobile Group

Hangzhou, Zhejiang, China

Engineer Intern, Chassis Department

Aug. 2021-Sept. 2021

- Develop control arm, steering knuckle in automobile's suspension system for Geely LEVC TX, 03//2022 go to the market
- Designed and developed an intelligent test and report system using Flask and ReatJS, which supports 10+ test report generation. Built a visualization dashboard for aggregated test metrics and analysis data (e.g. chassis dynamics, structure reliability)