Hanyu Zhang

Zhejiang, China

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Education

Zhejiang University, China *2022-2026 (expected)*

Bachelor of Engineering in Automation   *Chu Kochen Honors College "Mixed Class"*

- College of Control Science and Engineering
- **GPA**: 93/100 (4.18/4.30)   **Ranking**: **1** /121
- **Minor** in *Physics*
- **Core Courses**:

  $\mathbb{M}$athematics: Calculus (97/100), Mathematical Analysis (97/100), Linear Algebra (97/100), Probability and Statistics (98/100), Statistical Learning (95/100)

  $\mathbb{P}$hysics: General Physics(I) (97/100), Mathematical Physics(I) (96/100), Electrodynamics (92/100)

  $\mathbb{P}$rogramming: Fundamentals of C Programming (96/100), Embedded System (95/100)

  $\mathbb{E}$ngineering: Principles of Automatic Control (96/100), Modern Control Theory (95/100), Electric Circuit and Analog Circuit (96/100), Signal Analysis and Processing (95/100), Intelligent Control (97/100), Robot Modeling and Control (96/100)

Research Interest

Mathematics in Robotics & Control System , **Mechatronics** , **Statistical Learning**

- Geometric Control and Equivariance in Robotics
- Dynamical System Approach for Learning from Demonstration
- Well-Designed and Reliable Hardware Still Matters
- Interdisciplinary Fields of Physics and Engineering

Selected Awards

National Scholarship, *Ministry of Education*   *2023-2024 and 2024-2025*

The First Prize Scholarship of Zhejiang University, *Zhejiang University*   *2023-2024 and 2024-2025*

Publication

- Singularity-Avoidant Motion Mappings for Pose-Tracking Teleoperation with Operational Jacobian Analysis
  Jianshu Zhou*#, Boyuan Liang#, Junda Huang, **Hanyu Zhang**, Ian Zhang, Yixiao Wang, Pieter Abbeel, Masayoshi Tomizuka*   Submitted to *IEEE/ASME Transactions on Mechatronics* (Under Review)

Research Experience

Mechatronics and Teleoperation *May 2025 - October 2025*

Advisor: Prof. Masayoshi Tomizuka   *Mechanical Systems Control Lab, University of California, Berkeley*

  I was responsible for one of the two mapping strategies presented in this paper — designing both the universal-joint hardware and the corresponding algorithm that together yield a more intuitive, singularity-robust pose-tracking teleoperation method.

- Hardware: I designed the structural components of a custom robot joint and integrated actuation motors. I established communication across all motors and the industrial manipulator, also integrating a haptic device as the human operator interface.
- Algorithm: I developed the inverse kinematic and control mapping required for whole-manipulator control. This algorithm was verified and validated both in simulation and on a real physical industrial manipulator.

Hardware and Control Algorithm Design *October 2024 - May 2025*

Advisor: Prof. Tiefeng Li *Center for X-Mechanics, Zhejiang University*

   This project was inspired by the buoyancy mechanisms of marine mammals. It focuses on the development of control algorithms for devices that modulate buoyancy through the phase transition of paraffin wax. This involves conducting hardware experiments, constructing physical models, and performing simulation analyses in *Simulink*. Additionally, the research explores the potential application of these devices in extreme high-pressure environments.

Visual Servo Peg Insertion *March 2024 - April 2025*

Advisor: Prof. Rong Xiong *College of Control Science and Engineering, Zhejiang University*

   I led a student research training program about robotic arm peg-insertion task using the visual servo method. This work extended prior work on vision-based peg localization. During peg-in-hole experiment, we captured raw images using a RealSense camera, segmented the peg and hole, and then used a neural network to predict the position and orientation deviations. The robotic arm's end-effector was adjusted accordingly to achieve accurate insertion. We have trained the network using data obtained from *PyBullet* simulations, setup a small-scale physical manipulator and verify the method on it. The project was conducted at *Zhejiang Humanoid Robot Innovation Center*.

Skills

Python, C/C++, ROS, MATLAB & Simulink, SolidWorks, LaTeX