Zizhe Zhang

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website | github | linkedin | scholar

EDUCATION

University of Pennsylvania, *GRASP Lab* — Aug 2024 – Present
Master of Science in Engineering (M.S.E.) in Robotics — *Philadelphia, PA*
Advisor: Prof. Nadia Figueroa

University of California San Diego, *Jacobs School of Engineering* — Jan 2023 – Mar 2023
Visiting Student — *San Diego, CA*

Southeast University, *School of Instrument Science and Engineering* — Aug 2020 – Jun 2024
Bachelor of Engineering (B.E.) in Measuring Control Technology & Instruments — *Nanjing, China*
Advisor: Prof. Yuan Yang

PUBLICATIONS

(* and † denote equal contribution)

Viability-Preserving Passive Torque Control
Zizhe Zhang*, Yicong Wang*, Zhiquan Zhang, Tianyu Li, and Nadia Figueroa
Under Review [arXiv] [PDF] [Website]

Flow with the Force Field: Learning 3D Compliant Flow Matching Policies from Force and Demonstration-Guided Simulation Data
Tianyu Li*, Yihan Li*, **Zizhe Zhang**, and Nadia Figueroa
Under Review [arXiv] [PDF] [Website]

VLMgineer: Vision Language Models as Robotic Toolsmiths
George Jiayuan Gao*, Tianyu Li*, Junyao Shi, **Zizhe Zhang†**, Yihan Li†, Nadia Figueroa, and Dinesh Jayaraman
Under Review at International Conference on Learning Representations (ICLR), 2026 [arXiv] [PDF] [Website]
*Robotics: Science and Systems (RSS) Workshop on Robot Hardware-Aware Intelligence (**Oral Spotlight**)*, 2025

Image-Based Visual Servoing for Enhanced Cooperation of Dual-Arm Manipulation
Zizhe Zhang, Yuan Yang, Wenqiang Zuo, Guangming Song, Aiguo Song, and Yang Shi
IEEE Robotics and Automation Letters (RA-L), 2025 [arXiv] [PDF] [Website]

RESEARCH AND INDUSTRY EXPERIENCE

Visiting Scholar, Duke University — *Durham, NC*
Robot Dexterity Lab, advised by Prof. Xianyi Cheng — Jun 2025 – Aug 2025
Working on developing an adaptive compliance motion representation for generalizable robotic manipulation and physical human–robot interaction (In Progress)

Graduate Research Assistant, University of Pennsylvania — *Philadelphia, PA*
Figueroa Robotics Lab, advised by Prof. Nadia Figueroa — Nov 2024 – Present
Working on machine learning applications in control theory and robot manipulation. Projects include:
- Ensuring feasibility of passivity-based torque control via learned kinematic constraint mappings (*Under Review*)
- Implementing vision-based learning with force feedback for contact-rich manipulation tasks (*Under Review*)
- Utilizing Vision Language Models (VLMs) for robot policy synthesis (*RSS Workshop 2025*)

Technical Intern, Schneider Electric — *Shanghai, China*
Working in the Kylin project, including: — Jun 2023 – Aug 2023
- IGBT thermal simulations
- Capacitor lifetime assessments
- EMC testing
- Circuit design

Undergraduate Research Assistant, Southeast University *Nanjing, China*
Robotic Perception and Control Lab, advised by Prof. Yuan Yang Dec 2023 – Aug 2024
Worked on developing visual-servoing-based robotic control architectures. Projects include:
- Designed an enhanced dual-arm collaborative control system based on image-based visual servoing (*RA-L 2025*)
- Designed a shared teleoperation system control based on visual servoing (*Bachelor Thesis*)

Automotive Safety Technology Lab, advised by Prof. Dong Wang Mar 2022 – Jun 2023
- Applying edge detection to classify Martian topography and identify soft-ground hazards
- Designed a wheeled-leg ground-detection mechanism for rover traversal and analyzing force signals to predict mobility

Advanced Navigation Technology Lab, advised by Prof. Xuanpeng Li Jul 2023 – Sep 2024
- Utilizing the PYTS library for signal visualization and building a CNN to extract and classify features from ADS-B radio signals

COURSE PROJECTS

News Source Classification, University of Pennsylvania *Philadelphia, PA*
Team of 3, Leader Aug 2024 – Dec 2024
- Collected and preprocessed 415,343 headlines from Fox News and NBC using sitemap scraping and BeautifulSoup, ensuring a balanced, cleaned dataset
- Built a TF-IDF + Logistic Regression baseline and fine-tuned BERT and DeBERTa models, applying k-fold cross-validation to eliminate data leakage
- DeBERTa K-fold achieved 88.66 % test accuracy, significantly surpassing the baseline (67.61 %)

Autonomous Vehicle based on GPS & DoF Camera, University of California San Diego *San Diego, CA*
Team of 3 Jan 2023 – Mar 2023
- Utilized Python and VESC to control the robot, DoF camera to find and track lanes, centimetric GPS and PID method to record and follow paths
- Brought the robot to a complete stop by using PyVesc and DepthAI libraries to run stop sign detection on the camera
- Enabled the robot to respond correctly to speed limit signs by performing text detection on the camera

Design and Implementation of a Weather Query and Display Module, Southeast University. *Nanjing, China*
Team of 3, Leader Jan 2023 – Mar 2023
- Used ASM to design the function and organize each part of the MCU. Designed a Weather Query and Display Module which can choose and display weather information of several customized cities
- The whole project is based on a small device which can be used as smart home device

HONORS AND AWARDS

IROS-SDC travel award, Committee of IROS 2025 2025
Outstanding Bachelor's Thesis, Southeast University 2024
Merit Student, Southeast University 2021

SERVICE

Reviewer
IEEE Transactions on Robotics (TRO) 2025
IEEE Transactions on Industrial Electronics (TIE) 2025
IEEE Transactions on Industrial Informatics (TII) 2025

Teaching Assistant
ESE 5000 Linear Systems Theory, University of Pennsylvania, advised by Prof. George Pappas Fall 2025

Volunteer
Robotics: Science and Systems (RSS) 2025

SKILLS

Programming C, C++, Python, MATLAB
Tools CMake, PyTorch, ROS, RLBench, ManiSkill, CoppeliaSim, PyBullet, Issac Gym/Sim/Lab
Robots UR3, UR3e, Franka Emika Panda, Franka Research 3