Xuechao ZHANG

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Education

- **Shanghai Jiao Tong University** — Shanghai, China
  Master, Electronic Information ***GPA:*** *3.6/4.0* — *Sept. 2021 - Mar. 2024*
- **Georgia Institute of Technology** — Atlanta, USA
  Exchange student in Atlanta Summer Program ***GPA:*** *3.9/4.0* — *Jul. 2018 - Aug. 2018*
- **Southeast University** — Nanjing, China
  Bachelor, Robotics Engineering (Chien-Shiung Wu College) ***GPA:****3.7/4.0* — *Sept. 2017 - Jun. 2021*
  - Chien-Shiung Wu College is a pilot college and training ground in Southeast University to cultivate top-notch undergraduate students selected from multiple science and engineering departments.

Skills Summary

- **Robotics Experience**:
  - **Hardware**: PCB design (Altium Designer), CAD modeling (AutoCAD, SolidWorks, Fusion 360), 3D printing
  - **Algorithms**: visual detection & localization, SLAM, NeRF, path planning & motion planning, simulation (MuJoCo, MJX, NVIDIA Isaac Lab, MATLAB Simulink, Webots)
  - **Deployment**: Franka Robots, Universal Robots, NVIDIA Jetson, STM32, Arduino, and Raspberry Pi
- **Theoretical Knowledge**: control theory, robotic, optimization, deep learning, computer vision
- **Programming Languages**: Python, Swift, C++, MATLAB, Verilog, HTML, JavaScript, and LaTeX
- **Language Proficiency**: Chinese (native), English (TOEFL 101)
- *Refer to my blog for other robotics projects.*

Publications

1. Yang W, Xie Z, **Zhang X**, et al. TwinTrack: Bridging Vision and Contact Physics for Real-Time Tracking of Unknown Dynamic Objects[J]. arXiv preprint arXiv:2505.22882, 2025. Paper Page Video
2. **Zhang X**, Wang D, Han S, et al. Affordance-Driven Next-Best-View Planning for Robotic Grasping[C]//Conference on Robot Learning (CoRL). PMLR, 2023: 2849-2862. Paper Page Video
3. **Zhang X**, Ding X, Ren Y, et al. Toward Global Sensing Quality Maximization: A Configuration Optimization Scheme for Camera Networks[C]//2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022: 13386-13391. Paper Video
4. Hou Y, Li J, Fang Z, **Zhang X**. An Initialization Method of Deep Q-network for Learning Acceleration of Robotic Grasp[C]//2020 IEEE International Conference on Networking, Sensing and Control (ICNSC). IEEE, 2020: 1–6. Paper

Work Experience

- **Silicon Validation Automation System** — Apr. 2024 - Jan. 2025
  Robotics Engineering Intern @ Apple Inc.
  - **Led** the development of an automation system based on UR10e robots for USB interoperability testing. Task included **device ports localization, cable plugging (e.g., Type-C, HDMI) and simulating user operations on HID devices**.
  - Implemented visual positioning algorithms for 6-DoF target localization, achieving spatial positioning precision of **0.3mm/2°** with marker and **2.0mm/5°** without markers.
  - Integrated camera and force sensor feedback, achieving a **99.9% success rate** in grasping universal boxes and a **97.0% success rate** in cable plugging operations.
  - Developed **a comprehensive robotics toolkit**, including system calibration, front-end task management, robot path planning and visualization, along with robust fault recovery policy, **ensuring 24/7 reliable operation**.
  - Successfully deployed the system across labs in **Shanghai, Tokyo, and Cupertino**, enabling testing for **over 200 diverse devices**. Results were reported to the **vice president**, demonstrating substantial impact and value.
- **Autonomous Driving Car Demonstration Model** — Aug. 2023 - Jan. 2024
  Strategic Intern (Part-time) @ Bosch (China) Investment Ltd.
  - Designed and implemented a model-scale autonomous indoor navigation platform using a Raspberry Pi-powered demonstration vehicle, equipped with onboard camera for real-time perception and control.
  - Developed educational materials and documentation as part of the global Bosch AI Learning Curriculum, and conducted online and offline training sessions for internal staff, reaching over 100 employees.
- **Swarm Robots System for Cooperative Construction** — Jun. 2022 - Sept. 2022
  Research Intern @ Tencent Robotics X Lab — *Collaborated with Dr. Yi Ren*

- Contributed to the development of a digital-twin system for heterogeneous robots, including quadruped robots and Mecanum wheeled robots, which can transport blocks/slopes to construct multi-layer buildings.
- Designed the mechanical and electrical systems and developed the embedded software based on the Robot Operating System (ROS) to enable Mecanum wheeled robots to operate blocks/slopes under centralized control.
- Integrated the visual sensors and IMU of the robots using **Kalman filtering** to enable autonomous localization, reducing positioning error by 43% and improving positioning information reporting rate by 57%.

Research Experience

- **Long-Horizon Planning for Dexterous Manipulation** Jan. 2025 - Present
  Research Associate @ Intelligent Robotics & Interactive Systems Lab *Advised by Prof. Wanxin Jin*
  - Conducting research on **model-based planning for contact-rich dexterous in-hand manipulation**.

- **Active Perception and Robotic Grasp Prediction** Sept. 2022 - Aug. 2023
  Research Intern @ Shanghai Artificial Intelligence Laboratory *Collaborated with Dr. Dong Wang*
  - Conducted research on **robotics grasping prediction** in cluttered desktop environments.
  - Developed an AffordanCE-driven Next-Best-View planning policy (ACE-NBV), which effectively guides the robot arm to find feasible grasps for target objects by continuously observing scenes from new viewpoints.
  - Utilized the synergies between grasp affordance and 3D reconstruction through **multi-task learning** of a shared implicit neural representation. And leveraged the paradigm of novel view imagery from **NeRF** to predict grasp affordances for previously unobserved views.
  - Demonstrated significant improvements over current state-of-the-art methods by consistently identifying more informative views, resulting in a comparable grasp success rate with 32.4% fewer observations.
  - Published a paper[1] as the first author in **CoRL 2023**.

- **Real-Time Digital Twin Platform of Multi-Robots** Feb. 2021 - Mar. 2022
  Graduate Researcher @ Shanghai Jiao Tong University IWIN-FINS Lab *Advised by Prof. Jianping He*
  - Contributed to the development of a multi-robot testbed that exploits the ideas of digital-twin system.
  - Designed and implemented a distributed PTZ camera network and AprilTag visual positioning system which can achieve 120Hz tracking frequency, 10ms delay, and 0.5mm tracking error.
  - Proposed a multi-camera sensing quality model and an optimization strategy for camera network configuration based on this model, which improves the overall positioning performance of the platform.
  - Published a paper[2] as the first author in **IROS 2022**, and submitted an invention patent.

- **Competition Robots Software and Hardware Development** Apr.2019 - Nov.2020
  Team Leader @ Southeast University Smart Car Team *Collaborated with my team*
  - Designed a Mecanum wheeled chess-playing robot, measuring 470×480×960mm in size, which utilizes IMU and cameras for self-positioning, an electromagnetic system for moving chess pieces, and algorithms for solving the Eight Queens problem and playing the Quoridor. Video
  - Designed an intelligent car with differential drive, measuring 340×245×165mm in size, which is powered by supercapacitors, capable of wireless charging at 30W through self-made circuits, and utilized inductors to detect alternating currents for navigation. Video
  - Designed a self-balancing bicycle robot, measuring 450×120×240mm in size, which was manufactured using 3D printing and utilizes an IMU to obtain its own posture, while a flywheel system is used for balance. Figure
  - Won the **Second Prize** of the 14th National College Student "NXP Cup" Smart Car Competition and **First Prize** of the 10th Jiangsu Provincial College Student Robotics Competition. Submitted two invention patents.

Honors and Awards

- Outstanding Graduate of Shanghai Jiao Tong University Mar. 2024
- First Class Academic Scholarship from Shanghai Jiao Tong University Sept. 2021&2022
- SMC Corporation Scholarship Sept. 2022
- "Chien-Shiung Student" of Southeast University (Top 1%) Jan. 2021
- Huawei Scholarship (Top 3%) May 2020
- Second Prize of the 14th National College Student "NXP Cup" Smart Car Competition Aug. 2019
- Second Prize of Zhengbao Education Scholarship Jun. 2019