Lechen Zhang

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Education

Columbia University New York, NY
Master of Science in Mechanical Engineering (Robotics and Control Concentration) Expected Dec 2024
- **Advisor:** *Prof. Hod Lipson*

University of Nottingham, Ningbo Ningbo, CN
Bachelor of Engineering with Honours in Mechanical Engineering Jul 2022
- **Honors:** Dean's Scholarship in Academic Year 2018/2019
- **Advisor:** *Prof. Adam Rushworth*

Publication

- Lin, J., **Zhang, L.**, Lee, K., Ning, J., Goldfeder, J., & Lipson, H. (2024). AutoURDF: Unsupervised Robot Modeling from Point Cloud Frames Using Cluster Registration. *arXiv preprint arXiv:2412.05507.* ***CVPR 2025*** **Accepted**
- Zhou, H., Guo, Z., Ren, Y., Liu, S., **Zhang, L.**, Zhang, K., & Li, M. (2024). MoD-SLAM: Monocular Dense Mapping for Unbounded 3D Scene Reconstruction. *IEEE Robotics and Automation Letters*. (Oral at *ICRA 2025*)
- **Zhang, L.** (2024). CUDA-Accelerated Soft Robot Neural Evolution with Large Language Model Supervision. *arXiv preprint arXiv:2405.00698*. (Oral at *ICRA 2024 Workshop on Co-design in Robotics*)

Work Experience

Xiong'an Institute of Innovation, Chinese Academy of Sciences Xiong'an New Area, CN
Research Fellow (Full-time) Supervised by Prof. Wuling Huang Jul 2022 – Jul 2023
- Designed a novel monocular pose-free pipeline to train Neural Radiance Fields for large-scale scene digital twin reconstruction
- Led industry collaborative project with HAOMO.AI to develop an autonomous road inspection system, integrating multi-modal perception with lightweight defect detection algorithms via MobileNetV2 for real-time road condition monitoring

Research Experience

Eye, Robot: Learning Realistic Robot Gaze From Human Motion Data New York, NY
Advisor: Prof. Hod Lipson, Columbia University Jan 2025 – May 2025
- Designed an accurate human facial landmarks detection pipeline from monocular videos via the Kalman filter and Mediapipe
- Trained an implicit model for mapping human facial landmarks (478 form Mediapipe) to 11 DoF humanoid robot face control

AutoURDF: Self-Supervised Robot Kinematics Discovery from 4D Point Cloud New York, NY
Advisor: Prof. Hod Lipson, Columbia University Jan 2024 – Dec 2024
- Learning arbitrary degrees of freedom kinematics of complex robots and objects from the unlabeled point cloud sequence
- Designed a novel cluster representation that naturally maintains the rigidity without extra loss function for efficient training on dense 4D point clouds, achieving 20x speedup and 2x accuracy improvement over the previous *CVPR* state of the art.

RoboBIM: Autonomous BIM Model Reconstruction System (Bachelor Thesis Project with $15000 funding) Ningbo, CN
Advisor: Prof. Adam Rushworth, University of Nottingham, Ningbo Jun 2021 – Jul 2022
- Designed and prototyped a novel autonomous mobile robot system for Building Information Modeling (BIM)
- Built modular hardware stack with multi-modal sensors, Jetson Xavier AGX computing unit, and robust power & signal system
- Built a complete ROS-based software stack, including URDF design, low-level control, Gazebo simulation, LiDAR-based localization, mapping, and path planning. Achieving centimeter-level reconstruction accuracy

Technical Skills

Programming: Python, C++, CUDA, Matlab
Robotics Middleware: ROS, ROS 2, CyperRT
Simulation: Gazebo, Carla, Unreal Engine, PyBullet, MuJoCo
Deep Learning: PyTorch, Tensorflow, Keras
CAD: Solidworks, AutoCAD, Fusion360
FEA & CFD: Abaqus, Ansys
Prototype: FDM 3D Printing, Laser Cutting, CNC
Computer Vision: OpenCV, PCL, Open3D