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* (Acceptance Rate: 22.1%)**
- 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*
- **Zhang, L.** (2024). CUDA-Accelerated Soft Robot Neural Evolution with Large Language Model Supervision. *arXiv preprint arXiv:2405.00698*. (**Technical Spotlight 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
- Developed and deployed a novel deep learning network for automated bird's-eye view map reconstruction from sparse roadside sensor data, reducing map generation time by 80% compared to traditional manual drone-based surveying methods
- 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 deep learning-based defect detection algorithms for real-time road condition monitoring

RESEARCH EXPERIENCE

Self-Supervised Articulated Kinematics Discovery from 4D Point Cloud (AutoURDF)   New York, NY
Advisor: Prof. Hod Lipson, Columbia University   Jan 2024 – Dec 2024
- Learning complex high degrees of freedom kinematics (up to 18) of robots and objects from the unlabeled point cloud sequence
- Designed novel rigid cluster representation for efficient training on dense 4D point cloud, achieving 20x speedup and 2x accuracy improvement over *CVPR* SOTA.

Self-Supervised Physically Embodied 3D Gaussian Splatting   New York, NY
Advisor: Prof. Hao Sun, Renmin University & Prof. Changxi Zheng, Columbia University   Aug 2024 – Present
- Designed physics-informed deep neural network to infer kinematics and dynamics from pure visual supervision
- Achieved comparable dense scene flow estimation accuracy to AutoURDF while using only visual supervision

RoboBIM: Autonomous BIM Model Reconstruction System (Bachelor Thesis Project with $15000 founding)   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	**CAD:** Solidworks, AutoCAD, Fusion360
Robotics Middleware: ROS, ROS 2, CyperRT	**FEA & CFD**: Abaqus, Ansys
Simulation: Gazebo, Carla, Unreal Engine, PyBullet, MuJoCo	**Prototype**: FDM 3D Printing, Laser Cutting, CNC
Deep Learning: PyTorch, Tensorflow, Keras	**Computer Vision:** OpenCV, PCL, Open3D