Xiaoyi Lin

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SUMMARY

- Research-oriented Software Engineer with experience in autonomous driving, robotics, and deep learning systems, specializing in computer vision, motion planning, trajectory prediction, and multi-modal perception.
- Conducted research at NYU CAN Lab and AI4CE Lab on reinforcement learning-based autonomous driving, diffusion-based motion planning, SLAM, mapping/localization, and navigation systems.
- Industry experience at Ambarella and Amazon Robotics developing production-grade autonomous systems using C++, Python, deep learning, point cloud processing, and large-scale simulation/testing pipelines.
- Research interests include computer vision, generative AI, diffusion models, robotics, autonomous systems, 3D scene understanding, and vision-language learning.

EDUCATION

New York University — **New York, NY, USA**
M.S. in Computer Engineering — *Aug 2022 - May 2024*

Tongji University — **Shanghai, China**
B.S. in Mechanical Engineering — *Sept 2018 - Jul 2022*

RESEARCH EXPERIENCE

Auto Lane-changing with Reinforcement Learning and Advanced Perception

Supervised by Prof. Zhong-Ping Jiang | Control and Networks Lab (CAN Lab), NYU — *Sept. 2023 – Aug. 2024*

- Conducted research on learning-based autonomous lane-changing systems using RGB-D cameras and LiDAR for environment perception and state estimation.
- Developed end-to-end motion planning frameworks combining reinforcement learning, trajectory prediction, and diffusion-based generative planning models for autonomous driving decision-making.
- Designed safety-aware planning strategies under low-representative and corner-case traffic scenarios, improving trajectory smoothness, robustness, and navigation efficiency.
- Built simulation and evaluation pipelines for validating autonomous driving behavior across diverse traffic conditions and multi-agent interaction scenarios.
- **Research Areas:** Reinforcement Learning, Diffusion Models, Motion Planning, Autonomous Driving, Trajectory Prediction, Robotics

Mapping / Localization / Navigation Research for Autonomous Driving

Supervised by Prof. Chen Feng | AI4CE Lab / NYU Self-Drive, New York University — *Sept. 2022 – Aug. 2023*

- Conducted research on mapping, localization, and navigation systems for autonomous driving applications.
- Optimized large-scale visual SLAM and mapping pipelines using openVSLAM, reducing offline processing time while maintaining localization robustness comparable to COLMAP-based systems.
- Improved feature extraction and mapping consistency under dynamic urban driving environments through enhanced visual feature processing and navigation-aware scene representation.
- Developed scalable data processing and evaluation workflows for autonomous driving mapping systems using large-scale driving datasets.
- **Research Areas:** Visual SLAM, Mapping, Localization, Navigation, Computer Vision, Autonomous Systems

3D Image Reconstruction Based on Optical Flow Deep Neural Networks

Supervised by Dr. J. Zheng | University of Oxford — *May 2021 – Aug. 2022*

- Developed deep neural network frameworks in PyTorch for 3D image reconstruction using optical flow, depth estimation, and semantic feature fusion.
- Integrated optical flow, depth, and semantic representations to improve reconstruction quality and geometric consistency of 3D scenes.
- Implemented moving-average optimization techniques to stabilize network training and improve reconstruction robustness.
- **Research Areas:** Computer Vision, 3D Reconstruction, Deep Learning, Optical Flow, Representation Learning

Automatic Venipuncture Robot Design Based on Deep Learning

Supervised by Prof. Peng Qi | Tongji University — *May 2020 – Sept. 2021*

- Designed robotic perception and positioning modules for an autonomous venipuncture robot using ultrasound imaging and deep learning-based vein segmentation.
- Proposed a semi-supervised segmentation network (Semi-ResNeXt-Unet) for vein detection and depth estimation in ultrasound images.
- Collected and processed ultrasound datasets from 400 patients to validate segmentation performance and robotic navigation accuracy.
- **Research Areas:** Medical Robotics, Deep Learning, Image Segmentation, Computer Vision, Robotics

INDUSTRY EXPERIENCE

Software Engineer II

Oculii (An Ambarella Company), Beavercreek, OH | *Autonomous Driving Perception Team* *Aug. 2024 – May 2026*

- Research and develop deep learning-based autonomous driving systems using high-resolution imaging radar for trajectory prediction, free-space reasoning, and autonomous navigation.
- Developed Transformer-based radar perception and multi-object tracking systems, improving traffic actor classification accuracy from 60% to 82% through multi-modal feature fusion.
- Conducted research on Quantization Aware Training (QAT) and model compression techniques for real-time embedded deployment of autonomous driving models.
- Developed Occupancy Grid Mapping and environment representation systems for navigation-aware autonomous driving applications.
- Built large-scale simulation, automated testing, and evaluation pipelines supporting concurrent validation across 40+ autonomous driving scenario sequences.

Robotics Software Development Intern

Amazon Robotics | *Control and Motion Planning Team, Manipulation Group* *May 2023 – Aug. 2023*

- Conducted research and development on machine learning-based robotic perception and motion planning systems for autonomous manipulation applications.
- Developed and integrated deep learning-based geometric primitive collision checking algorithms into a real-time robotic motion planning pipeline using C++.
- Built high-performance perception-processing workflows for 3D spatial reasoning and obstacle representation, improving collision checking runtime from ∼1ms to ∼100ns and reducing overall planning computational cost by 5.4%.
- Designed large-scale simulation and evaluation pipelines using NVIDIA PhysX and AWS S3 for validating robotic perception, trajectory planning, and autonomous behavior across complex manipulation scenarios.
- Worked with multi-modal robotic scene representations and point-cloud-based environment understanding to support navigation-aware motion planning and collision avoidance.
- Explored data-driven approaches for robotic perception and planning, including deep neural network inference optimization and scalable autonomous system evaluation workflows.
- **Research Areas:** Robotics, Deep Learning, Computer Vision, Motion Planning, Point Cloud Processing, Autonomous Systems, Generative Planning

PUBLICATIONS

- Learning-Based State Estimation for Automated Lane-Changing ITSC 2024
- A Compacted Structure for Cross-domain learning on Monocular Depth and Flow Estimation ArXiv