Renyun Li

929-599-8356 rl4210@nyu.edu linkedin.com/in/Renyun Li renyunli0116.github.io

Education

New York University ***Advisor Yao Wang*** **Sep. 2021 – May. 2023**
MS in Computer Engineering *Focusing on DL, CV, 3D Point Cloud*

Tsinghua University ***Advisor Jianyu Chen*** **May. 2021 – Sep. 2021**
Visiting Scholar in IIIS *Focusing on RL, Autonomous Driving, SLAM*

Tianjin University ***Advisor Tiegen Liu*** **Sep. 2016 – May. 2020**
BS in EECS *Focusing on SLAM, Robotics, ML, Optics*

Technical Skills

Languages: Python, C++
Field: CV, RL, SLAM, 3D Point Cloud, ROS, Embedded System, DSP
Tools: Linux, PyTorch, HPC, GCP, AWS, Apollo, CARLA, Unreal, CUDA, OpenACC, FFmpeg

Experience

New York University **June 2023 – Present**
Deep Learning Researcher

- Designed a PointNet-based model with a dynamic kernel and multiple frames as input, and infused with motion estimation for 3D point cloud segmentation, paving the way for the compression of 3D video based on this.
- Created 3D point cloud augmentation algorithm, performed Human part segmentation on the dataset generated from 4D FAUST with **97%** acc, **generalized** to unknown subjects and actions with loose-fitting clothes and intricate hair.
- Refine the seg result with motion estimation in a GOP. By utilizing the prediction of the current frame, searched for related parts in the next frame and computed the rigid transformation by ICP local matching. Through dynamic splitting and merging, got each voxel prediction, and then compressed the whole video by Huffman Coding.

Shanghai Qizhi Institute **June 2021 – Sep. 2021**
Deep Learning Research Intern

- Generated a virtual environment based on ROS, Webots Turtlebot3, and Gazebo, and trained a robot car to explore the environment without collision using **RL**, while also reconstructing the map using **Lidar-SLAM**.
- Created an **Autonomous Driving** model consisting of Deep Imitation Learning trajectory planner and safety tracking controller, achieved 6.5 and 8.2 km/infraction desperately in the open and close loop evaluation on **CARLA**.

NXP Semiconductors **Jan. 2021 – June 2021**
Software Engineer Intern

- Engaged in AIoT, TinyML, Visual-SLAM on Embedded Systems with software-hardware co-design.
- Besides optimizing the extraction and matching algorithm of **ORB-SLAM**, leveraged the NXP LS1028 development board's memory hierarchy for efficient multicore utilization and minimized memory allocations through parallelization. This allowed for the efficient reconstruction of **3D point clouds** of the environment by a monocular camera and **ROS**.

Projects

Bridging 2D Segmentation to Empower 3D Scene Understanding **Aug. 2023**

- Rendered 3D objects into 2D images through Pointersect, which would generate different views of the 3D objects. Then segmented the 2D images to generate the predicted label and obtain predicted segmentation masks.
- Propagated the predicted 2D segmentation labels back into the 3D scene by NeRFs and generated a coarse estimate of semantic labels for 3D scenes based on the propagated labels from the inverse rendering process.

3D Human Face Reconstruction from RGB image by Computer Vision **Apr. 2022**

- Extracted the landmarks from CACD2000 by face alignment, captured statistical variations in facial shape and texture. Aligned 3DMM to the facial landmarks, and leveraged its shape representation to fit the model to the detected points.
- Mapped information from 3DMM to the aligned 3D face shape, capture the detail variations. Conducted mesh smoothing and refinement to optimize geometry, then rendered through Soft-Rasterizer.
- Took the image and landmark as input pair to ResNet50, with Image, Perception and Regularization loss function.

Active Multi-Sensory Inspection Robot **Nov. 2019**

- Constructed the optical fiber **sensor system** of the inspection robot and programmed to achieve the control algorithm.
- Utilized **SLAM** and **ROS**, the robot can get 3D point cloud of environment and make path planning automatically.
- Published one paper in SPIE, received **three national awards**, and was granted a patent CN110764500A

Honors and Awards

- NYU CS-GY 6953 Deep Learning TA, with Chinmay Hegde
- 2 papers in IEEE/SCI, 5 patents, 33 honors or awards during undergraduate
- Student Science Award (The youngest candidate of 10 students in all undergraduate, MS and PhD)
- First Prize of China Undergraduate Physics Tournament (ranking 5/63), 2018 News
- Special Prize of Chinese National Undergrad Challenge Cup (top 1%), 2019 Poster
- Outstanding Graduate in Tianjin University(top 5%)