EMILY JIA

+86 15801400715 ◇ Beijing, China
jyt19@mails.tsinghua.edu.cn ◇ jiaemily120@gmail.com ◇ https://emily-jia.github.io/personal-web/

STATEMENT

I'm Emily Yue-ting Jia, an undergraduate student from Tsinghua University. I'm **US citizen** and now studying abroad in China. It's my fourth year at Tsinghua and I will **graduate in 2023**.I plan to go on for **Doctor's degree** in US after graduation.

My main research interest is **computer vision** and I have done some research under the guidance of **Prof. Li Yi** and **Prof. Yushen Liu**. I'm also interested in **operating system** and have done some research about micro kernel for VM image as graduation program under the guidance of **Prof. Yu Chen**.

Besides research, I also spend a lot of time on software engineering. I was a leader in Network branch of Tsinghua CS student technology group. I have plenty of experience on website development and tutoring in website development, as part of our group activity.

EDUCATION

Undergraduate in Computer Science and Technology, Tsinghua University Augest 2019 - Jul 2023
GPA: 3.83
Rank: 61/207

SKILLS

Research	computer vision, 3D vision, operating system, virtual machine, recommendation algorithm
Engineering	Android, web front end, Database
Tools	Cuda, Nginx, Raspberry Pi, Docker, Latex
Language	Python, C++, Java, Rust, JavaScript, Verilog

RESEARCH PROJECTS

Project 1 TenSurf Nerf: 3D scene reconstruction using voxel to SDF training

- from summer 2022 to now, with **Prof. Yushen Liu**
- **submitted to CVPR 2023**
- We propose a 2 stage training pipeline for faster and more detailed 3D scene reconstruction. On the first stage, we use a voxelized neural network to approximate the radiance field. On the second stage, we input the coarse radiance field as prior into a SDF-based Nerf and get a consistent and finegrained field for mesh reconstruction.
- Experiments show that our method achieve better reconstruction performance with less training time, compared with previous method such as Neus and unisurf. Meshes retrieved from our method have flatter wall and floor area and more accurate shape for small crafts such as bowls and spoons on table.

Project 2 3D reconstruction using UDF learned by NeRF method

- from spring 2022 to now, with **Prof. Yushen Liu**
- **to be submitted to ICCV 2023**
- We investigate using UDF instead of SDF in neural radiance field learning. We propose a set of formulas to translate UDF value into opacity value used in ray marching. Such translation meets both the occlusion-aware and intersection-maximum requirements, proposed by Neus.
- Experiments show that we achieve a competitive result on DTU, compared to SDF-based methods like Neus and unisurf. Our translation is more stable towards different sample steps than Neus' translation.

Project 3 Unicore: unikernel for light virtual machine image

- from fall 2022 to now, with **Prof. Yu Chen**

- **graduation program**
- a modularized Rust lib os for light VM image building
- We aim at cutting off functions of monolithic kernel, such as networking, that are known to be unnecessary by users for lighter and faster VM image. We build a highly modularized library os that can be static linked separately in image building process to achieve that.

Project 4 Domain Adaptation on Point cloud Completion

- from fall 2021 to spring 2022, with **Prof. Li Yi**
- We propose to use structure as a guide for point cloud completion. Given a partial scan, we first predict its coarse cuboid structure using conditional GAN. Next, we refine the coarse cuboid prediction and output complete point clouds.
- Note that we do not use paired ground truth data(we only needs ground truth cuboid structure set for the training of condition GAN), our methods can be directly trained on target domain.

Project 5 Learning structure deformation using cuboid abstraction

- from summer 2021 to fall 2021, with **Prof. Li Yi**
- We propose a method to learn possible variation for certain kind of human-made objects unsupervisedly. We first extract the cuboid structure for each object. Then we learn several meta variations for the predicted structure by deforming the object to other objects in the set.
- Experiments show that the network do learn many meaningful and low dimensional structure deformation, and the learnt deformation can guide meaningful point cloud deformation.

Project 6 Part segmentation using slot attention

- from spring 2021 to summer 2021, with **Prof. Li Yi**
- We try to use slot attention for unsupervised point cloud segmentation, using reconstruction task as proposed by its original paper. However, we find that each slot tends to control the reconstruction of points on a particular sphere.
- We therefore argue that color might be the clue for unsupervised object detection using slot attention, but such information is often missing in 3D data.

OTHER PROJECTS

Project 1 Erasql

- A simple relation database with index manager, record manager, file manager, script parser and executor. Support basic management for database and tables.
- Gitlab: Erasql
- scored 2nd among 90 people in Database class and get me an A+!

Project 2 Think-top CPU

- A simple 5-stage-pipeline CPU supporting Riscv.
- Interrupt/Exception Handler Delegation, virtual address and page table are supported. Experiments show that this CPU is enough to support simple operation systems like ucore.
- scored 3rd among over 50 teams in Computer Structure class!

Project 3 Dongfeng education app

- an android app based on knowledge maps.
- Gitlab: front-end app
- win a third prize for Educational App Competition!