Lujing Xing

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Reasearch Interests

Computational Imaging, Computer Vision, Image Segmentation, Multimodal Reconstruction, Deep Learning Methods

Education

Peking University — *Beijing, China*

Bachelor of Science, majoring in Physics in Space Science — *Sept 2020 - June 2024(expected)*

- **Academic:** Overall GPA 81.5/100 (3.36/4.0)
- **Main Courses:** Advanced mathematics, Linear Algebra, Probability and Statistics, Methods of Mathematical Physics, Electromagnetism, Electrodynamics, Theoretical Physics, Optics, Quantum Mechanics, General Physics Lab, etc.
- Both basic physics and applications on space physics were included, as well as hands-on experiments.

Peking University — *Beijing, China*

Bachelor of Science, majoring in Computer Science(Dual Degree) — *Sept 2021 - June 2024(expected)*

- **Academic:** Overall GPA 81.7/100 (3.37/4.0)
- **Main Courses:** Data Structure & Algorithm(C/C++), Introduction to Computer Systems, Algorithm Design and Analysis, Introduction to Artificial Intelligence, Operating System, Computer Architectures, Compiler Theory, Computational Photography, Computer Vision & Deep Learning, etc.

Research Experience

Image Segmentation with extension on MAE and SAM, Supervisor: Prof. Yibin Xie — *Cedars-Sinai, UCLA (remote), 2023.06 -*

- To aid diagnosis of different organs, especially small abnormal areas, focused on providing more accurate 3D medical image segmentation.
- Inspired by SAM's (Segment Anything Model) success on 2D natural images, modified MAE (masked autoencoder) to effectively encode 3d input, then combined the 3D image encoder with SAM to take a 3D input, and directly segmented out a 3D volume.
- Taking 2D SAM segmentation result and MedSAM-adapter as baseline, currently refining our model to achieve better segmentation result. Our model can currently achieve a dice score at around 0.7/1 on a big label, while smaller labels require further investigation. Aiming for ISBI.

Multislice phase reconstruction based on BRIEF and NeRF, Supervisor: Prof. Yi Xue — *UC Davis (remote), 2023.06 -*

- IDT provides a simple experiment setup to recover cells in a 3D sample for better further research.
- Combined deep learning framework like NeRF with BRIEF's modality of using the bottom fluorescenece layer to lighting up the upper sample layer. Based on several former works like DeCAF and multi-slice models, used physics forward model to replace NeRF's rendering process.
- Simulated data are being tested, planning to gradually test on glass bead samples and more complex cells.

Cell Image Reconstruction by SIM, Supervisor: Prof. He Sun — *Peking University, 2022.09 - 2023.06*

- As a basis for further cell research, focused on low-level image reconstruction to achieve super-resolution for cells.
- Based on 9-picture Hessian SIM's (Structured Illumination Microscopy) reconstruction strategy, established a learning model.
- Used Hessian loss as an important regularizer, inspected the effect of different loss terms on the model's performance. Further works would accept fewer than 9 pictures and reconstruct dynamic cells.

Course Projects

Single Image Super Resolution(SISR) — *Course: CV and Deep Learning*

- Making a single image clearer helps object detection and segmentation works.
- Completed traditional SISR process by deconvolution and used machine learning to study a blurring kernel.
- Inspected the development of SRGAN, ESRGAN and Real ESRGAN, compared their performances and difference in structures, and experimented on different depth of residual connections.

Deblur-NeRF — *Course: Computational Imaging*

- Further than rendering a new view for simple objects, Deblur-NeRF could render clearer new views with blurred input.
- Shot different images of different subjects, under different lighting conditions, and of different blurring types (motion blur of object or camera, and defocus blur). Then evaluated Deblur-NeRF on our data and did comparative analysis.

My Compiler — *Course: Compiler Theory*

- To get better understanding of compiler's working process and the core of coding language, implemented a compiler from scratch in C/C++, using school-developed IR and sysY.

Skills

Programming C/C++, Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), Matlab, HTML/CSS, LaTeX

Soft Skills Time Management, Teamwork, Paper Reading, Problem-solving, Documentation, Presentation.

Languages Fluent in Chinese and English.
GRE Verbal 161+Quantative 170+AW 5.0; TOEFL Reading 30+Listening 29+Speaking 23+Writing 28.

Extracurriculum Experience

Dancing Joined FLCrew, a dancing community, since freshman year, and was associate leader of Urban team in sophomore year.

Documentary Interviewed Cong Cai, a visual impaired man, shot and edited a 15 minute documentary with two teammates.

References available upon request.