

PENGHAO WANG

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INTRODUCTION

I am pursuing an undergraduate degree in Computer Science and Technology at the School of Information Science and Technology, ShanghaiTech University. I'm also a student researcher at ShanghaiTech VRVC Lab where I am advised by Prof. Jingyi Yu and Prof. Lan Xu. I am passionate about exploring novel ideas and implementing them. My research interest lies in 3d reconstruction and computer graphics with deep learning, including neural rendering, and dynamic scene reconstruction. Recently, I am focused on using neural radiance field based methods to perform real-time, memory-efficient dynamic scene reconstruction.

EDUCATION

ShanghaiTech University

2021-Present

Bachelor Candidate, Major in Computer Science and Technology

EXPERIENCE

ShanghaiTech VRVC Lab, Student Researcher - Shanghai

2022.8 - Present

- **NeRF Research:** Utilized PyTorch and JAX frameworks to replicate and optimize the NeRF(Neural Radiance Fields) paper, and accelerated MLP training and inference speed using CUDA.
- **VR Develop:** Develop NeRF demo with a VR headset, enable for high rendering speed and realistic rendering results.

NeuDim Digital, Research Intern - Shanghai

2022.8 - 2023.6

- **NeRF Deploy:** Commercialize the NeRF(Neural Radiance Fields) algorithm by encapsulating it, optimizing it for multi-GPU servers, and developing flexible scheduling to make the most of the available computational resources.
- **Backend Develop:** Develop backend for the NeuRecon platform with python Flask, MySQL, Nginx, Aliyun SMS, and Aliyun OSS, and use K8s with docker to schedule the NeRF reconstruction service.
- **DevOps Development:** Maintained a cluster of 4 servers, managed the backend Kubernetes cluster, deployed Docker services, and configured Nginx. Additionally, set up a private ChatGPT service for internal company use.

Teaching Assistant of Computer Graphics I, ShanghaiTech University

2023.6 - Present

- Shared responsibility for designing coursework, project, and tutorial.

PUBLICATIONS

- NEPHELE: A Neural Platform for Highly Realistic Cloud Radiance Rendering.
Haimin Luo, Siyuan Zhang, Fuqiang Zhao, Haotian Jing, **Penghao Wang**, Zhenxiao Yu, Dongxue Yan, Junran Ding, Boyuan Zhang, Qiang Hu, Shu Yin, Lan Xu, Jingyi Yu.
(Submitted at Siggraph 2023) [[Paper](#)]

PROJECTS

NeuRecon platform backend

Built a backend for NeuRecon 3D reconstruction platform. Support for user accounts, and flexible schedule of NeRF 3D reconstruction. Using Apifox to achieve efficient communication with the frontend developer.

Volume Rendering with OpenGL in Real time

Reproduce Sparse Volume rendering with OpenGL. With fps to 3000+, it enables an interactive and smooth viewing experience even for large sparse scenes.

Glossy Geometric optimization in NeRF

Based on related work of NeRF, using SDF to get a more accurate prediction of object geometry thus a more realistic reconstruction of scenes with NeRF, implemented with PyTorch.

ChatGPT with Stable Diffusion web demo

Built a web demo with Python Flask backend and Vue frontend, support for chatting with ChatGPT with API, and a viewer with stable diffusion to generate images from ChatGPT response in real-time.

RISC-V assembler and simulator

Using C++ to build a RISC-V assembler, support for standard RISC-V instructions, with the function to load machine code and execute.

AWARDS

World Artificial Intelligence Conference Volunteer	2023.07
Shanghaitech University Merit Student	2022.12
National College Students Robot Contest National 3rd Prize	2022.08
Robomaster Super Tournament Regional Competition (Eastern Division) 2nd Prize	2022.06
Robomaster Intramural Competition Champion	2021.12

TECHNICAL SKILLS

Programming Languages	Python, C, C++, CUDA, HTML, JavaScript, Taichi, RISC-V Matlab, GoLang, Lua
Operating System	Windows, Ubuntu, Kali, MacOS
DEV Tools	Visual Studio, Pycharm, Jupyter Notebook, Matlab Agisoft, RealityCapture, Unreal Engine, Adobe Photoshop
Computer Graphics	OpenGL, Vulkan, Nvdiffrastr
Machine Learning	PyTorch, JAX, Scikit
Backend	Flask, Kubernetes(K8s), Docker, Redis
Frontend	Vue, WebGL
Others	SSH, Git, Tmux, Latex, Markdown, Make, CMake Vi, Vim, wrk, Nmap