Zimu Guan

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Education

University of Illinois at Urbana-Champaign — Urbana, IL
B.S in Computer Engineering, Overall: 3.96/4.00, Major: 3.96/4.00 — *Aug. 2018 – May. 2022*

Zhejiang University — Hangzhou, China
B.E. in Electronics and Computer Engineering, Overall: 3.97/4.00, Major: 4.00/4.00 — *Aug. 2018 – May. 2022*

Research Experience

Cut-and-Paste Neural Rendering — Aug. 2021 – Dec. 2021
Research Intern, Advisor: David Forsyth — *University of Illinois at Urbana-Champaign*

- Contributed to a project involving convincing cut-and-paste reshading with consistent image decomposition inferences.
- Created a benchmark data set and evaluated the performance of the cut-and-paste neural renderer.

All-hexahedral Mesh Refinement with Flexible Density Control — Apr. 2021 – Aug. 2021
Research Intern, Advisor: Jin Huang — *State Key Lab of CAD & CG, Zhejiang University*

- Built a conformal unstructured all-hexahedral mesh refinement pipeline as a prototype aiming to improve physically-based simulation, especially the adaptive finite element method.
- Researched existing hexahedral mesh optimization, generation, and refinement methods, transferred selective padding method for mesh optimization to mesh refinement, solved the limitation of inflexible density control of previous methods.
- The pipeline can refine the target mesh according to a given reference density field using several refine methods, including selective padding and element-by-element methods. After that, the pipeline can evaluate the result refined mesh then output vtk files for visualization.

Virtual Reality in Robot Assisted Surgical Training — Jun. 2019 – Aug. 2019
Research Intern, Advisor: Liangjing Yang — *ZJU-UIUC Institute*

- Researched 3D reconstruction, integrated VisualSFM 3D reconstruction tool into a virtual reality robot-assisted surgical system.
- Technically supported other parts of the surgical system, including a unity-based virtual reality surgical environment and an Arduino-based voice-controlled robotic arm.
- Won the Second Prize of Excellent Summer Intern Project, awarded by ZJUI institute.

Selected Projects

TLEOS (Unix based Operating System) | *C,ASM(x86)* - [CODE] — Apr. 2021

- *Course Project for ECE 391 Computer Systems Engineering*
- Developed a Unix-like operating system kernel from scratch that supports almost all basic functionalities of a Linux kernel, including scheduling, interrupts, system calls, exceptions, virtual memory and a read-only file system.
- Supported a range of devices including keyboard, mouse, sound card, serial port, RTC, PIT, network card and VGA.
- Developed some basic graphics functionality including high-resolution image display.

FPGA-Based 3D Graphics Renderer | *SystemVerilog* - [CODE] — Dec. 2020

- *Final Project for ECE 385 Digital System Laboratory.* Won the Best Design Award in the course project competition (One of the Top 4 over 40 groups).
- Designed and implemented a basic real time graphics pipeline on FPGA that renders 3D objects through model, view, projection transformation, viewport triangle clipping and rasterization, including all control & data flow.
- Achieved real-time rendering and interactive interface with the position of the camera and the rotation of the object in control. Supported .obj model file loading.
- Improved rendering performance by efficiently utilizing numerous on-chip resources such as SRAM, DRAM, NIOS core, with the frame buffer and parallel hardware design, to achieve smooth and stable frame rates.

Teaching Experience

MATH 241 CALCULUS III — Sept. 2020 – Jan. 2021
Teaching Assistant, Instructor: Thomas Honold — *ZJU-UIUC Institute*

- Held discussion sessions every week and taught difficult concepts covered in the course, including Lebesgue integral, manifolds, and differential forms for engineering students. Made videos and Geogebra scripts to help students better understand the materials, attracted other sessions' students to join in. Graded assignments and exams, held office hours and review sessions before exams.

Extracurricular Activities

Design Event Posters Sept. 2019 – Aug. 2020

Core member of Creative Design Department *New Media Center, International Campus, Zhejiang University*

- Gave overall frameworks of posters design used in graduation ceremonies, activity propaganda, etc., made posters using Adobe Photoshop and Illustrator.

Aid Education in Remote Mountains of China Aug. 2019

Volunteer Teacher *Jiaoma Center School, Jiaoma, Qiannan, Guizhou, China*

- Taught arts & English to elementary school students for two weeks and was loved by students. Visited students' families deep in the mountains and local government staff to investigate local education and poverty relief conditions.

Skills

Programming Languages: C/C++, Python3, x86-asm, MATLAB, SystemVerilog(FPGA), Shell
Tools: CUDA, OpenGL, CMake, LaTeX, Markdown, Git, Docker