CHENG WANG

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EDUCATION

University of California San Diego *Sep. 2022 - Present*
Master of Science in Computer Science

Zhejiang University *Sep. 2018 - Jun. 2022*
Bachelor of Engineering in Computer Science and Technology
Chu Kochen Honors College
GPA: 3.90 / 4.0, GPA for major courses: 3.99 / 4.0

RESEARCH EXPERIENCE

State Key Laboratory of CAD&CG, Zhejiang University *Feb. 2020 - Jun. 2022*
Advisor: Prof. Rui Wang

Offline Ray Tracing Renderer
- Developed an offline renderer based on Whitted ray tracing with multiple acceleration technics, including HBV (Hierarchical Bounding Volume), uniform grid, 3DDDA and octree, with PBR (Physically Based Rendering) supported.

Tiled Forward Rendering
- Implemented tiled forward rendering and tiled deferred rendering according to existing papers.
- Optimized light culling pass by using multiple frustum dividing and light-frustum intersection strategies. Conducted experiments to compare the performance of the strategies mentioned above.

Real-Time Texture-Space Subsurface Scattering
- Applied a new, efficient method which performs convolution of radiance map and weight kernel in texture space. By pre-calculating weight kernels with Burley's normalized diffusion profile and applying wavelet transformation, significantly reduced time complexity of convolution.
- Awarded the Outstanding Graduation Thesis of Zhejiang University Undergraduates in 2022.

WORK EXPERIENCE

RaysEngine Tech Co. LTD, Zhejiang, China *Dec. 2021 - Jun. 2022*

Rendering Engine Engineer Intern
- Focused on digital human, especially skin rendering. Applied improved texture space subsurface scattring technique to the rendering engine of the company.
- Contributed to the standard deferred pipeline module of the engine, enhancing the performance and quality, especially the subsurface scattering part.

SELECTED PROJECTS

Zhejiang University *Sep. 2018 - Jun. 2022*

Medical appointment system (Software Engineering course project)
- Developed a hospital website based on Vue.js and Java, whose main functions including information viewing, registration appointment, online consultation, video diagnosis, online forum, etc.
- Participated in front-end, back-end and the design and maintenance of the cloud database.
- Worked in a group of 20 and acted as team leader.

Chess Museum (Computer Graphics course project)
- Constructed a 3D realistic, interactive, editable chess museum based on OpenGL and C++.
- Worked in a group of three and acted as team leader.

Petiu: Pet farewell service system
- Collaboratively designed and independently developed IOS App "Petiu" with SwiftUI.
- Worked in a group of three and acted as technical leader.
- Attended China Collegiate Computing Contest -- Mobile Application Innovation Contest held by Apple Inc. and Zhejiang University in 2021, awarded Third Prize.

Cyber Creed (Computer Game Programming course project)
- Designed and implemented a 3D computer game resembling Assassin's Creed with Unreal Engine 4.
- Worked in a group of five with a main focus of scene and level design, enemy animation and behavior design, special effect design based on particle system, etc. Assisted to complete other modules in the game.

MiniSQL (Database System course project)
- Designed and implemented a single user SQL engine, MiniSQL, which enables user to define tables, create or delete indices, make queries and insert or delete records. The system frame includes intepreter, record manager, index manager, catalog manager, buffer manager and API layer.
- Worked in a group of five and acted as team leader.

C-- Compiler (Compiler Principle and Technology course project)
- Designed and implemented a "C--" language compiler based on C++, Lex, Yark and LLVM, composed of stages of lexical analysis, syntax analysis, semantic analysis, intermediate code generation and object code generation. The C-- language has most of the features of C language.
- Worked in a group of three.

Memory Pool Allocator (Object-Oriented Programming course project)
- Implemented std::allocator in C++ STL in a way of memory pool.

National University of Singapore *May. 2021 - July. 2021*

Real-Time Ray Tracing and Post-Processing
- Implemented a real-time ray tracer with normal mapping, procedural bump mapping, reflection mapping and shadow mapping through GLSL shader programming based on WebGL. Applied percentage-closer filtering to smooth shadow boundaries.
- Implemented bloom effect via applying pixel luminance-based image thresholding for bright-pass filtering and digital convolution with a separable 2D Gaussian filter for image blurring.

SKILLS

C, C++, Python, JavaScript, Html, SwiftUI, Linux, OpenGL, OpenCV, Pytorch, Unreal Engine 4, Unity, etc.