Cheng Cao

bobcao3@berkeley.edu | bobcaocheng@gmail.com
https://bc3.moe | github.com/bobcao3
+1 (510) 949-7061

Education

UC Berkeley / Graduating Junior — Aug 2018 ~ Now. Berkeley, CA

Computer science, L&S. Expected graduation Spring 2021

Technical Classes Taken: — Technical GPA: 3.93/4.00 Overall GPA: 3.74/4.0

Computer Graphics & Imaging / User Interface Design and Development / Data Structures / Machine Structures / Discrete Mathematics and Probability Theory / Computational Color / Operating System / Algorithms / Deep Neural Networks / Computer Architecture / Digital Design and IC

Experience

Blizzard Entertainment / Graphics Engineering Intern – Shared Game Engine — Summer 2020

Working on the new shared game engine of Blizzard, focusing on developing prototypes and systems based on next-gen graphics technology such as hardware raytracing (RTX / DXR). Created a dynamic real-time path-traced global illumination system with dynamic point lights and spatial temporal denoiser.

UC Berkeley / Teaching Assistant, Computer Graphics & Imaging — Spring 2020 & Summer 2020

Developing class assignments, Leading discussion sections, Helping/guiding students with projects

UC Berkeley / Junior Mentor (CSM), Machine Structures — Fall 2019

Teaching small group of students on course topics, including C, assembly, memory, cache, parallel system, etc.

UC Berkeley Vive AR/VR Lab / Researcher — Mar 2019 ~ May 2020

Helping the research on the topic of “Indoor scene reconstruction” for indoor AR/VR applications.

Projects

Wisdom-Shaders — A Minecraft shaders — https://gh.bc3.moe/Wisdom-Shaders

A Minecraft shader that utilizes the custom shaders functionality given by Shadersmod to improve graphics appearance

- Featuring shadows, PBR surface, volumetric lighting, SSR, ambient occlusion, bloom, forward transparency, image filters, tone-mapping, atmospheric scattering (PBR based procedure skybox), and other post-processing effects
- Over two million downloads, 65 stars on GitHub, an average of 60 unique viewers per day on GitHub, Most-popular Award on Netease Minecraft Developer Conference 2020.

Voxel Cone Tracing for Real-time Global Illumination — A real-time GI renderer — https://bc3.moe/VCTGI

An algorithm for real-time global illumination using a combination of voxelized GI and Ground-Truth Ambient Occlusion

- Featuring an Event & Component system based on modern C++ standards (C++17)
- Developed Pipelang, a DSL for shader meta-programming based on Lua
- Supports both Vulkan and DirectX 11 backend with custom-built RHI abstractions & shader multi-compiling

Deep Learning Based Demosaicing — Image sensor data demosaicing — https://bc3.moe/hdrdmcnn

A neural network designed to perform image demosaicing task on different sensors with different color filter arrays.

- Utilizing residual training and combining pervious work on image demosaicing and image segmentation networks
- Supports extremely complex color filter array design, achieving high signal to noise ratio on random CFAs
- Very high accuracy, with peak signal to noise ratio of 39.24dB on Kodak image dataset with bayer CFA

ASM76 — An interpreted bytecode VM — https://github.com/IcebergThings/ASM76

An interpreted bytecode VM with a custom instruction sets, capable of running 230MIPS on Core i7-5500U at 3GHz

- Designed to be a part of a larger C++ program, able to interface with C++ programs using syscall instructions

Skills

Skills: Version control (git), Linux, DXR, OpenGL, Vulkan, Unity3d, C/C++ build systems (CMake, meson, Makefiles)
Languages: C, C++, Python, Java, Ruby, Julia, GLSL, HLSL, bash, JavaScript, Go, Lua, RISC-V assembly
Speaking Languages: Chinese (native), English (high working proficiency)