HongFei Huang

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Skills

- Language/tool: **C/C++, C#, Unity, Python, OpenGL, JAVA, Verilog, MATLAB, Git**
- Technique: **Computer Graphics, Linear/Geometric Algebra, RTOS, Data Structure, Linux**

Projects

Real-Time Rigid Body Fracture Simulation (C++ | OpenGL | Computer Graphics)

Engineered an interactive **OpenGL** fracture simulation program that utilizes pre-fractured 3D models. Implemented a Surface Area Heuristic Bounding Volume Hierarchy (**SAH-BVH**) for efficient collision detection involving **Ray-AABB** and **AABB-AABB** intersections. Computed the collision between debris using conservation of **momentum** and gravity.

Ray-Tracing Engine (C++ | Ray-Tracing | Computer Graphics)

Developed a custom Ray-Tracing engine from scratch using C++, capable of rendering triangular mesh 3D scenes with 3 textures(**lambertian, metal, glass**). Incorporated recursive **ray-tracing** for handling reflections and refractions.

Real-Time Operating System on Keil Board (C | RTOS | Task Scheduling | Embedded Design[ARM])

Designed and implemented memory allocation with **binary tree**, adopted earliest-deadline-first(EDF) scheduler for task scheduling, the OS is capable of **context switching** in between tasks and handle user input through **UART** with **interrupt.**

Experience

University of Waterloo -- Research Assistant (C# | Unity | Mixed Reality) (May 2024 - Present)

- Created a 3D **Unity** C# project to transform **Geometric Algebra(GA)** visualization into an interactive **VR** environment using Meta's OVR toolkit, deployed on Meta Quest3 headset.
- Implemented functionalities for Point/Vector/Bivector/Multivector generation and visualization, with lexing via **Antlr parser** and variable storage using dictionaries.

Huawei -- Software Engineer (RTOS | C | Python | CI/CD) (Sep 2023 - Dec 2023)

- Developed a user-level program to validate kernel-level priority boosting for CI workflows
- Leveraged Python with NumPy and Matplotlib to analyze OS metrics, improving performance and power efficiency analysis by **60%.**

OpenText -- R&D Software Developer (C++ | OScript | Data Profiling) (Jan 2023 - Apr 2023)

- Revitalized and enhanced source code profiling suites using JMeter and Intel Vtune to identify bottlenecks with call maps, stack, heap.
- Created a TypeScript VS Code extension with Eclipse **LSP4J** for CI/CD integration, supporting various **IDE features**(parse trees, auto-completion, and syntax highlighting).

OpenText -- Software Developer (C++ | Linux | Compiler) (Jan 2022 - Apr 2022)

- Managed the upgrade of all C++ dependency libraries/modules for newly released products on both Windows and **Linux** (RedHat7) platforms after performing a thorough compatibility check.
- Resolved **75%** of compatibility issues, sped up the validation process by **10%** against the deadline

Education

University of Waterloo (Sep 2019 - Apr 2024)

- Bachelor of Applied Science, Co-op **Computer Engineering** Student