HongFei Huang

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Skills

Language/tool: C/C++, C#, Unity, Python, PyTorch, OpenGL, MATLAB, Git

Technique: Computer Graphics, Virtual Reality, Machine Learning, Rendering Pipeline, Linear Algebra, RTOS, Linux

Projects

Real-Time Rigid Body Fracture Simulation (C++ | OpenGL | Computer Graphics) (Spring 2023)

- Engineered an interactive **OpenGL** fracture simulation program utilizing 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 **collision dynamics** between debris using conservation of momentum and gravity, enhancing the realism of the simulation.

VR Algebra Viewer (C# | Unity | Virtual Reality) (Fall 2024 - Present)

- Developed an educational tool using Unity + C# on Meta Quest 3 to visualize Geometric Algebra (GA) concepts intuitively in **Mixed Reality** via Meta's OVR toolkit.
- Crafted responsive 3D scenes in MR, allowing users to grab & drag vectors and observe **real-time** changes in the algebra volume.
- Processed lexing with **Antlr** to parse user inputs, and used Dictionaries for variable storage, providing fine-grained control over custom vectors.

Experiences

Waterloo Reality Labs – VR Software Engineer (Unity | C# | Machine Learning) (Sep 2024 - Present)

- Constructed the data extraction pipeline for one-handed dynamic gesture recognition from 0% to 100%, enabling efficient capture of temporal hand-tracking sequences for **LSTM neural network** training.
- Enhanced Unity's data recording system to process hand movement as sequential training examples, improving the performance and accuracy of the VR gesture classification models by 30%.

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

- Developed a user-level program to validate kernel-level priority boosting, improving CI workflow reliability by enabling the detection of priority inversion bugs.
- Leveraged Python with NumPy and Matplotlib to analyze OS metrics, improving performance and power efficiency analysis by 60%.

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

- Revitalized and expanded source code profiling suites using JMeter and Intel Vtune, enhancing CPU performance analysis capabilities and identification of bottlenecks (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 – Intern 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 (4/8 month co-op term) (2024 - 2026)

- Candidate for Master of Mathematics, co-op Computer Science student

University of Waterloo (4 month co-op term) (2019 - 2024)

- Candidate for Bachelor of Applied Science, co-op Computer Engineering student