Haoyang Wu

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Summary

I am seeking research opportunities in computer graphics, scientific computing, high-performance computing and related fields!
Computer science student with experience in graphics and parallel programming, especially simulation and geometry. Current research focuses on reconstructing explicit surface mesh from signed/unsigned distance field. Additional experience includes designing a domain-specific language and developing its compiler.

Education

Nanjing University — Nanjing, Jiangsu
Master's Student in Computer Science — *Sep. 2023 – Sep. 2024 (**Quit**)*

Shandong University — Qingdao, Shandong
GPA: 90.07/100.00 ***Bachelor of Engineering in Computer Science | Economics*** — *Sep. 2019 – June 2023*

Experience

Remote Research Assistant — Aug. 2024 – Present
The University of Texas at Dallas — *Supervisor: Prof. Xiaohu Guo*

- Research topic: reconstruct high-quality explicit surface mesh from signed/unsigned distance field, especially with low resolution grid.
- Develop a framework for investigating the problem and visualizing each stage of the algorithms.
- Propose methods and conduct experiments to to validate our ideas and compare the outcomes.

Selected Projects

Physics Based Rendering (Darts framework) | *C++* — Aug. 2024 – Present

- Naive ray tracing; Material: diffuse, metal, & dielectrics

Physics Based Simulation | *C++, CUDA, Houdini, Eign, Matlab* — Apr. 2024 – July 2024

- **Three-Dimensional Material Point Method** simulator accelerated on GPU using **CUDA**; PIC, FLIP & APIC; BSpline interpolation & Explicit integration; OpenGL (online rendering) & OpenVDB + Houdini (offline rendering)
- **Two-Dimensional incompressible Eulerian fluid** (smoke in the open air) simulator; Semi-Lagrangian advection; Marker-and-cell (MAC) method: staggered grid
- Interactive simulation of a single deformable object using **finite element method** and **mass-spring system**; Semi-implicit integration & Optimization algorithm (Newton's method); Simulate low-resolution & render high resolution meshes via skinning

Geometric Modeling and Processing (Assignments) | *C++, libigl, Houdini, Python* — May 2024 – July 2024

- Poisson surface reconstruction on regular grid; Registration using point-point and point-plane rigid matching
- Ray-mesh, mesh-mesh intersection and point cloud distance queries using bounding volume hierarchy data-structure
- Visualize Laplacian harmonic functions on mesh; Calculate geodesic distance using heat method
- Basic combinatorial surface operators: star, closure, boundary and link; Basic discrete exterior calculus operators: Hodge star and exterior derivative on 2D manifold

Skills

Programming: C/C++, Python, Matlab, CUDA, LaTeX, Java
Softwares: Houdini, Blender
Developer Tools: CMake, Git, Vim
Libraries: Eigen, libigl, CGAL, OpenGL
Language: English (B2-C1), Chinese/Mandarin (Native)

Standardized Tests

English: TOEFL iBT 102
Others: GRE General Test 331

Awards

Academic Scholarship | *Nanjing University* 2023
First Prize, Shandong Province | *Contemporary Undergraduate Mathematical Contest in Modeling* 2021
Academic Scholarship | *Shandong University* 2020 – 2023