Connor Geshan

connorgeshan@gmail.com (703) 408-5718 cgeshan.github.io

Summary I am a C++ engineer with experience in codebase optimization and performance of large-scale simulation codebases. I have a strong focus on enhancing performance through advanced techniques in multithreading, parallelism, and hardware integration.

Skills
Programming: C++ (including OpenGL), CMake, Git
Additive Manufacturing: 3D Printing, CURA

Work Experience

Controls System Engineer **January 2024 – Present**
Envisioneering Inc. Alexandria, VA

- Programming:
  - Optimized large-scale simulation codebases:
    - Applied event-based profiling techniques to identify and resolve performance bottlenecks.
    - Refactored legacy code to implement multithreading and parallel processing.
    - Designed and implemented a custom thread pool utilizing spinlocks, improving synchronization efficiency over traditional mutex-based approaches.
    - Developed wait-free and lock-free data structures to enhance concurrency.
    - Applied SIMD intrinsics to accelerate non-concurrent algorithms.
    - Offloaded computationally intensive tasks to the GPU.
  - Conducted detailed performance profiling and benchmarking, comparing SIMD, GPU, and threaded serialized implementations, selecting the most efficient approach for each scenario.
  - Ensured real-time execution
  - Integrated software with hardware (FPGA) via UDP message reception and handling (parsing)
- Management:
  - Managed and maintained a Windows-based performance optimization library, standardizing and implementing cross-project optimizations for improved portability and consistency.
  - Led the development maintenance of CMake build scripts, including both CPU and GPU architecture specific compilation.
- Hardware Related
  - Spec'd and built custom workstations tailored to project need
  - Optimized and overclocked these workstations to comply with real time execution requirement.

Research and Development Intern June 2021 – August 2021
Callaway Golf. Carlsbad, CA

- Utilize Python to enhance usability and efficiency of Graphical User Interfaces (GUI)
- Designed and supported patent initiative for putting alignment aid
- Generated data manipulation Excel Sheets using Visual Basic to study the effect golf ball properties have on performance

Education

Master of Science in Mechanical Engineering December 2023
Concentration in Robotics and Control Systems
Carnegie Mellon University, Pittsburgh, PA

Bachelor of Science in Mechanical Engineering May 2022
Concentration in Mechatronics **Minors: Computer Science & Mathematics**
Western New England University, Springfield, MA

Projects

CMU G.H.O.S.T. Jelly - Biomimetic Jellyfish Soft Robot January 2023 - May 2023

- Programmed control system for electromagnetic actuation system **(Arduino)**
- Won Best Overall Project at CMU Mechanical Engineering Design Expo

CMU Unoptimized - Voxelization Application **(C++)** January 2023 - May 2023

- Developed binary stl import and export functionality
- Handled all **OpenGL** rendering of stl files and voxelized structures
- Build applications user interface (**wxWidgets**) and implemented its functionality
- Assisted in depth-first search algorithm for merging voxels

Activities

NCAA Athlete – Men's Ice Hockey – Western New England 2018-2022