Alexander Shah

Software Developer

zandershah | alexander.shah@uwaterloo.ca | zandershah.me

Languages C/C++, Python, Scala, JavaScript, HTML, CSS, SQL, MATLAB, Java, Rust, Go

Tools / Tech Git, Bash, PostgreSQL, React, jQuery, Flask, OpenGL

Experience

SideFX | 3D Software Developer - R&D | C++, MATLAB | *Winter 2018*
- Extended the Convex Ridge Separation algorithm for **approximate 3D convex decomposition** to improve the performance of collision simulations in Houdini
- Trained a **linear SVM** on results pulled from graph cuts to obtain temporally coherent segments, allowing for the **decomposition of animated models**
- Implemented the Geodesics in Heat algorithm and added the feature to trace geodesic paths through following the heat gradient
- Optimized convex hull merging algorithm by initially pruning with a **R-tree**, resulting in a **2x speed increase**

PaveAI | Software Engineer - Full Stack | Python, Javascript, SQL | *Summer 2017*
- Designed an **async service** with Celery and Redis to distribute tasks across servers
- Replaced Elasticsearch key-value store with PostgreSQL JSONB resulting in a **10x speed increase** and increased reliability
- Worked with PostgreSQL, using Alembic for migrations and SQLAlchemy for ORM

Projects

Lacs Compiler | Scala, MIPS Assembly
- Compiles a subset of the Scala language into MIPS using an Earley parser
- Supports closures, nested functions, first class functions, and type checking
- Included **automatic garbage collection** using Cheney's algorithm

Raytracer 🔗 | C++
- Wrote a **photorealistic graphical renderer** that works by simulating light rays
- Implemented reflections, refractions, and translucency for spheres and planes

Slime Farming Simulator 🔗 | Java
- Developed a **multithreaded server and client** for a rogue-like dungeon crawler
- Incorporates collision detection and double-buffering to reduce screen tearing
- Designed a procedural map generation algorithm and a pathfinding AI

Education

University of Waterloo | *2016 - 2021*
- Candidate for Bachelor of Software Engineering
- Dean's Honour List

Coursera - Stanford University Machine Learning | MATLAB | *2016*
- Implemented Linear & Logistic Regression, ANN, k-NN, and SVM

Awards
- Top 30 Canadian Computing Olympiad Qualifying Round | *2016*
- Platinum Division USA Computing Olympiad | *2016*