Alexander Shah

Software Engineering

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

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

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
- Trained an **SVM** on results from graph cuts over 3D meshes to obtain temporally coherent segments, allowing for the **decomposition of animated models**
- Traced geodesic paths through following the heat gradient returned from the Geodesics in Heat algorithm
- Optimized convex hull merging algorithm by initially pruning with an **R-tree**, resulting in a **2x speed increase**

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

Projects

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

Raytracer 🔗 | C++
- Wrote a **photorealistic graphical renderer** based on 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
- Incorporated 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 (3.9 Cumulative GPA)

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*