Apurva S Modak

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EDUCATION

University of Pennsylvania
Master's degree in Computer and Information Technology | current

Carnegie Mellon University
Master's degree in Computational Design and Manufacturing | fall 2017

University of Mumbai
Bachelor's degree in Mechanical Engineering | spring 2015

COURSEWORK

Artificial Intelligence
Computer Graphics
Computer Systems Programming
Data Structures for App. Programmers
Mathematics for Computer Science
Advanced Engineering Computation
Numerical Methods

SKILLS

C++11/14/17, Python, Java,
Git / SVN
Latex

MOOCs

Machine Learning, Modeling and Simulation. (MIT/edx)

ACADEMIC PROJECTS

Scotty3D – path tracing in C++

- Ray generation, ray primitive intersection (triangle and sphere), Spatial acceleration with Bounding Volume Hierarchy.
- Ray tracing with Global illumination effects (direct, indirect and environment lighting) and materials (mirror, glass).

DrawSVG – C++ Rasterizer

- Rasterizer drawing points, lines, triangles, ellipse and bitmaps.
- Antialiasing with super-sampling.
- Texture maps with bi & trilinear filtering using mip-maps.

PROFESSIONAL AND RESEARCH EXPERIENCE

Dassault Systemes | R&D Software Development Engineer
Boston, MA | spring 2018 – current

- Expert developing Computer Aided Engineering software in C++11/14/17
- Developed for SOLIDWORKS (Desktop) and SIMULIA (Powerflow) brands.
- Experienced implementing 3D geometric algorithms in production code.
- Skilled in 3D surfaces such as NURBS, splines, and subdivision surfaces.
- Led dev effort creating script-automated regression testing framework.
- Regularly participated in design and code reviews for code quality.
- Adept working solo or in geographically distributed development teams.
- Typically collaborates with Product Managers, QA, UI/UX teams.

Dassault Systemes | R&D Software Development Intern
Boston, MA | summer 2017

- Improved software quality with enhancements and bug fixes for Surface modeling, sheet metal and weldment features.

Carnegie Mellon University | Graduate Research Assistant
Pittsburg, PA | spring 2017 – fall 2017

- Reconstructed 3D surface from MRI scans with marching cubes algorithms.
- Evolved C++ library for storing and processing polygonal mesh data.

PROFESSIONAL PROJECTS

Subdivision Surfaces for Solidworks 3D Surface Modeling | C++ 11/14/17

- Developed prototype for Subdivision Surface modeling in Solidworks.
- Supported Local (erase, flip, split, and bevel) and global (triangulation, Linear, Catmull-Clark and Loop Subdivision) mesh editing operations.
- Enabled efficient fitting, fairing and mesh interpolation.
- Used Siemens' Parasolid, Pixar's OpenSubdiv, Intel's Math Kernel Library

Deep Feature Baselines for Solidworks 3D Parts Modeling | C++11/14/17

- Created Test generation framework offering automated workflow recording.
- Generated Xml logs containing geometric data used as baselines on playback.

Weldments Corner Treatment for SolidWorks (Youtube) | C++11/14

- Improved logic to trim weldment segments so they butt up correctly.
- Worked with End Butt joints, End Trim and End Miter configurations.

Engine Cooling Module - cloud-based design for PowerFlow (Link) | C++11/14

- Implemented interactive UI for package design, and performance visualization.
- Integrated this functionality with existing 'CASE and 'DELTA soft wares.
- Used Qt5, Python, XML, SVN, Eclipse, targeting Linux and Windows.

Deformed Rotating Tire – simulation setup tool for PowerFlow | C++11/14

- Enabled efficient Sharing of 3D geometric data within the tread separation library, client application and the PowerFLOW solver.
- Developed intuitive user interface for setting up simulation parameters.