DHARSHAN VISHWANATHA

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EDUCATION

University of California, San Diego (Aug 2019 - Dec 2020)

BS, Mathematics-Computer Science

- GPA 3.7 - **Provost Honors** (Fall 2019, Spring 2020). **iLead program** - certified.
- Courses: Graph Theory, Numerical Analysis, Real Analysis, Theory of Computability, Mathematical Reasoning, Statistical Methods, Abstract Algebra, and Advanced Data Structure.

Pasadena City College (Aug 2017 - June 2019)

AS, Computer Science

- GPA 3.8 - **Dean's Honor** for all semesters. Awarded **Honors in Mathematics**.

SKILLS

C++, Java, C#, Python, OpenGL, OpenCV, IBM Qiskit, Acceleration Structures, Qt Frameworks, openFrameworks, Jupyter, Jenkins (CI/CD), Docker, Linux, Git, CMake, Neo4j, and SQL.

Student Organizations

CalTech FSAE (Oct 2019 - Dec 2019)
- Collaborated with the CalTech FSAE team on building an electric autonomous racecar.
- Prototyped detecting cones and distance from Kinect's camera, and displayed depth using OpenCV.
- Discovered that the sun's uv-lights cancels out the Kinect's infrared sensor. Making the Kinect useless in competition, and looked towards LiDAR.
- Tools used: OpenCV, Contour's, openFrameworks, and ofxKinect.

Publication

Ray Tracer - Simple Introduction (Oct 2019 - Dec 2019)
- Published a book (link: rb.gy/ex8n8y). Step-by-step, in-depth and overarching on the basics of ray tracing.
- Includes mathematical foundations, code implementations, documentation, and rendered images.

PROJECTS

IBM Quantum Programming (Python, Aug 2020 - Present)
- Exploring fundamentals of Quantum computing: Mathematical foundations and Circuit Programming
- Learning Qiskit framework, Gates, Superposition, Entanglement, and Quantum Algorithms.

ELocation (C#, Mar 2019 - Apr 2019)
- An android app that gives the user real time information of 100+ public buses across the United States.
- Learned API requests and parsing the JSON object to represent the bus data. And Google's Map API.

Android OpenGL Reflection (Java, July 2019 - Sep 2019)
- A java-based app that implements an engine using OpenGL ES to do a cube-based reflection.
- The purpose was to take a 360° image with a camera, then do a reflection on a virtual sphere to emulate PBR.

AllChat (Java, May 2020 - Present)
- Implemented a chat server/client for multiple users through TCP/IP connections.
- Initially built a console application, but plan to expand to an Android app and user SQL database with PHP.

Car Dealership (C#, Jan 2020 - Mar 2020)
- Developed a CRUD application for a car dealership, using OOP concepts and Dictionary to handle processes.
- Fast query of cars by ID, Make, or by range between years. Allows for scalability with minimal change.

Ray Tracer (C++, Aug 2019 - June 2020)
- Implemented Ray Tracer with basic geometry, lighting, reflection, and cubemap. Used in Pixar's RenderMan.
- Learned ray sphere, plane intersection, and using vector operations.

Octree/QuadTree (C++, Sep 2019 - Oct 2019)
- Implemented an accelerated spatial data structure, that enables fast lookup of 3d points and triangles.
- Improved ray tracing time complexity between ray and triangle intersection.

Cloth Simulation (C++, Aug 2019 - Sep 2019)
- A simple OpenGL cloth simulation that reacts to gravity and wind forces by using Verlet Integration
- Implemented common physics objects such as springs and particles.

SVD-Image Compression (C++, Feb 2019 - Dec 2019)
- Implemented a concept form Numerical Analysis course to image compression.
- Learned about Matrix Decomposition, and getting Eigenvalues through Jacobi Iteration.