

Dharshan Vishwanatha

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Education

University of California, San Diego (Aug 2019 - Mar 2021)

BS, Mathematics-Computer Science

- GPA 3.55 - Provost Honors (Fall 2019, Spring 2020). iLead, Machine Learning With Big Data - certified
- Courses: Numerical Analysis, Linear Algebra, Differential Equations, Real Analysis, Mathematical Reasoning, Statistical Methods, Theory of Computability 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.
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Skills

C++, Java, C#, Python, OpenGL, OpenCV, IPC, Shared Memory, TCP/IP, IBM Qiskit, Qt, Jenkins (CI/CD), Docker, Linux, Git, CMake, Neo4j, SQL, Hadoop, and Apache Spark (MLlib).

Student Organizations

CalTech FSAE (Oct 2018 - Dec 2018)

- 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.
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Self-Publications

Ray Tracer - Simple Introduction (Oct 2019 - Dec 2019)

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

Antialiased Shadows

- Wrote a paper (link: rb.gy/yddklv) considering different methods of rendering shadows and pros/cons.
 - Addressed methods: PCF, Variance Shadow Maps, Moment Shadow Mapping and other improvements.
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Projects

Inter process communications (IPC) (C++, Sep 2020 - Dec 2020)

- Explored Linux IPC's: Message Queues and Shared Memory to send data between two processes.
- Achieved 500 nanosecond latency using complex Shared Memory data structure with Multi-threading.

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 and Plane Intersection, Image Processing, and Multithreading rays.
- Used Jenkins for CI/CD, Docker image, project structure for development and deployment.

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 from Numerical Analysis course to image compression.
- Learned about Matrix Decomposition, and getting Eigenvalues through Jacobi Iteration.