

Dharshan Vishwanatha

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Education

University of California, San Diego (BS, Mathematics-Computer Science, Aug 2019 - Mar 2021)

- ❑ GPA 3.57 - 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.
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Experience

Rockstar Games - AI/Gameplay Programmer (Apr 2021 - Present)

- ❑ Worked on a AAA title involving systems in AI, gameplay and character mechanics.
 - ❑ Collaborated and interacted with multiple teams and studios globally to deliver features on schedule.
 - ❑ Provided immediate results by quickly managing and learning the large code base.
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Self-Publications

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

- ❑ Published a book (link: rb.gy/2pqts5) 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.

Blog - Computer Graphics (June 2021 - Present)

- ❑ Started a blog to learn and understand topics related to Computer Graphics and Mathematics in general.
 - ❑ Covered/In-progress topics: Monte Carlo, Inverse Transform, Quaternions, Navier-Stokes, and many more.
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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.
 - ❑ Learned sun's uv-lights interfere with Kinect's infrared sensor. Making the Kinect useless in competition.
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Projects

Path Tracer CUDA (C++, Dec 2020 - Present)

- ❑ Real-time Ray Tracer (rb.gy/e9tbbl) using CUDA cores and rendered using OpenGL in 10-50ms/frame.
- ❑ Uses BRDF function for material scattering. Working on loading 3D models and Spatial Data structure.
- ❑ Learned Ray Sphere and Plane Intersection, Image Processing, and Multithreading rays.

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.

Memory Manager (C++, Dec 2020 - Jan 2021)

- ❑ All heap allocated memory is routed to the manager's local buffer to manage and avoid memory leak.
- ❑ Allows multithreaded allocation and uses Free List data structure to manage available memory on buffer.

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)

- ❑ An OpenGL cloth simulation that reacts to gravity and wind forces by using Verlet Integration
 - ❑ Implemented common physics objects such as springs and particles.
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Skill: C++, CUDA, Java, C#, OpenGL, OpenCV, Perforce (Helix Core), IPC, TCP/IP, Qt, Jenkins, Linux, and Neo4j.