Aman Sachan

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Skills

Graphics: Vulkan, WebGL/OpenGL, DirectX 11/DirectX 12, GLSL/HLSL, Threejs
Programming: C/C++, Python, C#, Javascript, HTML/CSS
Software: Unity, Unreal, Maya, Houdini, RenderDoc & other profilers

Experience

Graphics Engineer, Obsidian Entertainment, Microsoft   Jan, 2021 — Present
● Analysed, implemented, and optimised Rendering systems for **The Outer Worlds 2**, in a heavily modified fork of the Unreal Engine; primarily using C++, HLSL, and Unreal's RDG (Render Graph) & RHI (Render Hardware Interface) APIs;
● Specifically worked to improve static lighting systems (for baking massive open worlds), real-time lighting and shadowing systems, shading models, subsurface scattering, ambient lighting, and fog of war systems for PC and XBox;
● Worked on game performance passes, as well as miscellaneous crashes and bugs;

Software Engineer II, Havok, Microsoft   Mar, 2020 - Jan, 2021
Software Engineer I, Havok, Microsoft   Aug, 2018 - Mar, 2020
● Developed features and improvements across the Havok SDK suite focussing primarily on the Visual Debugger (VDB), Physics, and Havok Graphics (HKG); but also contributing to the UE4 integration, Cloth, and AI;
● Support developers by tracking & fixing bugs, implementing custom features, and identifying client errors
● Manage relations with clients; Identify risks & set expectations; use feedback to drive product roadmaps;
● Helped ship multiple AAA titles across many studios & game engines;

Teaching Assistant, University of Pennsylvania | Procedural Graphics (CIS 566)   Jan — May, 2018

Research Assistant, SIG Center for Computer Graphics   May — Aug, 2017
SUBLIMINALLY DIRECTING GAZE IN VR under Dr. Stephen Lane at the University of Pennsylvania
● Developed a VR game that used visual stimuli to subliminally (without conscious perception) direct user attention
● Supervised & taught an undergraduate intern working on the project; implemented a realtime CMA-ES algorithm

Education

University of Pennsylvania — MSE Computer Graphics | *GPA: 3.57/4.0*   May, 2018
Visvesvaraya Technological University — BE Electrical and Electronics Engineering   July, 2016

Projects (See more projects at amansachan.com)

Vulkan Cloudscape Rendering ◈ *C++, Vulkan, GLSL, HLSL* ◈ *Group Project*   Nov — Dec, 2017
● Realistic cloud rendering in under **3ms/frame** on a notebook GTX 1070.
● **Responsibilities**: **Vulkan framework**; 2D and 3D texture support; **ray marching** of cloud shapes; **reprojection** and cheap sampling optimizations; **post-processing** (god rays, tone mapping, **temporal anti-aliasing**);

Monte Carlo Path Tracer ◈ *C++, CUDA, OpenGL*   Feb — April, 2017
● *CUDA Optimised:* **material sorting; stream compaction; first bounce caching; subsurface scattering**; anti-aliasing
● *CPU Generalised:* **multiple importance sampling; volumetric** rendering; **BVH acceleration**; multi-threading; **micro-facet** materials; fresnel reflectance model; realistic modelling of light sources; thin lens camera models

Jello Simulator Using FEM ◈ *C++, Houdini* ◈ *Group Project*   March, 2018
● The simulation uses the **finite element method** with a **fixed corotated elastic model**
● Implemented **collisions**, fixed point constraints, in a **data driven architecture**

Clustered Deferred & Clustered Forward Plus Shading ◈ *WebGL, Javascript, GLSL*   Oct, 2017
● **Real-time (60+ FPS)** rendering of more than **2100 dynamic lights** in complex scenes using a **compacted g-buffer**

Hand Of God ◈ *Unreal Engine 4* ◈ *Group Project*   Oct, 2017
● Asymmetric co-op endless runner game **merging** traditional **non-VR and VR gameplay**.

CUDA Rasterizer ◈ *CUDA, C++, OpenGL* | **tile based** & **scanline** Rasterization in **real-time (60+ FPS)**   Oct, 2017

Mesh Editor ◈ *C++, OpenGL*   Nov, 2016
● Implemented an interactive **Half-Edge Mesh data structure**, **Catmull-Clark Subdivision**, **Interactive Skeleton** Structure, **Skinning**, and Shader Based **Skin Deformation**