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CIS565 Final Project

11/13/17

Overview

3D rendering engines developed for the web, that we have come across, either lack support for participating media and/or lack realism. For our final project, we would like to explore and implement Frostbite's Physically Based Volumetric Rendering in WebGL. By leveraging compute capabilities of modern GPUs with latest optimization and graphics techniques, we can achieve physically based volumes in real-time.

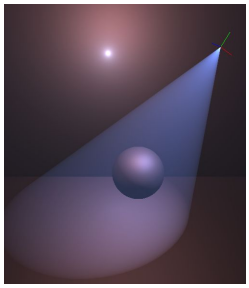
Creating realistic volumes can be a very expensive process as it requires an extensive amount of ray marching. Utilizing a clustered deferred renderer will help alleviate this bottleneck.

After implementing a physically based volumetric renderer, we have several secondary goals we would like to try to accomplish. Frostbite implements Intel's Adaptive Volumetric Shadow Mapping which is something we would like to explore.

Goals

Primary Goals:

- Naive volumetric rendering
- Volume definition (3D textures, clusters, tiles, etc.)
- Physically based volume rendering like Frostbite.



Secondary Goals:

- Incorporate particles for an interesting fog simulation
- Adaptive Volumetric Shadow mapping
- Indirect lighting for volumetric
- Physically based materials

Milestones

11/20 - Naive volumetric rendering
11/27 - Physically based volumetric rendering
12/04 - Smoke/fog simulation
12/11 - Optimizations, performance analysis, deploy

References

- Physically Based and Unified Volumetric Rendering in Frostbite
- Volumetric Fog: Unified Compute Shader Based Solution to Atmospheric Scattering
- Fast, Flexible, Physically-Based Volumetric Light Scattering
- Light Propagation Volumes
- Adaptive Volumetric Shadow Maps
- Froxel Development
- Moving Frostbite to PBR