EE/CprE/SE 4920 SPRINT REPORT 6

4/11/25 - 5/2/25

Group number: 40

Project title: Hybrid Relightable 3D Gaussian Rendering

Client: Jackson Vanderheyden & Brian Xicon

Advisor: Simanta Mitra

Sprint Summary:

	Sprint Tasks	**Accomplished Tasks**	**Tasks for Next Sprint**
Ethan	-ML: Finish Polishing Splicer and SfM Scripts -ML: integrate Optimizer into Package -ML: Merge package into main	-ML: Finished Polishing Splicer and SfM Scripts -ML: integrated Optimizer into package -ML:Merged Package into main	-Finish design document -finish poster -finish presentation -update website
Kyle	-Put the pieces together . -Have the python runner running in Unity. -Have the optimizer running on in Unity. -Work or Read me	-Completed the ReadMe -Prepared in detail the steps needed to publish our project to the asset store. -Assisted in general wrap of the project.	-Finish design document -finish poster -finish presentation -update website
Jackson	-GP: Code review for Luke's BVH Merge Request -GP: multiple-intersection hybrid rendering -GP: polish up by completing lower priority tasks + regroup with ML to get an MVP working	-GP: Code review for Luke's BVH Merge Request -GP: multiple-intersection hybrid rendering	-GP: polish up by completing lower priority tasks + regroup with ML to get an MVP working

Luke	- GP: match Gaussian representation to ML output - GP: Implement color determination using spherical harmonics - GP: Merge Gaussian BVH and spherical harmonics into main	- GP: match Gaussian representation to ML output - GP: Implement color determination using spherical harmonics - GP: Merge Gaussian BVH and spherical harmonics into main	-Finish design document -finish poster -finish presentation -update website
Brian	-ML: Optimize camera angles for training ML models off our premade images. -ML: Create ML model and optimize it to work with different values of Gaussians like color, texture, etc.	-ML: Finished the retrieval and processing of our image data, images of point cloud are now optimized to match the truth images -ML: Create a working renderer to use for data processing.	-Finish design document -finish poster -finish presentation -update website

<u>Ongoing Tasks:</u>

Graphics Programming (GP) Team:

- ☑ ~~Merge BVHs into the main branch~~ **~~[High Priority]~~**
- ☑ ~~Write ray gaussian intersection code~~ **~~[High Priority]~~**
- ☑ ~~Gaussian BVH~~ **~~[High Priority]~~**
- ☑ ~~Update necessary buffers on scene update~~ **~~[Medium Priority]~~**
- ☑ ~~Remove bounce from Path struct and add pathBounce counter buffer~~ **~~[Medium Priority]~~**
- ☑ ~~Gaussian parser~~ **~~[High Priority]~~**
- ☑ ~~Gaussian spherical harmonics support~~ **~~[High Priority] (due Apr 27)~~**
- ☑ ~~Handle multiple paths per pixel~~ **~~[Low Priority] (due Apr 20)~~**
- ☑ ~~Anti-aliasing in primary path generation~~ **~~[Low Priority] (due Apr 20)~~**
- ☐ PBR materials **[Low Priority] (due Apr 27)**
- ☐ Improve workgroup count **[Low Priority] (due Apr 27)**
- ☐ Support Unity lights **[Low Priority]**

Machine Learning (ML) Team:

- ☑ ~~Prep point cloud data by removing noise and outliers~~ **~~[Medium Priority]~~**
- ☑ ~~Create a ML model to convert a point cloud into a Gaussian point cloud.~~**~~[High Priority]~~**

- ☑ ~~Test accuracy of Gaussian point cloud generation **[Low Priority]**~~
- ☑ ~~Modify SfM script to accept user-selected paths **[Low Priority]**~~
- ☑ ~~Fix bug within SfM script with user-selected paths having format issues**[HIGH Priority]**~~
- ☑ ~~Video to images support for preprocessing **[Low Priority]**~~
- ☐ Extract original lighting from models **[Low Priority]**
- ☑ ~~Create .cs script to run python scripts within Unity scenes **[Medium Priority]**~~
- ☑ ~~Test .cs script on all python scripts within Unity scenes **[Medium Priority]**~~
- ☑ ~~Explore techniques on running python scripts within the unity environment**[Medium Priority]**~~

General Features:

- ☐ Have complete Read Me