EE/CprE/SE 4920 SPRINT REPORT 2

2/14/25 - 2/28/25

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: Work with Kyle to get python scripts working within the Unity Environment. -Machine Learning: Modify SfM script to accept user selected paths	-ML: Work with Kyle to get python scripts working within the Unity Environment.	-Work with Brian to get a model working for point cloud to gaussian point cloud creation/optimizer -Update website
Kyle	— Create a team account for registering Unity Package to the store – Test importing PyTorch modes to ONNX files for importing to Unity	-GP & ML: Successfully created a team account for registering Unity Assets the the Unity Public Store.	-GP: Work with Ethan to get Python scripts working within the Unity Environment. This is part of importing Pytorch models to Unity.
Jackson	-GP: Model texturing render support -GP: Physically based path reflection rendering	-GP: Model texturing render support -GP: Debugging Luke's BVH branch after merging in main -GP: Started work on Physically Based lighting calculations	-GP: Finish physically based lighting calculations -GP: hybrid rendering of ray Gaussian intersection

Luke	- Write BVH intersections - Merge BVHs into main branch - First iteration of ray - Gaussian intersections	- Write BVH intersections - First iteration of ray - Gaussian intersections	- Merge BVHs into main branch - Improve ray-Gaussian intersection - Start BVH generation for Gaussian
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 the ML model used to turn our normal point cloud into a Gaussian point cloud.

Ongoing Tasks:

Graphics Programming (GP) Team:

☐ Physically based lighting calculations **[High Priority]**
☐ Merge BVHs into the main branch **[High Priority]**
☐ Write ray-gaussian intersection code **[High Priority]**
☐ Update necessary buffer on scene updates **[Medium Priority]**
☐ Handle multiple paths per pixel **[Medium Priority]**
☐ Add pathId as a unique identifier in getSeed() **[Low Priority]**
☐ Improve workgroup count **[Low Priority]**
☐ Remove bounce from Path struct and add a pathBounce counter buffer **[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]**
☐ Video to images support for preprocessing **[Low Priority]**