CS11: 3D Scanning of Large Spaces

3/12/2021 Meeting

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Unreal Engine Plugin :
As per our plan, we are getting ready to start creating an Unreal Engine plugin to help import FBX files that MetaShape creates. We already have great experience with the built-in FBX importer that is baked into the Unreal Engine already. We have been able to find the source SDK for the importer within the engine's directory files. This includes a huge library of FBX importing resources that we can tap into. It is neatly organized with a lot of documentation behind each library function. Within each header file they lay out a typical workflow on how to use a particular class. However, there is a lot to sift through in terms of content.

Metashape Plugin :
We are in the process of creating a plugin for creating and exporting a mesh from an imported point cloud. Having solved the problem of how to calculate vertex normals, we can now work on building and applying textures. At the moment, the setup for this plugin is somewhat involved as it requires installing both MetashapePro and a Python 3 module (as it is a standalone command line script), but we hope to simplify this process. While the plugin can already run without opening Metashape, in theory, we should be able to implement a script that can utilize Metashape's capabilities without installing the entire application in the first place.

Timeline for the Rest of the School Year :
As of the meeting today, we have less than three months left until the engineering expo, where we will present our project. With this little time left, there are some tasks that still need to be completed:
- Complete the plugins for Metashape and Unreal engine
- Integrate the plugins with our user interface
- Being able to integrate multiple point clouds into one mesh(likely a Metashape feature)
- Scan a large space as a control, such as the forestry lab.
- Develop a final video of our project
- Stretch Goals: Vr-compatibility, Possible more work with DotProduct

There are 2 sprints left before the expo, and time from between now and the beginning of spring term. We think that this is an adequate amount of time to complete this project, we just need to continue to be vigilant and get key parts of the project completed. Here is a sample timeline for How we think the project should continue to go:

Finals/Spring Break, 3/12 - 3/28:
- Keep working with the plugins that we need. We can finish the MetaShape plugin, but the Unreal engine plugin will likely need more time. Since this is our break period, there will not be that much development during this time.

Sprint 1, 3/29 - 4/16:
- This time we will integrate the plugins we have written with our UI. This will mean finishing up what we have left with our plugins, then working on the user interface with QtPy to access the plugins with it. Take time to see if our work will integrate with large spaces well, such as using multiple point clouds

Sprint 2, 4/17 - 5/7:
- This time will be spent debugging and tweaking all of our plugins, pipelines, and user interface, as well as testing multiple scans with it. We will tie everything together and make sure that our project does what it is supposed to.

The rest of the time before the expo can be spent on finishing up any things that still need to be completed, as well as working on the video that we will make for the expo.