CS11: 3D Scanning of Large Spaces

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EARS Requirements :

EARS, or the Easy Approach to Requirements Syntax, is a method of defining requirements given by the customer. Generally, it is really easy to define a requirement to be really vague, and leave a lot more questions than answers. When writing requirements, there is a specific way that the writer should make the requirement to make it as specific as possible. When defining requirements, the writer should use this template for creating them:

EARS Patterns

Pattern Name	Pattern
Ubiquitous	The <system name> shall <system response>
Event-Driven	WHEN <trigger> <optional precondition> the <system name> shall <system response>
Unwanted Behavior	IF <unwanted condition or event>, THEN the <system name> shall <system response>
State-Driven	WHILE <system state>, the <system name> shall <system response>
Optional Feature	WHERE <feature is included>, the <system name> shall <system response>
Complex	(combinations of the above patterns)

Therefore, these are the requirements we wrote for this project:

- The meshing software shall create photorealistic scans.
- The interface shall upload directly to the user computer rather than on a remote server.
- Where the user requests in the settings, the software will allow the user to edit their point cloud before it begins meshing.
- When the user generates the mesh, the software shall allow the user to virtually walk around the generated mesh
- The software shall cost significantly less money than the Matterport camera
- When the mesh is added to Unreal Engine, the plugins enabled will automatically add collision and set up a first person camera.

Meeting with Dot3D :

Chris Ahern of DotProduct took time out of his day to talk to us about our software and answer some of the questions that we asked. It was a good meeting and we learned some key points about using Dot3D:

-Dot 3D has a contract deal with Pointfuse that makes the license cheaper for DotProduct users.Though still expensive(~$1000 a year compared to $1000 a month), this product costs about the same as Dot3D would. However, this price is still too much for development currently, and we would have to ask PointFuse if they could offer an extension to the license. Along with pointFuse, there were other softwares that he offered.

DP Meshing Recommendations (zoho.com)

3D Meshing Recommendations:

Pointfuse for DP (Windows): $950/year - Free Trial - Video
DAE, DXF, FBX, IFC, SKP, STL, OBJ, NWG, & X3D Mesh Exports
3DReshaper (DP import) - Video
CloudCompare (DP import) - Video
Reconstructor (DP import)
Thinkbox Sequoia (DP import)
Meshlab (PLY import) - Video

All of these new softwares require licenses as well to use, and it will take more time to compare prices and the quality of their work.

-Dot3D does not have libraries that can directly access the scanning interface, and it would take a lot of work to implement it in our User interface. Chirs mentioned that he can try to send us what they have, and see if there is anything that we can do to get it to work. However, it is time to start rethinking how we can create the user interface.

Some suggestions we have is first to create a user interface for specifically the second part of the pipeline. We could have the interface take in the point cloud that was scanned earlier by Dot3D, then the software will do the rest of the work. This would be a simple way to mitigate the stress of figuring out how to connect to the scanning process. On top of this, this means that the user won't be required to use Dot3D to create the point clouds, and in turn could potentially save money if they need to.

Another experimental option is to rather than having the user interface be connected to Dot3D, it instead opens the Dot3D application, and automatically clicks on the create a scan button for the user. This option I am not certain is possible, but if it is, it could be a temporary solution to the problem that is faced here. Chris mentioned that DotProduct is trying to develop an SDK for Dot3D that can allow the scanning to be done external to the application.