System test case - #1

Test case details

Tester: Niilo Rannikko
Date: 27.3.2025
Device: Laptop Macbook Pro 14, MacOS v15.3.2
Environment:

- Most recent main branch of the project repository
- Most recent commit is 4ea285ea6d09dee2dc3bba13abb5903c20a255f9
- Unity editor version 6000.0.35f1
- Generated runnable .exe via File > Build and run

Test details

The test focuses on the core functions of the software – scanning point-cloud data from the simulation environment. In the test the user moves around the simulation area scanning points and focusing on a tree in the area. The gathered point-cloud data is then revisualized with dedicated visualization software to compare the walked route to the one remapped from the data. Comparison is done by the tester and is done by feel.

Test steps and results

1. Open the project with Unity Editor, go File > Build Profiles, and Build the project for the macOS with Apple silicon platform. The tester chooses to build it into a folder called 'simu' in the Downloads directory.
    a. Result: Build succeeded in a couple of minutes. Simulated forest scanning.exe now exists in the directory where building was done to.

2. Run 'Simulated forest scanning.exe'
    a. Result: Simulation starts successfully
1. Rotated character view around and walked towards a larger tree close by.
    a. Result: Scanned points appeared in the general direction where the character was looking. More points appeared the longer a same area was viewed. Character moved towards the tree successfully.
2. Walked around the tree scanning it up and down for about a minute
    a. Result: Scanned points appeared on the surface of the tree and around its branches. More and more points were scanned until the point "web" was dense. The scanned points mimicked the shape of the tree, its branches and the ground around it in a clear way.

3. Turned visible points off and back on with "u" button
    a. Result: The points disappeared and reappeared as the button was toggled.
4. Terminate the simulation after about 2 minutes and 10 seconds
    a. Result: The simulation was terminated by force using command + q keys
    b. Result: The simulation would benefit from a proper way to shut it down.
5. Locate generated point-cloud data files from build directory, copy the to the visualizer app and run the visualizer with the data
    a. Result: Generated files were found under Package contents in the built version of the simulation software that was run. The folder, containing the data files were copy-pasted into Demo folder in the visualizer application files. For specifics refer to "User Guide for GamiLiDAR Visualizer Software" document from GamiLiDAR Visualizer project. The visualizer was set up according to the instructions in the same documentation.
    b. Result: When running the data with the visualizer, the software recreates the movements the user made inside the simulation. The visualizer shows the rotations and movements of the character and the scanned points recreate the environment from the simulation exactly as it was walked through.
    c. Those areas of the simulation that were scanned more thoroughly are more clear in the visualizer and it feel that larger amount of scanned points "per batch" than the default amount currently in the system would improve the effect of scanning an area in one go.

Conclusions

Simulation seems to collect accurate point-cloud data that can be remapped back into the environment that it was scanned from. Rising the amount of scanned points per scan could improve the accuracy of depicting a scanned environment but can cause performance issues. A dedicated quit-button would help with user experience.