

Data Documentation

NIST LiDAR Extraction – NVision Solutions, Inc. – Hancock County, MS

Overview

LiDAR data was collected for two school districts in Mississippi: Hancock County School District and Bay-Waveland School District. Data for the school buildings includes the point cloud in LAS and PLY format, the trajectory of the device in PLY format, raw video feed from the device capturing the LiDAR in MP4 format, and text files for the tagged features of interest.

Directory Structure

The data files are grouped by school district and school. Within each school directory are three folders: Extracted Features, Scans, and Videos. Extracted Features contains the text files of the tagged features of interest. The Scans folder contains the directories for each LiDAR scan. Videos contains the GoPro video files associated with the LiDAR scans for the school or building.

In the case of Hancock High School, the Extracted Features and Scans folders contain subfolders for each building in the school to better organize the data.

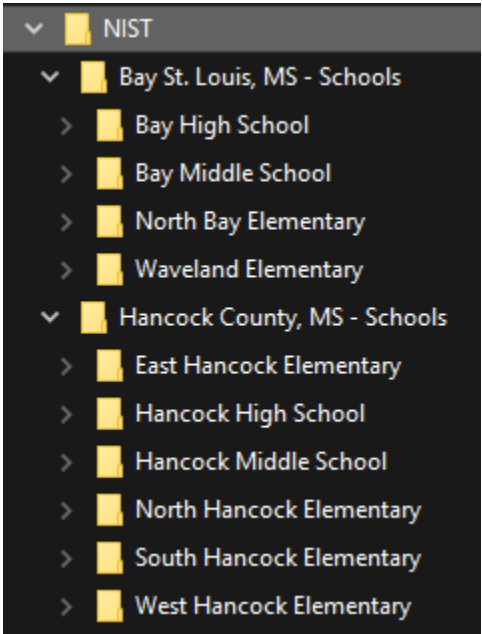


Figure 1 - Directory Structure

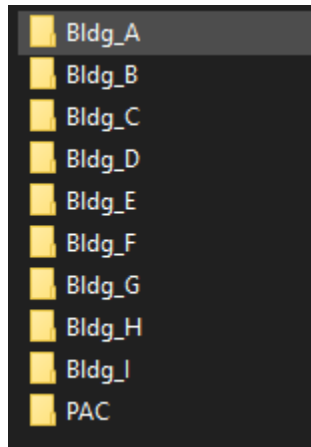


Figure 2 - Hancock High School Building Directories

Naming Convention

Scans Directory

Each directory under the Scans folder is named with the date of the scan followed by the area of the school the scan was performed. Below is a list of the files and their general naming convention.

Basic Filename	Description
*_shade_norm_ts.ply	Grayscale-shaded LiDAR point cloud in PLY format
*_traj.ply, *_traj2.ply, *_video_trajectory.ply	PLY file of the path/trajectory of the device performing the scan
*_zebcamsh_ts.las	LiDAR point cloud in LAS format. Some of these files have color applied from the accompanying video

Also included in the Scans directory is a folder named viewerData. This contains the raw video file captured the same time as the LiDAR scan. It is named with the data of the scan and should match the first part of the parent directory name.

Videos Directory

In some cases, the video file contained in <Scans>\viewerData is incomplete. The Videos directory contains additional video files that provide video continuity of the LiDAR scan following the trajectory taken when the scan was performed. The names of the video file will match the areas of the scans (ex. "Auditorium.MP4" so they can be linked to specific LiDAR files.

Extracted Features Directory

The Extracted Features directory contains the text files of all the tagged points of interest relative to the LiDAR file they were tagged. All the tagged feature text files reside in this location, but the filename is descriptive in pointing to the LiDAR file used to tag the feature.

The file name format is <Feature>__<Scan Directory>__<LiDAR file>. Generally, Windows and Doors were extracted from the LAS point cloud while the Single Point features were tagged in the PLY point

cloud. Refer to the table above to see if the tagged feature file has “_zebcamsh” in its name to determine if the LAS file was used. Following the colored example above, here is a sample tagged feature filename: **Doors**__BayHigh_Last_Left_results_color__2019-01-21_20-28-45_zebcamsh_ts.txt.

Tagged Feature Types

The points contained in the tagged feature text file follow the same format: Point ID (X;Y;Z) Descriptor.

Doors and Windows

All school directories have at least one tagged feature file each for doors and windows. Both doors and windows contain four corner points representing the feature and follow the same format: Bottom Left, Top Left, Top Right, and Bottom Right.

Single Point Features

Other features have been tagged from the LiDAR files as well. All schools have the following features tagged with a single point representing the centroid of the feature: Exit Sign, Fire Alarm, Fire Alarm Pull, Fire Extinguisher, and Water Cutoff.

Some schools have additional features tagged: Bookshelf, Chair, Computer, Desk, Sink, Table, Television.

Data Screenshots

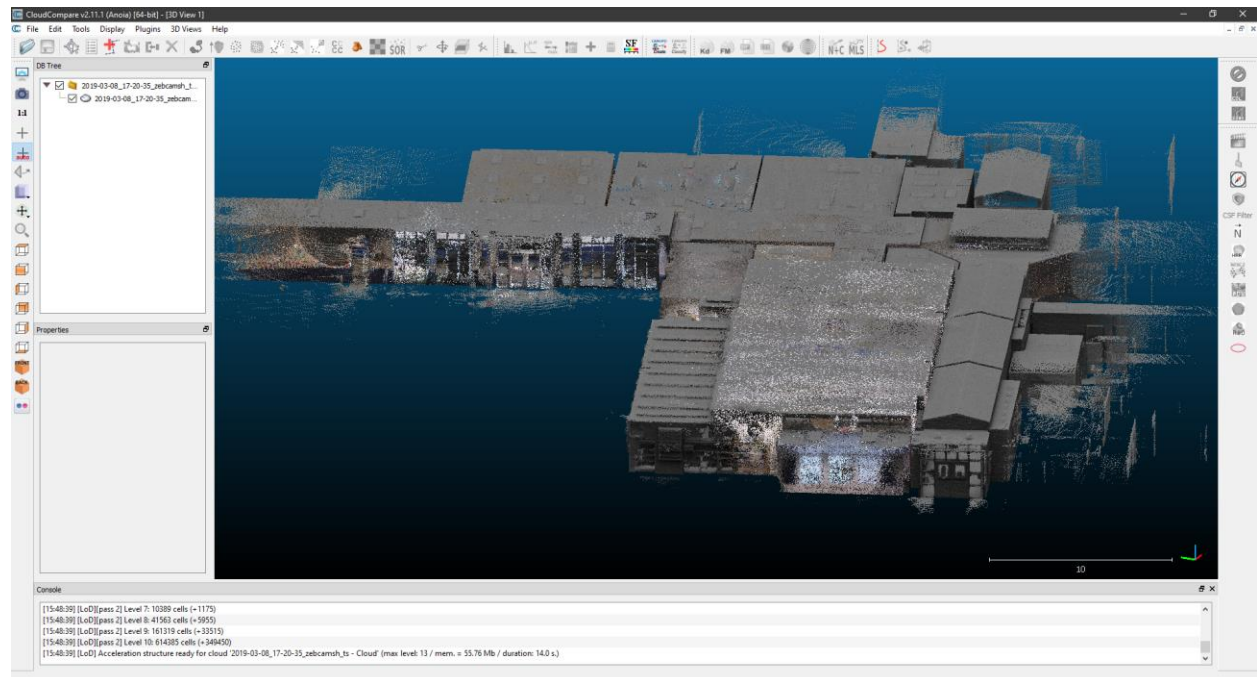


Figure 3 - LAS Point Cloud in CloudCompare

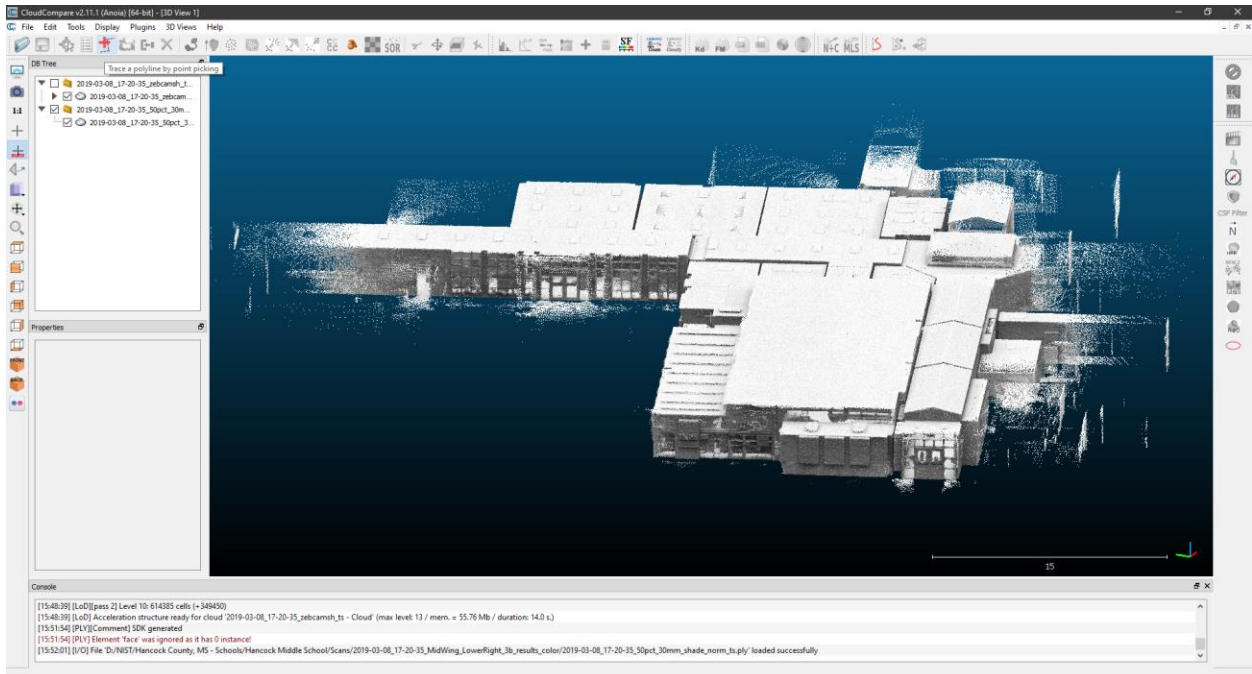


Figure 4- PLY Point Cloud in CloudCompare

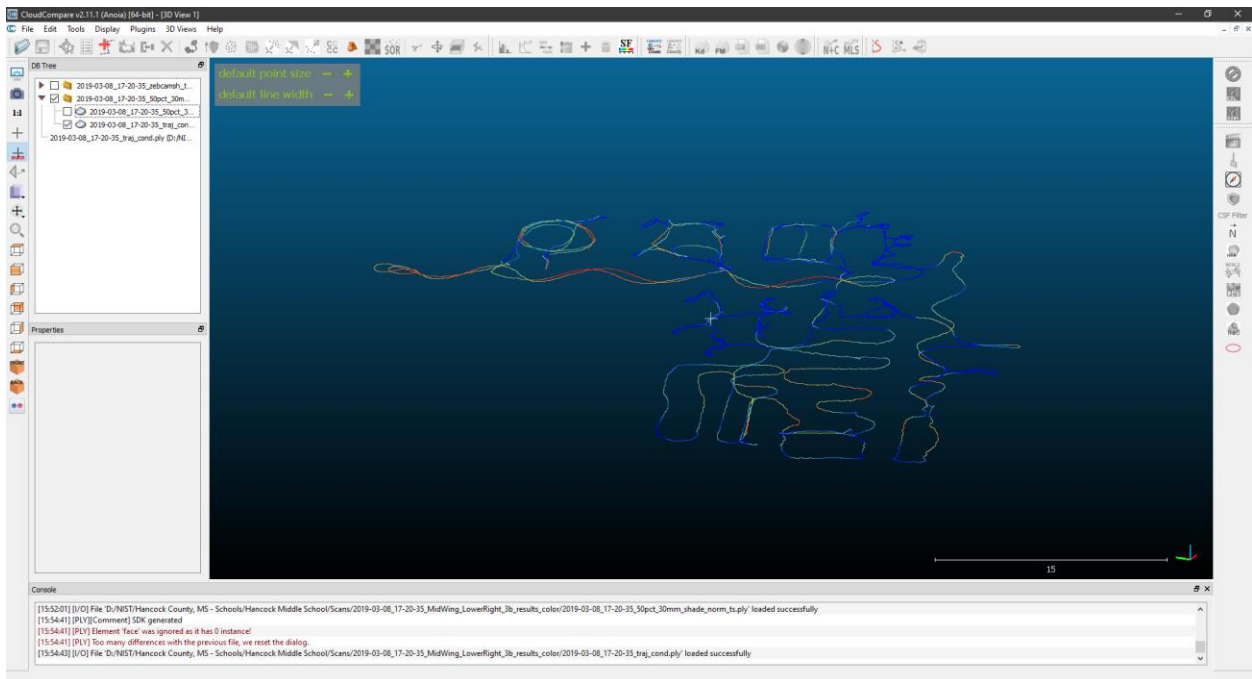


Figure 5 - PLY Trajectory in CloudCompare

1.. Doors_2019-03-08_15-38-29_gym_1_results_color_2019-03-08_15-38-29_50pct_30mm_shade_norm_ts.txt									
0	10	20	30	40	50	60	70	80	90
1	P#3027722	(-17.512363;-46.275887;-0.787360)	Exterior Door Bottom Left						
2	P#2880917	(-17.404045;-46.353321;1.301590)	Exterior Door Top Left						
3	P#2581847	(-16.120914;-46.842243;1.334115)	Exterior Door Top Right						
4	P#3022272	(-16.120071;-46.865028;-0.780834)	Exterior Door Bottom Right						
5									
6	P#3046412	(-15.262218;-47.086132;-0.793830)	Exterior Door Bottom Left						
7	P#2852075	(-15.264203;-47.109814;1.275866)	Exterior Door Top Left						
8	P#2996262	(-14.273899;-47.088825;1.287160)	Exterior Door Top Right						
9	P#3022837	(-14.304900;-47.156979;-0.813187)	Exterior Door Bottom Right						
10									
11	P#3131318	(-8.062223;-45.538414;-0.811887)	Exterior Door Bottom Left						
12	P#3091882	(-8.072546;-45.466038;0.850895)	Exterior Door Top Left						
13	P#2808663	(-6.949312;-44.571156;0.930559)	Exterior Door Top Right						
14	P#3035997	(-6.841561;-44.697647;-0.813322)	Exterior Door Bottom Right						
15									
16	P#3381387	(-2.297197;-35.695972;-0.756984)	Exterior Door Bottom Left						
17	P#3580170	(-2.292991;-35.763142;1.318611)	Exterior Door Top Left						
18	P#3430544	(-2.565555;-33.913639;1.289762)	Exterior Door Top Right						
19	P#3415388	(-2.607729;-33.896236;-0.811594)	Exterior Door Bottom Right						
20									
21	P#3763267	(-3.386108;-29.165577;-0.797000)	Exterior Door Bottom Left						
22	P#3761391	(-3.333179;-29.103184;1.304299)	Exterior Door Top Left						
23	P#3635388	(-3.621960;-27.308191;1.286491)	Exterior Door Top Right						
24	P#3624628	(-3.616179;-27.307590;-0.784440)	Exterior Door Bottom Right						
25									
26	P#3997073	(-5.259394;-17.213642;-0.833317)	Exterior Door Bottom Left						
27	P#4035193	(-5.238923;-17.147305;1.289667)	Exterior Door Top Left						
28	P#4045321	(-5.488565;-15.380158;1.240372)	Exterior Door Top Right						
29	P#4055694	(-5.479243;-15.395680;-0.789790)	Exterior Door Bottom Right						
..									

Figure 6 - Tagged Feature Example: Doors

1.. SinglePoints-FireAlarm_2019-03-08_21-24-29_7GradeWing_UpperTop_5a_results_color_2019-03-08_21-24-29_50p									
0	10	20	30	40	50	60	70	80	90
1	P#2587168	(4.187771;5.033974;1.306293)							
2									
3	P#3650742	(-11.567781;8.952176;1.295727)							
4									
5	P#4682905	(-16.453741;-6.128036;1.340678)							
6									
7	P#4419586	(-24.922123;-6.081712;2.018295)							
8									
9	P#5040016	(-9.974869;1.120329;1.174863)							
10									
11	P#5497385	(-2.323314;-1.368428;1.012157)							
12									
13									
..									

Figure 7 - Tagged Feature Example: Fire Alarm