

Senior Design Weekly Meeting #17

Meeting Minutes

01/05/2021 13:30 – 14:45

CM/TM: Dr. Honggang Zhang

Students: Zhuoming Huang, Alinson Sanquintin, Lucas Lomba

- **Agenda**

1. Point cloud of CAD model
2. Reflectors from point cloud
3. CAD model of scene in experiment

- **Notes**

1. FreeCAD <https://www.freecadweb.org/>
 - a. Alinson shared how to convert a CAD model to the form of point-cloud in FreeCAD
 - i. Select workbenches 'Mesh Design' in tab 'View'
 - ii. Select create mesh from a shape in tab 'meshes'
 - iii. Select workbenches 'Points'
 - iv. Select convert to points in tab 'points'
2. Extract reflectors from CAD point-cloud for depth imaging
 - a. Define the resolutions of range, elevation and azimuth (rho, theta and phi) for constructing a grid map in spherical coordinates;
 - b. Convert the point cloud from cartesian to spherical coordinates (`cart2sph()`);
 - c. Mark the voxels that has points to 1 in the grid map and others to 0;
 - d. Create another empty grid map then go over the voxels, for any pair of theta and phi that defines a direction, mark the first voxel of 1 in this direction;
 - e. Convert the points in marked voxels from spherical coordinates back to cartesian coordinates.
3. Construct the CAD model of senior design room (with the experiment scene)