Mobile Robotics

# Assignment 2
## Formula AI

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## Point Cloud Registration

In this question, we load the pose and pointclouds using the functions given. Given how dense they are we first try to downsample them by making bounds.

- Clip points. After that we use voxel_downsampling which averages all point_clouds in a voxel and replaces it with the mean.
- Rotate the frame from lidar to actual camera.
- Transform with the poses to get the result. The matrix has been provided and is appended with [0,0,0,1] to make it homogenous
- Combine all 77scans to get the final result
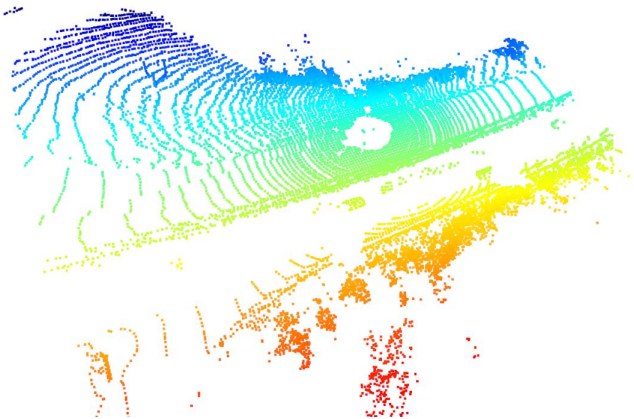


Single Scan
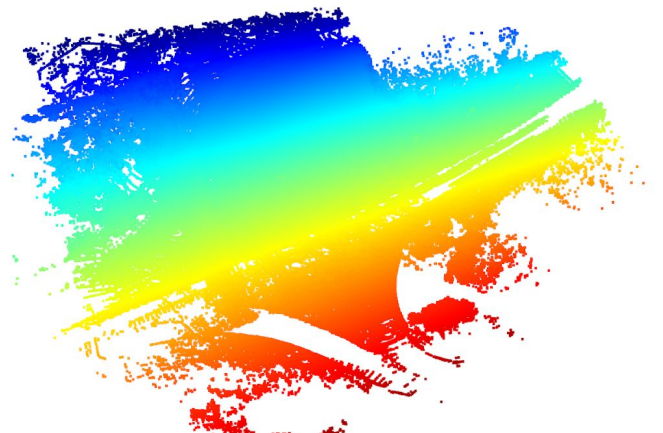


77 scans combined

# Occupancy Grid

In this question we consider the xy plane and z to be up. We first do a little bit of preprocessing where we add the min(x) to all x values and similarly to y. We then discretize them. Then we chose one point and see if there are any corresponding to it. If there are more than the threshold then we allot the corresponding image pixel as 1 else 0. Note: This was done in Lidar frame. We repeat the same process with 5 consecutive, 10 consecutive images.



Occupancy Grid -000054
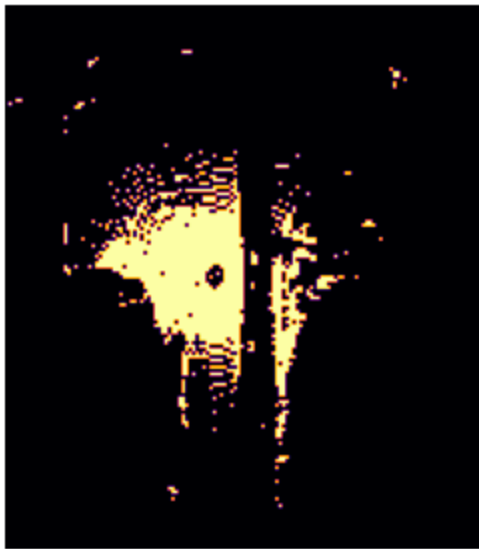


Occupancy Grid -000001
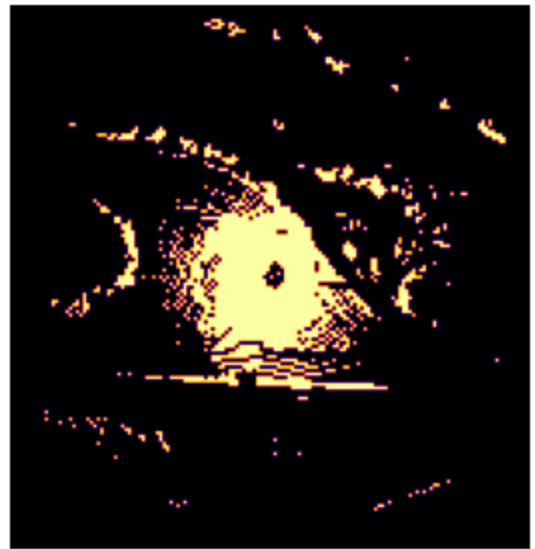
## Results Link:

https://iiitaphyd-my.sharepoint.com/:f:/g/personal/pulkit_gera_research_iiit_ac_in/EuoP6NG
R8idKpUNUVFmmX8UB5r_MjpyRaJuQjfGKNRyZXQ?e=9kFviE