Scan Matching Localization

Introduction:

The objective is to localize a car driving in simulation for at least 170 m from the starting position and never exceeding a distance pose error of 1.2 m. The simulation car is equipped with LiDAR, provided by the simulator at regular intervals are LiDAR scans. Localization of the car has to be achieved by point cloud registration matching between the map and the scans localization of the car.

Following are the main steps:

Step 1: Filter scan using voxel filter

Step 2: Find pose transform by using ICP or NDT matching

Step 3: Transform the scan so it aligns with ego's actual pose and render that scan

Conclusion: The car was localized at 170 m and reached passed state. Difference distance instances results are mentioned below.

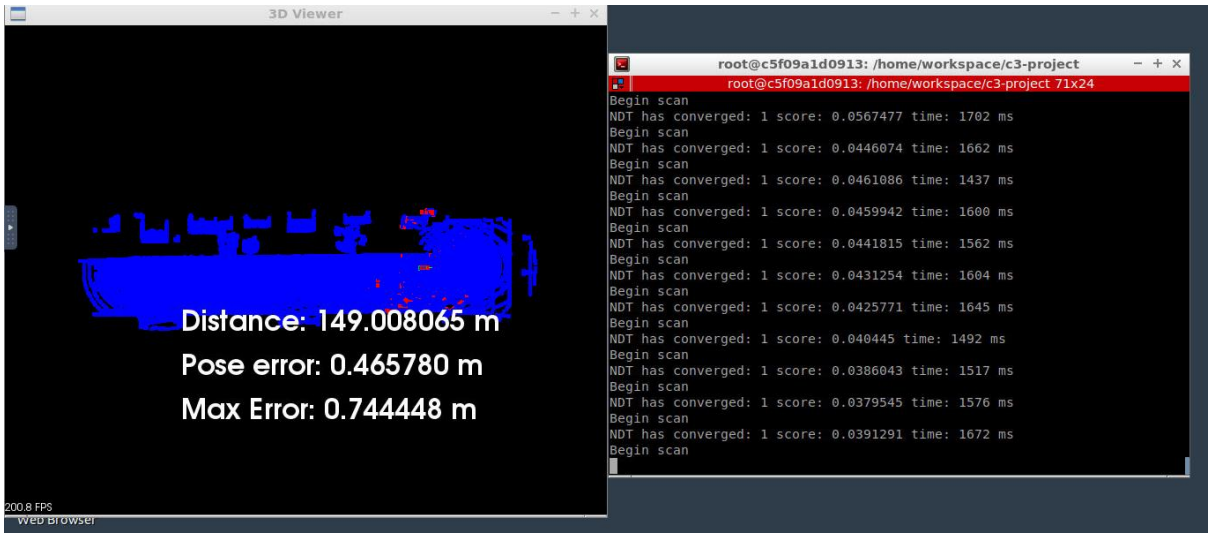

Fig 1: Scan matching using NDT at distance: 149.008 m

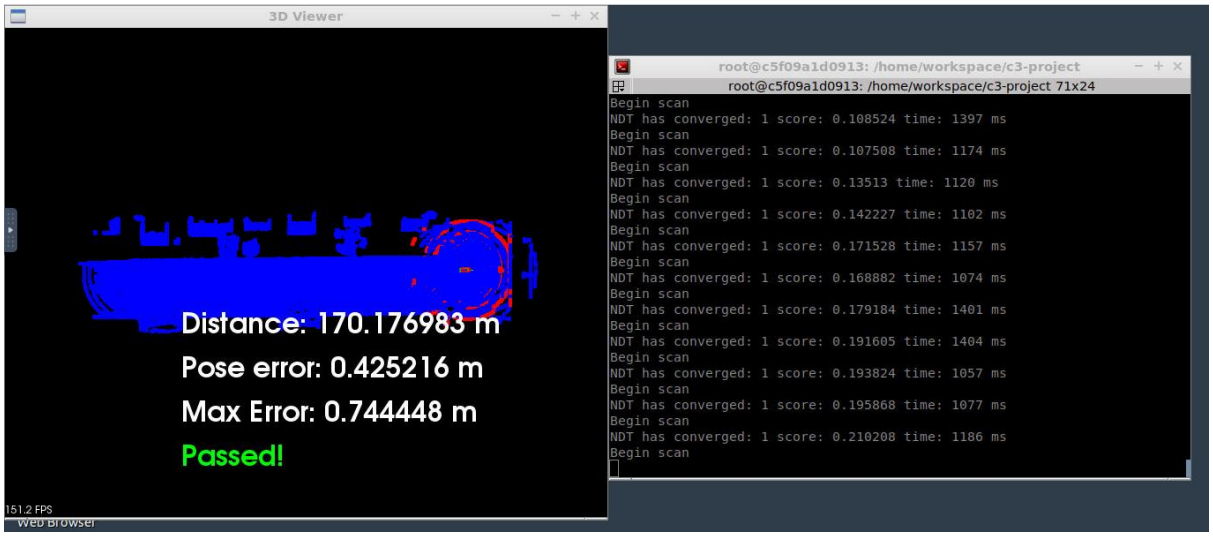

Fig 2: Scan matching using NDT at distance: 170.18 m (passed state)

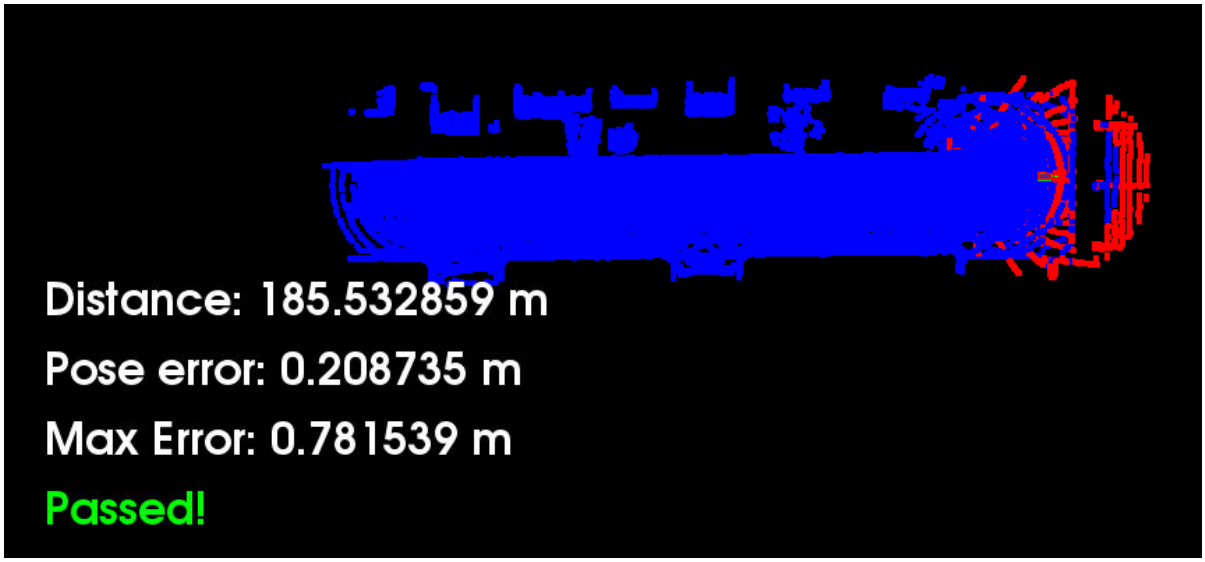

Fig. 3: Scan matching localization using NDT (passed state)