HomeServiceBot

This is the final project in Udacity Robotics Software nanodegree program.

Here, I simulated a HomeService Robot that can be thought as moving around your house and doing certain chores.

To emulate the behavior I worked on Localization, Mapping and Path Planning modules.

Some of the packages used in this projects are:
1. **Mapping pkg:**
       Specifically, for mapping I have used RTAB Map (that is Real Time Appearance based Mapping). It is a ROS wrapper and it uses RGBD Sensors (Camera) for SLAM method with Real Times constraints and Global Loop Closure detection. This generates 3D PLY data using frames pair from both imagers. That 3D correspondence like a laser scan helps to create Occupancy grid mapping.

2. **Localization** – For localization, AMCL is used that is adaptive MonteCarlo Method to provide probability distribution for estimating Robot poses. It utilizes data from odometry (/odom) and Range Finder Sensors that is published on /scan (topic for laser messages). With Occupancy Grid Mapping and AMCL to localize, Robot poses posteriors are better estimated.

3. **For navigation** – Navigation uses ROS navigation pkg that's built on Dijkstra Algorithm with given start and end points for path planning with motion control and obstacle avoidance. The other approach could be custom developed A* approach with better heuristic.

Here is some screenshots with Robot in motion:

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