Home Service Robot which pick and place objects at different locations in the environment.

Packages used::

I used following packages to complete the project

turtlebot_gazebo : This package is available in turtlebot_simulator, which allows loading the environment, robot and parameters. I also used this package to save my custom map into map folder of this package.

turtlebot_rviz_launchers: This package is available in turtlebot_interactions, which allows different types of interactions of robot in the environment. This package is also used to launch the robot visualization for different packages.

I develop two packages:

pick_objects: this package sends 2 goals which are picking and dropping the object in the environment, move_base_msgs and actionlib are used to give commands to robot for pick up goal and drop off goal positions.

- move_base_msgs: package has messages for communicating with robot frame.
- Actionlib: package use to give different actions to the robot.

add_markers: this package create marker points at pick up location and at goal drop off location in the rviz. This package show object position where robot needs to pick up and when robot drop that object, it will show in the rviz. It hides the marker (object) when robot already picked it and in motion.

visualization_msgs: This provides set of messages for visualizing the data in the rviz. I used it to show the markers.

amcl_pose: I used amcl_pose parameter to navigate in the environment which transform the robot pose to world frame. This helped to minimize the computation in the code.

gmapping: it is used to map the environment which can be used in localization. This SLAM mapping can be used for manual control of the robot and autonomously. I unable to create accurate map and it was taking lot of time to generate map for my environment so I used pgm_map_creator to get the map files and use it for localization.

amcl: This is particle based algorithm to navigate and localize the environment autonomously by giving goal position to the robot. This is used to localize in the environment with cost function and find the optimal path to reach the goal.