Overview

This repo is simulation version of RRT Exploration for single robot or multiple robots.

Environment

PC:

- ubuntu 18.04
- ROS melodic

Dependency

rosdep initialization nad update

```
rosdep init
rosdep update
```

If 'rosdep init' complains "ros init Website may be down.". Then run the following codes to manually add related initialization file in your ubuntu system.

```
sudo mkdir -p /etc/ros/rosdep/source.list.d
cd /etc/ros/rosdep/sources.list.d
sudo gedit 20-default.list
# copy the following contents into 20-default.list
##################
# os-specific listings first
yaml https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/osx-
homebrew.yaml osx

# generic
yaml
https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/base.yaml
yaml
https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/python.yaml
yaml
https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/ruby.yaml
gbpdistro
https://raw.githubusercontent.com/ros/rosdistro/master/releases/fuerte.yaml
fuerte
##################
```

Then rerun rosdep udpate

kobuki related packages

kobuki related packages are not installed by default when installing the ros-melodic-desktop-full. Two Packages need to be installed on your ubuntu system.

1. kobuki_desktop

```
mkdir ~/kobuki_desktop_ws && cd ~/kobuki_desktop_ws
mkdir src && cd src
git clone https://github.com/yujinrobot/kobuki_desktop
cd ../
rosdep install --from-paths src --ignore-src -r -y
```

2. kobuki_msgs

```
mkdir ~/kobuki_msgs_ws && cd ~/kobuki_msgs_ws
mkdir src && cd src
git clone https://github.com/yujinrobot/kobuki_msgs
cd ../
rosdep install --from-paths src --ignore-src -r -y
```

Map Merge

The relative poses and transformations are manually setup in the .launch file. Maps from all robots are merged together using the mapmerge_node in the mapmerge package. With respect to the multirobot_map_merge package (This package uses OpenCV libraries to merge maps from all different robots. The origin of the odometry is the center of the input map, for which the origin will changes the location when receiving different maps. However, as for the real robot in the simulation environment or in the real world, the origin of odometry is fixed all the time. As a result, the merged map will be invalid.) The new map merge is modified from mapmerge package. Maps from different robots are merged using ros-based msg type and functions.

Ready to Run

- change the '/home/jimmy/work/C_test/profiling' to any path you like.
- setup a catkin_workspace and put this repo under the src directory.
- Run the following code in terminal

Single Robot Simulation in house

```
// Terminal 1
roslaunch rrt_exploration_tutorials single_simulated_house.launch

// Terminal 2
roslaunch rrt_exploration single.launch

// click two points in RVIZ which are the diagonal points of the rectangle
```

```
region to explore
// click one goal point in RVIZ to setup the goal of the robot.
```

Multiple Robots Simulation in house (two robot)

```
// Terminal 1
roslaunch rrt_exploration_tutorials multiple_simulated_house.launch

// Terminal 2
roslaunch rrt_exploration two_robots.launch

// click two points in RVIZ which are the diagonal points of the rectangle
region to explore
// click one goal point in RVIZ to setup the goal of the robot.

// You can also uncomment spawn-robot3 & transform between robot3 and
robot1 in multiple_simulated_house.launch and then run the following code
to start three robots simulation.
// Terminal 1
roslaunch rrt_exploration_tutorials multiple_simulated_house.launch

// Terminal 2
roslaunch rrt_exploration three_robots.launch
```

Have Fun 😀