Demo: RTAB-Map & ORB-SLAM2 With ROS

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RTAB-Map

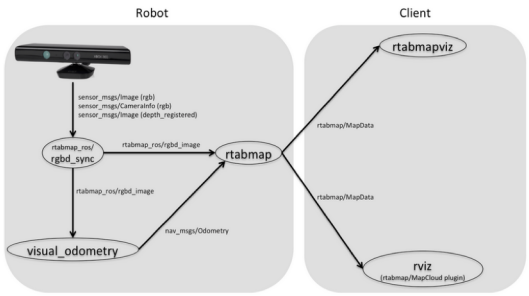
- Requires 3D sensor (eg. stereo-vision, RGB-D, or 3D LiDAR)
- Can also integrate robot odometry and 2D laser rangefinder data
- Includes their own visual odometry method, as well as 7 other approaches by other authors including ORB-SLAM2
- Good integration with ROS, makes it easy to change parameters
- Dense map
- Can save and load maps

ORB-SLAM2

- Can use 3D vision or monocular
- No map saving in original library(but you can find implementations on github)

rtabmap_ros

- Installation instructions
  - https://github.com/introlab/rtabmap_ros#rtabmap_ros-
- Tutorials on using RGB-D camera
  - http://wiki.ros.org/rtabmap_ros/Tutorials/SetupOnYourRobot#Kinect
  - http://wiki.ros.org/rtabmap_ros/Tutorials/HandHeldMapping



http://wiki.ros.org/rtabmap_ros/Tutorials/SetupOnYourRobot#Kinect

rtabmap and rgbd_odometry nodes

List params:

- *rosrun rtabmap_ros rtabmap --params*
- *rosrun rtabmap_ros rgbd_odometry --params*

rtabmap node params examples:

Param: Optimizer/Strategy = "1" [Graph optimization strategy: 0=TORO, 1=g2o and 2=GTSAM.]

Param: Vis/FeatureType = "8" [0=SURF 1=SIFT 2=ORB 3=FAST/FREAK 4=FAST/BRIEF 5=GFTT/FREAK 6=GFTT/BRIEF 7=BRISK 8=GFTT/ORB 9=KAZE 10=ORB-OCTREE.]

Rgbd_odometry node params examples:

Param: Odom/Strategy = "0" [0=Frame-to-Map (F2M) 1=Frame-to-Frame (F2F) 2=Fovis 3=viso2 4=DVO-SLAM 5=ORB_SLAM2 6=OKVIS 7=LOAM 8=MSCKF_VIO]

Example launch command:

Using rtabmap gui:

roslaunch rtabmap_ros rtabmap.launch rtabmap_args:="--delete_db_on_start" rgb_topic:=/camera/rgb/image_raw depth_topic:=/camera/depth_registered/image_raw info_topic:=/camera/rgb/camera_info

Using rviz gui:

roslaunch rtabmap_ros rtabmap.launch rtabmap_args:="" rgb_topic:=/camera/rgb/image_raw depth_topic:=/camera/depth_registered/image_raw info_topic:=/camera/rgb/camera_info rtabmapviz:=false rviz:=true

Note: need to be publishing camera tf

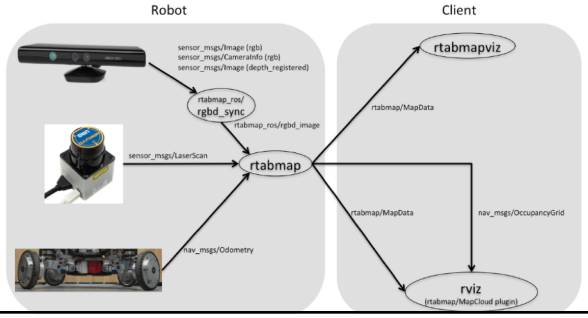
orb_slam2_ros

- Github page with Installation instructions and documentation
  - https://github.com/appliedAI-Initiative/orb_slam_2_ros
  - Clone into catkin_ws/src and use catkin_make to install
- Need config file specific for camera
- Use rqt and rviz to visualize map and tracking info
- dynamic_reconfigure rqt plugin can be used to change some parameters and switch to localization mode

Example launch command:

roslaunch orbslam_ros_demo orb_slam2_astra_rgbd.launch

RTAB-Map with laserscan and wheel odometry



Why is it not working?

- Check subscribed topics have data being published to them
  - rostopic hz <topic name>
- Use rqt_graph to view node graph
- Use rqt and rviz for visualization of sensor data
- Read the warning and error messages being printed in the terminal