

Indoor Environment Mapping Tutorials

Adding Realsense R200 camera to ARDrone
in Gazebo7

Required ROS Packages

- For simulation of ARDrone in Gazebo
 1. ardrone_simulator_gazebo7 ^[2] - [1]
- For simulation of Realsense R200 in Gazebo
 1. realsense_gazebo_plugin ^[2] - [1]

URDF File format

- The Universal Robotic Description Format (URDF) is an XML file format used in ROS to describe all elements of a robot
- URDF can only specify the kinematic and dynamic properties of a single robot in isolation. URDF can not specify the pose of the robot itself within a world
- URDF is the main file format used in ROS and visualisation RViz

SDF File format

- SDF is an XML format that describes objects and environments for robot simulators, visualisation, and control
- Originally developed as part of the Gazebo robot simulator, SDF is a substitute for the URDF format and solves the shortcomings of the URDF format
- SDF format is capable of describing all aspects of robots, static and dynamic objects, lighting, terrain, and even physics.
- SDF is the main file format supported by Gazebo

Challenge

- The `realsense_gazebo_plugin` package provides the Realsense R200 camera in SDF format
- The `ardrone_simulator_gazebo7` package provides the ARDrone in URDF format
- The two formats are incompatible with each other and hence one file format needs to be converted to the other

Solution

- Launch `ardrone_testworld.launch` (`cvg_sim_gazebo` package) to spawn the URDF of the ARDrone in Gazebo
- Add the Realsense R200 camera into the same world from the insert tab in the left pane of Gazebo
- Save this world from the file menu in Gazebo in `.world` format

Solution

- In the world file (which is of SDF format) the Realsense camera as well as the ARDrone will be defined as models.
- Make Realsense camera model nested inside the ARDrone model and edit the pose tag to place it at the appropriate position. Also create a fixed joint between the two models. Refer to [3]

Appendix

1. Github Link for packages - https://github.com/eYSIP-2017/eYSIP-2017_Indoor-Environments-Mapping-using-UAV
2. Link to install Gazebo7 - https://github.com/eYSIP-2017/eYSIP-2017_Indoor-Environments-Mapping-using-UAV/blob/master/bash_scripts/install_gazebo7.sh
3. Tutorial for nested model and joint - http://gazebo-sim.org/tutorials?tut=nested_model&cat=build_robot#Joints
4. Link to final world file - https://github.com/eYSIP-2017/eYSIP-2017_Indoor-Environments-Mapping-using-UAV/blob/master/realSense_gazebo_plugin/worlds/ardrone_realSense.world

References

- http://gazebosim.org/tutorials/?tut=ros_urdf
- <http://sdformat.org>

THANK YOU!