
CSCE574 – Robotics

Spring 2014 – Notes on rviz

So far, we've seen some rudimentary ways to see what's going on in a running ROS system. However, none of these techniques are really suitable for viewing and understanding the complex data that's produced by a real robot. To fill this gap, ROS provides a tool called `rviz` that can display a wide variety of information about how the robot itself is operating.

To start `rviz`, use the command (or, in a launch file, the corresponding node element):

```
roslaunch rviz rviz
```

That's it: `rviz` is just a fancy node that we can use to visualize many different kinds of data. The rest of this document has some details on how to use `rviz`.

1 Setting the fixed frame

We'll display some data shortly, but first we need to tell `rviz` what coordinate system to use. In ROS terms, a coordinate system is called a **frame**. `rviz` needs to know which frame use for its drawing. To choose the fixed frame, type its name (or use the drop-down box) on the left under "Global Options."

For Project 2, there are two coordinate frames called `world` and `laser`. These frames happen to be identical: Both have their origins at the center of the sensor, with the sensor facing the positive x -axis, sensing in the x - y plane. Either one is suitable as the fixed frame.

2 Adding displays

When you start `rviz` for the first time, most of its window will be taken up with a black rectangle containing a grid. This is the 3D view of the world; nothing interesting is displayed there yet because we haven't asked `rviz` to display any data other than that grid.

`rviz` refers to the different kinds of data that we might want to show as *displays*. To add a new display, use the "Add" button near the bottom left of the window, then select the type of display that you want. After adding the display in this way, it will show up in the Displays panel on the left, and generally will need to be configured there. There are several different displays that you may want to add for Project 2.

- A *Grid* display as a reference point for where the ground is, and for judging distances.
- A *Laser Scan* display to show messages of type `sensor_msgs/LaserScan`, which represents a reading from a laser rangefinder, or from another sensor that provides similar data. You'll need to choose a specific topic of this type to display (but there will not generally be many choices).
- A *Point Cloud* display, to show the positions that your program is publishing. Again, this display will not work until you specify a topic (whose message type must be, of course, `sensor_msgs/PointCloud`).
- An *Axes* display, to serve as a reference point for where the origin is.

Each of these displays includes a wealth of options that allow you to modify its appearance.

2.1 Display configurations

If you've started rviz several times, you might have noticed that it remembers your displays and their configuration from the previous run. Rviz stores this kind of information in files that end with `.rviz`. There are several things you can do with this kind of file to force rviz to behave nicely.

- To save (or load) the rviz configuration to (or from) a `.rviz` file, you can use the appropriate commands in the File menu.
- To force rviz to use a specific, existing `.rviz` file when it starts up, you can pass it a `-d` followed by the file name on its command line. In a launch file, you can put the `-d` and filename in the `args` attribute.
- When rviz starts without a `-d`, it automatically loads configuration from a file in your home directory called `.rviz/default.rviz`. If you would like to return to the default, empty configuration, you should close rviz, delete this file, then reopen rviz.

2.2 Views

In the top right of the rviz window, you'll find drop-down to select a view type, which controls the camera placement for your RViz view. The details of how these views work is best learned by experimenting.

- However, you will might find the `TopDownOrtho` view type to be particularly useful, especially when you're dealing with two dimensional data, such as the laser scans in Project 2.
- Keep an eye on the bottom of the rviz window for instructions about how to move the camera in various ways.

2.3 See also

There is a user guide for rviz here:

<http://wiki.ros.org/rviz/UserGuide>)

It appears to be a bit out-of-date, but is still generally correct.