6.141/16.405 Robotics: Science and Systems

Laboratory Exercise 2-B Module 3: Streaming and collecting data

In this module you will run the RACECAR with all the sensors working. You can stream the data to visualize it on your computer as well as collect data which will be useful for testing your algorithms offline.

For this module you can `ssh` into the RACECAR through your VM using the following steps:

1. Power on the router and connect it to an ethernet socket for internet access.
2. Power on the RACECAR.
3. Connect your computer to wireless network with SSID: `racecar-ap-[car no.]` and password: `g0_fast!`
4. Run `ping 192.168.0.[car no.]` to check connection with your RACECAR.
5. Run `ssh -X racecar@192.168.0.[car no.]`; password: `racecar@mit`
6. Once you are logged in, run `screen`.

Test whether the ZED stereo camera works by running these commands on the RACECAR Jetson:

1. `screen`
3. `roslaunch zed_wrapper zed.launch`
4. `ctrl a+c`
5. In the new screen: `rostopic list`

You should see a list of topics with `/camera` namespace.

Go back to the launch screen using `ctrl a+n` and kill the process.

Streaming sensor data

You can now launch several nodes to stream data from the RACECAR sensors. Run the following in the SSH session with the racecar.

1. `screen`
3. `roslaunch racecar teleop.launch`
4. `ctrl a+c`
6. `roslaunch zed_wrapper zed.launch`

In a new terminal **on the VM**, follow the commands below:

3. `runcar <car_num> rostopic list`

You should be able to see all the topics running on the ROS Master on RACECAR Jetson. In the same terminal, follow the steps below to view the streaming data:

1. `runcar <car_num> rqt_image_view`
2. Select `/camera/zed/rgb/image_rect_color` from the dropdown menu - the stream is very delayed.

3. Kill the process after you have played around for a bit.
4. `runcar <car_num> rviz`
5. Select `base_footprint` in the `Fixed Frame` global option.
6. Click `Add->By topic->LaserScan->OK` - you should see the laser scans.
7. You can run the car using joypad and view the laser scans simultaneously.
8. Kill RViz when you are done.

Collecting data

You will now collect data using the `rosbag` tool. Since there are so many video sensors on the RACECAR it consumes an enormous amount of space. As such, your jetson has a 250GB SSD. For recording camera data, mount the SSD to a convenient location on the jetson and navigate into the directory before recording data using the command:

- `rosbag record -a`

Simply kill the process when you want to stop data collection (CTL+C).