e-Yantra Robotics Competition (eYRC 2019-20)

Task 1.2 – Survey & Rescue

Problem Statement

- The drone should visit the given waypoint coordinates in the simulation using the PID control algorithm. Waypoints are in the form (x, y, z) :
  [(0.2, 0, 23), (3.5, -3.3, 23), (-4.4, -4.6, 20.7) , (-6.0, 6.3, 18.3), (5.0, 5.3, 16.3)]

Procedure

1. You must edit the *position_hold_gazebo.py* script you completed in the previous task to make the drone visit the waypoints given in this file.
   You must place the given waypoint list in your Python script and move the drone to these waypoints one after another. **The drone needs to visit the waypoints in the sequences/list given above**. Each element of the list is a coordinate in 3D space represented as (x, y, z). A maximum error of **0.2** from the desired waypoint is acceptable in both the x and y coordinates and an error **0.5** in the z coordinate. After traversing over the four waypoints as per expected flight path, the drone must land on the fifth waypoint indicating end of task.

Points to remember

- You are not supposed to change any of the templates.
- **Create a PID script or edit the given example script by adding your PID code. Finally, run it to control the drone. The drone must visit the given waypoints.**
- Drone must hover in the sequence given in the list only .
- **Tutorials are the best help you have for the task**

Submission Instructions

Follow the instructions below to submit your Task.

1. Bag File:

a. Next when you want to record the bag file for submission, run the launch file record_rosbag.launch. This file will launch both your position_hold_gazebo.py and the rosbag recording(note: this launch file is just for your help in submission).

```
>> roslaunch survey_and_rescue record_rosbag.launch
```

This will record a bag file (titled *markers.bag* by default) for a <u>duration of 20 seconds</u> and save it in the survey_and _rescue folder. Your aim is to have the drone traverse <u>all 5 given set-points</u> within that time. This bag will be stored in the survey_and_rescue package folder in the src folder of your catkin_workspace.
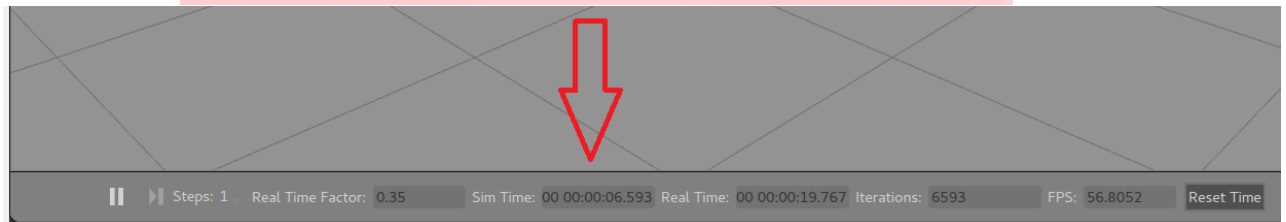

Figure 3: Simulation Time

NOTE: Repeated running of this launch file will overwrite the markers.bag file, please make sure you have a backup if you so wish. Alternatively, you can use the argument rec_name as follows to have a custom name.

```
>> roslaunch survey_and_rescue record_rosbag.launch rec_name:=hello.bag
```

This will create a bag file of the name *hello.bag* instead of the default *markers.bag*

b. The rosbag will record for 20 seconds of <u>Simulation Time</u> and stop recording, the output will look like Figure 4 when this has happened. But you will need to close the terminal running the launch file manually afterwards, since the PID script will still be running.
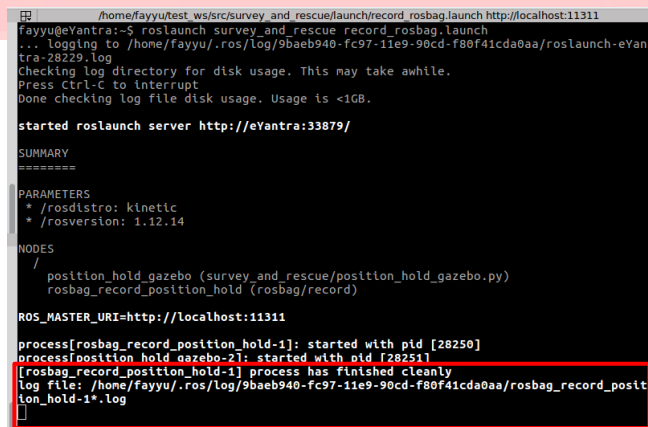

Figure 4: rosbag process has finished cleanly

c. Next step is to compress the bag file that is created before you can upload it. Run this command in the survey_and_rescue folder's terminal

```
>> rosbag compress -j bag_file_name.bag
```

d. Rename the compressed bag file as SR_<team_id>_1_2.bag
    Hence, say your team ID is 105, rename it as SR_105_1_2.bag

2. **Python Code:**
    a. You must submit your PID script that you developed.
    b. Rename the python script as **SR_<team_id>_1_2.py**
3. **Video:**
    i.   Upon verifying that your task is complete, record a maximum 2-minute video using a screen recorder like simplescreen recorder or kazam.
    ii. The video must be as follows:
         1. Team Slide –All members' details in a slide , included in this folder.
         2. Any One member of the team, running the scripts and launch files in terminal. Output of gazebo and whycon image_out window on the PC screen captured clearly.
    iii. Please record the video as shown here

The video should not be edited in any manner. Teams uploading an edited video will be disqualified from the competition. e-Yantra reserves the rights to disqualify any team if any foul play is suspected.

Uploading video/s on YouTube:
● Upload a one-shot continuous video with the title eYRC#SR#Task1_2#<TeamID>
(For example: If your team ID is 1234 then, save it as eYRC#SR#Task1_2#1234)
● Please note that while uploading the video on YouTube select the privacy setting option as Unlisted as shown in Figure 5. You need to upload the video as instructed on the portal.
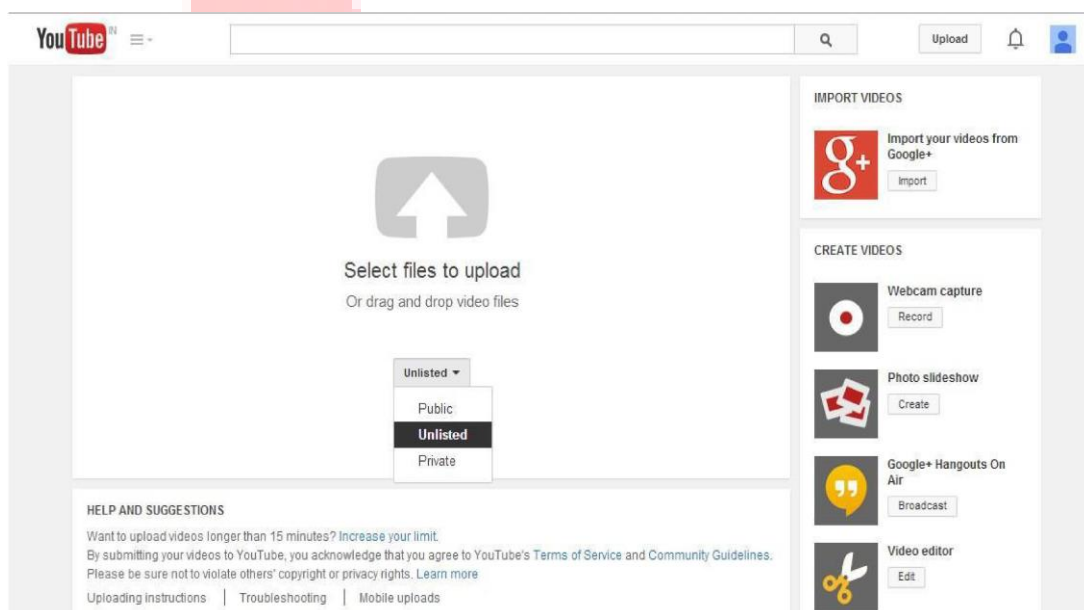

Figure 5: Uploading unlisted video on YouTube

NOTE: You must upload all of the following: (i) bag file and (ii) Python code. Please place all these files inside a .zip file before uploading. You must also upload the video to YouTube with the instructions above. <u>You will have to submit the video link on the portal.</u>

Store the files mentioned above into .zip file and rename the zip as <team_id>.

Please follow the naming convention strictly as specified in each step. Failure to do so may lead to repercussions. The deadline for Task 1.2 is 26th November 2019

Your final .zip output must be of the following structure:

<team_id>_1_2.zip

- SR_<team_id>_1_2.bag
- SR_<team_id>_1_2.py

Instructions for uploading the folder will be provided on portal

Good Luck!!!