Task 2C: Detecting suspecious objects using drone

Saail #1 October 10, 2022, 6:49am

@sd22

Aim:

The aim of this task is to scan the entire city area(arena) using drone, detect object from the drone camera and locate it.

Prerequisites

Installations

Update the sentinel_drone ros package from github

```
cd ~/catkin_ws/src/sentinel_drone
git pull origin main
cd ~/catkin_ws
catkin build
source ~/catkin_ws/devel/setup.bash
```

Resources

1. **Basics of opencv**

   For more detail description you can refer **opencv official documentation**.

2. Reading images from drone camera to process using open cv
   Working With ROS and OpenCV in ROS Noetic – Automatic Addison
   OpenCV with ROS using Python | turtlebot2-tutorials

Problem Statement:

In this task you will use computer vision techniques to find the location of the image taken from the drone where the object is detected.

In task 2B you successfully detected the object and its pixel location. Now in this task you need to extend this algorithm to search for the object on the arena using drone.

Hint: Make your own approach to plan the search over the entire arena, and then hover over the yellow block to maintain the block in the centre of the image frame

> Note: All the script should run at the start of the run, You are not allowed to run any script in between the run.

Procedure:

- Launch sentinel drone in Gazebo simulator.

```
roslaunch sentinel_drone task_2c.launch
```

- Drone will fly and scan the city.
- Detect the suspicious activities indicated by yellow block on the arena using the camera attached on the drone.
- Once yellow block is detected, you need to align the drone in a way that the yellow block is in the centre of the drone camera frame seen from the drone.
- Hover over the location of the block, the height of the drone is to be chosen by you (Remember, more higher you go, more area can be seen by the drone camera, but at the same time the accuracy of the block decreases with height as well as the overhead camera has a limited field of view, so the WhyCon marker also has to be in frame of the overhead camera. Optimise your drone height wisely)

> WARNING: Do NOT hard code the location of yellow block instead write a robust search and scanning algorithm, this task has only one block, later tasks will have multiple blocks at random positions. If hard coding is found, no marks will be given

Submission instructions

- Step 1: Use the waypoint navigation script and complete the python script for flying the drone for task 2c.

- Step 2: Make a new script for task 2c named **block_detection.py** that makes the drone fly and fulfil the task requirements.

- Step 3: Now you need to record your submission, a tool named rosbag helps to record rostopics just as a video. When you feel confident with the performance of your run and you are ready to record the submission, use another launch file which will run the same things as in task_2c.launch as well as start the position_controller.py and a node to record rosbag after 5 seconds delay so that gazebo starts and drone is spawned.
Update the sentinel drone ros package

```
cd ~/catkin_ws/src/sentinel_drone
git pull origin main
```

After the package is updated, you can find a new launch file named
task_2c_submission.launch

- Step 4: Now use this launch file to implement the task and record a bag file for 2 minute i.e. 120 seconds

```
roslaunch sentinel_drone task_2c_submission.launch
```

- Step 5: This will generate a bag file named `block_detection_<date_time>.bag` in the scripts folder, change the name to `SD_<team_id>_block_detection.bag`, you need to make a zip file containing this bag file and the python script, change the name of python script to `SD_<team_id>_block_dection.py`.

> NOTE: The zip should contain only 2 files in the root directory, DO NOT make a folder and then zip, directly zip the two files. You can use this command to zip the file. Use this command only after you have renamed both the files. replace <team_id> with your team id, for eg. if your team id is 1234, then the file names should be `SD_1234_block_detection.bag` and `SD_1234_block_detection.py`

```
 zip -r SD_<team_id>.zip SD_<team_id>_block_detection.bag SD_<team_id>_
```

This should be the structure of zip file
|__SD_1234.zip
… |__SD_1234_block_detection.bag
… |__SD_1234_block_detection.py

- Step 6: Submit this zip file on the portal in the place of Task 2C and check your score

Deadline

23 November 23:59 Hrs

All The Best !

3 Likes

Youtube video instructions not found

Smit unlisted #2 October 18, 2022, 8:37am

Smit closed #3 November 12, 2022, 8:28pm

Smit listed #4 November 12, 2022, 8:31pm