530.707 Robot System Programming

3D Visual SLAM and Motion Planning using AR Drone

Weekly Progress Report#1

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1. This Week's Goals

1. Converting the LSD-SLAM package from rosbuild+Indigo to catkin+Kinetic
2. Implement LSD-SLAM under ROS Kinetic on our own laptop independently with sample data as input
3. Communicate with AR Drone and get the image data

2. This Week's Progress

1. Finish converting the LSD-SLAM package from rosbuild+Indigo to catkin+Kinetic
2. Successfully implement LSD-SLAM under ROS Kinetic on our own laptops independently with sample data as input
3. Successfully communicate with AR Drone and can get the image data
4. Calibrate AR Drone front camera
5. Rectify image and ensure better input for LSD-SLAM package
6. Fix some small bugs in the LSD-SLAM package
7. Successfully reconstruct 3D point cloud using simulated environment in Gazebo
8. Create joystick control package

3. Changes in Project Scope/Goals

This week we follow our schedule and successfully did all the tasks, the only changes is that we finished one task that was supposed to be done next week.

4. Lessons Learned

1. How to upgrade packages from rosbuild+Indigo to catkin+Kinetic
2. Rectify AR Drone image using ROS with image_proc function
3. LSD-SLAM relies on features in key frames(should not rotate camera view violently)
4. LSD-SLAM algorithm accumulates pointcloud thresholded with different maximum variance(may add more noise to the reconstructions)
5. Communicate with AR Drone through ROS Kinetic
6. Some small bugs are in the LSD-SLAM package (Talyor Expansion)

5. Next Week's Goals

1. Tesing the LSD-SLAM on the AR Drone
2. Build Rviz world and conncet it with LSD-SLAM viewer
3. Start working on path planning package

Schedule:

Items	Start Date	End date
Install necessary packages in ROS Kinetic	March 27	March 28
Convert the LSD SLAM from rosbuild+Indigo to catkin+Kinetic	March 28	April 4
Be able to implement LSD-SLAM under ROS Kinetic on our own laptop independently with sample data as input	April 4	April 11
Communicate with AR Drone and get the image data	April 11	April 13
Tesing the LSD SLAM on the AR Drone	April 13	April 15
Path planning package	April 15	April 30
Test LSD SLAM & path planning on AR Drone	May 1	
Wrinting final report and making poster	May 1	