Improved Localization and Mapping for Miniature Aerial Vehicle (MAV)

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Abstract

The purpose of project is to improve localization for a small rotorcraft (hexacopter) over a previous implementation and generate a 3D map of the sensed terrain.

For this purpose, Hector SLAM package is modified to work on different height levels. ROS packages are also implemented to generate 3D point cloud working with Hector SLAM.

At current state, we are able to localize the MAV in 3D environments and generate map of the environment.

Solution

To be able to create better plans, we decided to use 3D map. However, instead of directly performing 3D SLAM, we used 2 different components:

- **Layered Hector SLAM** to localize the MAV in multiple heights.

- **Map Builder** to create 3D map using localization info and laser scans on an occupancy grid.

Result

- Localization is improved according to previous implementation with layered SLAM.

- Generated 3D map can be used by other nodes, such as a path planner, to help hexacopter in traversing around obstacles that require a 3D perspective.

References

- "Documentation - ROS Wiki." ROS.org