Team F: FALCON EYE

Individual Lab Report 10

Progress Review 11

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1 Individual Progress

My primary contribution to the progress was to segregate controllers for the system, integrating velodyne into costmap alongside Danny and refurbish the mechanical design. Also I helped in creating a ros node for imu data visualization and partial integration of the system.

1.1 Controller segregation

Since we decided to switch to just one computer there was a problem in communication between the controllers for husky and bebop. The commands given by one controller were accepted by both the systems causing a big hassle. To overcome this I used a joy_remapper node in ros. This basically creates two separate nodes whenever multiple joystick's are connected and maps the commands accordingly. It makes sure the commands are published in different topics and suitable subscribed by the individual systems.

Subscribed Topics - joy_source ([joy/Joy](joy/Joy))
  • Topic on which joystick commands are arriving to be remapped.

Published Topics - joy_dest ([joy/Joy](joy/Joy))
  • Topic on which the remapped joystick events are sent out to be remapped.

1.2 Velodyne costmap

The Hokuyo used for last PR didn't work outdoors. It gave random obstacles. Hence we integrated our velodyne to develop the costmap. We used Velodyne_laserscan package to convert the 3D pointcloud to 2D laserscan. Using the 2D laserscan from velodyne significantly improved the localization of obstacles outdoors. Also the system proved to work effectively even in the dark giving us an desirable advantage to our system.
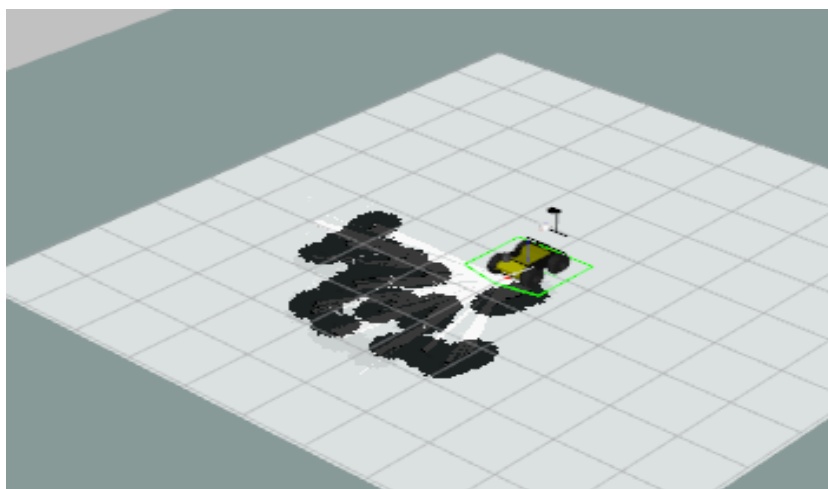

Fig.4. Visualization of obstacles detected by Velodyne laser

1.3 Mechanical Refurbishment

We switched the position of laser to the front since it was the true front of the husky. Also from last time we realized that the velodyne mount was not stable and its a problem we wanted to address for a long time. Hence we decreased the pivot length and made it more stabilized with multiple hinges. Although this doesn't affect the working of the system in any ways, it ensures the safety of Lidar.

2 Challenges

As usual, our biggest challenge continues to be the weather for testing the system outside. We still are having troubles with the GPS. The drift is really high and we are considering the change of GPS as one option at the moment. IMU too has started to be erratic in terms of its yaw values. One possible reason might be its positioning above metal parts. To eliminate this possibility, we are planning to mount it on top of a mount away from the base.

3 Teamwork

The team has been working hard to get things done and have constantly been helping each other when the system doesn't work as planned. We are able to perform synchronously and team efforts have grown strong since the beginning. Yuchi has successfully completed the complete autonomy of the drone. Danny and I worked on integrating velodyne into the costmap. Danny also worked on IMU calibration and data collection. Pulkit and Pratibha worked on solving the EKF errors and integrating GPS into the ekf package. Pratibha and I worked on the mechanical refurbishment.

4 Future plans

Since we are planning to have a complete working system by next PR, we as a team will be integrating each sub-components, meanwhile solving the issues corresponding to it. I will work on resolving the GPS issues and establishing communication between husky and bebop alongside Pulkit and Prathiba. Danny will work on making the IMU work and help Yuchi in setting up the Bebop side communication layer. Yuchi will work on setting up the communication layer for Bebop and help in complete system integration.