Intro to Navigation Stack

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What is Navigation Stack in ROS?

A 2D navigation stack that takes in information from odometry, sensor streams, and a goal pose and outputs safe velocity commands that are sent to a mobile base.

see http://wiki.ros.org/navigation.

Demo

see TEB_nav_demo

Components of Navigation Stack

```
command :rosrun rqt_graph rqt_graph
```

Things are different in Real Life (Atleast for our Class!)

- Don't have map of the environment .
- ROS navigation stack is only for 2D navigation .**We have drone to navigate**
- Don't know the obstacle shape .
- Drone doesn't have the Laser Scanner. . . . **but** Navigation Stack Works with 2d Laser Scanner Data .

Any Suggestions ?

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- Why do we need map?

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  - blahblah

Any Suggestions ?

- ~~Why do we need map?~~
  - We don't need it , We have OptiTrack Motion Capture System to track the position of drone And obstacle .

Any Suggestions ?

- ~~Why do we need map?~~
- ~~ROS navigation stack is only for 2D navigation .~~
  - We take the base foot print of the drone , DO only 2d navigation

Any Suggestions ?

- ~~Why do we need map?~~
- ~~ROS navigation stack is only for 2D navigation .~~
- Don't know the obstacle shape .

Any Suggestions ?

- ~~Why do we need map?~~
- ~~ROS navigation stack is only for 2D navigation~~ .
- ~~Don't know the obstacle shape~~
  - As drone will move in 2d (In our case) ,It only needs to know the approximate 2d radial foot print the . Over-aprroximate (not so much) it as a circle of some radius r

Any Suggestions ?

- ~~Why do we need map?~~
- ~~ROS navigation stack is only for 2D navigation~~ .
- ~~Don't know the obstacle shape .~~
- Navigation Stack Works with 2d Laser Scan Data .
  - Will see later how to solve this .

Simulation

It's a good Idea to have a proof of concept in simulation before trying anything in real world. Demo

Simulation LAB

- Use Gazebo to create the similar Environment As shown in the following figure name it as lab8.world. (walls,red launching pad at a corner , obstacles)
- Create a launch file to load lab8.world file and to Spawn a bebop drone on the launching pad .
- Use the commands used in the lab7 to fly the drone .
- Use the TODO.py file to get the pose of the obstacle present in your environment . (your lab8.world should have at least 3 obstacle (of different shapes(Cylindrical & Cuboid)), you can exclude the walls & the launching pad of the drone from the obstacle list .)

Slide with Plot