Universität Hamburg
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Robot Practical Course Bachelor
Assignment #3

On this assignment we will introduce navigation and mapping capabilities. The target objective is to create a map of the TAMS floor using Simultaneous Localization and Mapping (SLAM) techniques. This map will be used for the upcoming tasks.

Task 3.1 Build a map: Autonomous navigation in a certain environment requires a map for self localization and to generate a path to the desired position. We will now create our own map of the TAMS floor by using the Simultaneous Localization and Mapping (SLAM) algorithm available in ROS.

3.1.1: Use the tutorial

```
http://wiki.ros.org/turtlebot_navigation/Tutorials/indigo/Build a map with SLAM
```

to bring up the necessary tools.
Divide the floor into 3 regions, every group creates a map of one region:

Floor / PC-pool F304

Floor / Elevator

Lab F326 / Office F324

Open the lab and office doors as far as possible to enable loop closing. Use manual navigation (teleop_keyboard) to record a rough map of your region and then submit 2D-Nav-Goals via RVIZ to improve the map. Autonomous navigation results in smoother movements.

3.1.2: Once you have finished mapping your area, make sure to save the map before killing the gmapper-node!
Now merge the three parts into one complete map by editing the files with an image manipulation program (e.g. Gimp) and adapting the respective yaml-file.

Task 3.2 Use the navigation: Now that we have a map, use it for autonomous navigation.

3.2.1: Use the tutorial to start the navigation and set nav-goals via rviz:

```
http://wiki.ros.org/turtlebot_navigation/Tutorials/indigo/Autonomously navigate in a known map
```

3.2.2: Write a node that invokes the `move_base/goal` action at the move_base node to start the navigation.