Exercise Session 1

Theory

- ROS architecture
- ROS master, nodes, and topics
- Console commands
- Catkin workspace and build system
- Launch-files

Ecercise 1:

- >> sudo apt-get install ros-noetic-hector-gazebo-plugins
- >> sudo apt-get install ros-noetic-velodyne-description
- >> In -s /git/smb_common
- >> catkin build smb_gazebo
- >> source devel/setup.bash

Exercise

Get to know ROS by inspecting the simulation of a Super Mega Bot (SMB) robot.

1. Setup the SMB simulation:

Download the smb_common zipped folder on the course website. Unzip it and place it in the ~/git folder. Navigate into ~/Workspaces/smb_ws/src and make a symlink. Compile the smb_gazebo package with catkin.

2. Launch the simulation with roslaunch and inspect the created nodes and their topics using (Lecture 1 Slides 11/12):

```
rosnode list
rostopic list
rostopic echo [TOPIC]
rostopic hz [TOPIC]
rqt_graph
```

For more information take a look at the slides or:

http://wiki.ros.org/rostopic http://wiki.ros.org/rosnode

- 3. Command a desired velocity to the robot from the terminal (rostopic pub [TOPIC]) (Lecture 1 Slide 13)
- 4. Use **teleop_twist_keyboard** to control your robot using the keyboard. Find it online and compile it from source! Use git clone to clone the repository to the folder ~/git. (Lecture 1 Slides 22-26)

For a short git overview see:

http://rogerdudler.github.io/git-guide/files/git_cheat_sheet.pdf

5. Write a launch file with the following content (Lecture 1 Slides 27-30):

- smb simulation with a different world:

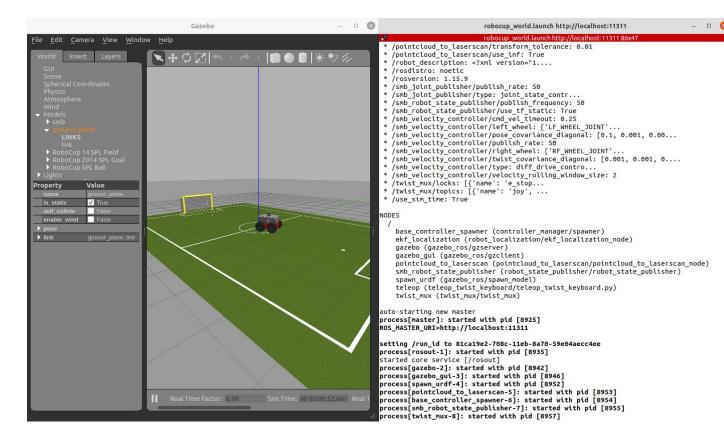
Include smb_gazebo.launch file and change the world_file argument to a
world from the directory /usr/share/gazebo-11/worlds (e.g.

worlds/robocup14_spl_field.world). This might take a little while to load



the first time. Note that the world_name is with respect to

/usr/share/gazebo-11/



Left: Gazebo with Robocup14 World, Right: First lines of output when starting the launch file you have to set up

Evaluation

- ☐ Check if teleop_twist_keyboard is compiled from source (roscd teleop_twist_keyboard should show the smb_ws folder) [40%]
- ☐ Start the launch file. This should bring everything up that's needed to drive SMB with the keyboard as shown in the above image. [60%]

Hints

• If the robot stops again after sending the velocity command, specify the rate of the publisher. Check out rostopic pub --help.

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