Exercise Session 1

Theory

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

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 channel. 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:
   ```
   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

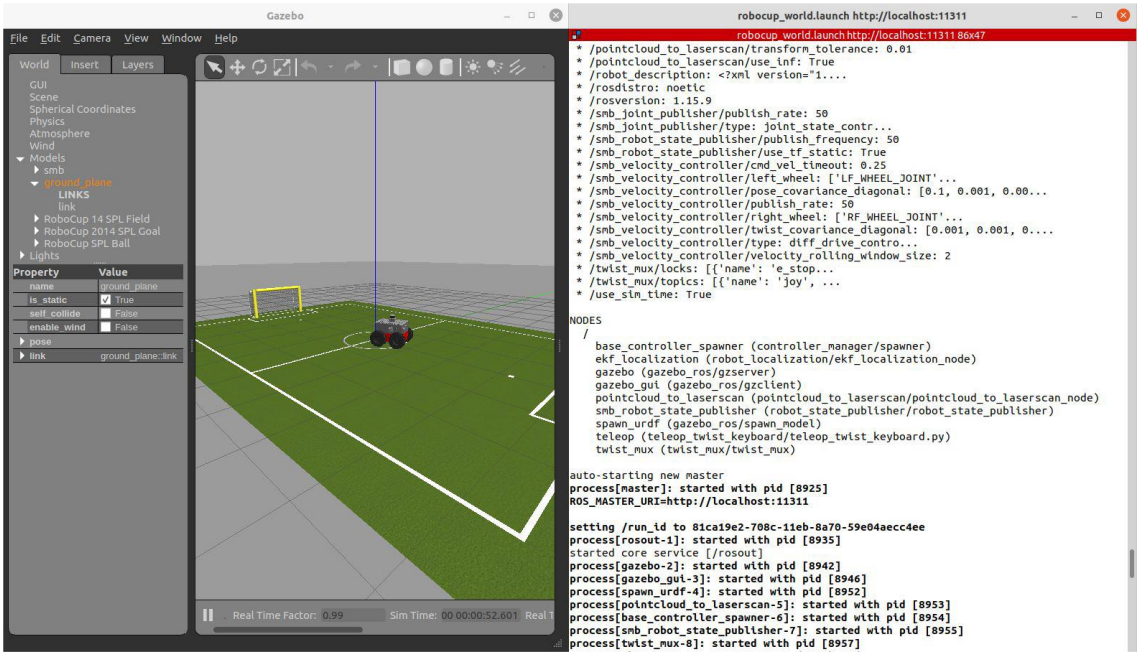

Fig. 1 Left: Gazebo with Robocup14 World, Right: First lines of output when starting the launch file you have to set up.

http://wiki.ros.org/rosnode

3. Command a desired velocity to the robot from the terminal (`rostopic pub [TOPIC]`)

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.
   For a shot git overview see:
   http://rogerdudler.github.io/git-guide/files/git_cheat_sheet.pdf

5. Write a launch file with the following content:
   - 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/`

Evaluation

- ☐ Check if the 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`.