

CS264 Practical 2 - Simulation and Real Robots

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Pioneer Robots

In this practical you will get to use some of our Pioneer 2 robots. These Pioneers have three wheels (two powered and one castor wheel), 16 sonar sensors, odometry¹ and bumper sensors. Some are fitted with other pieces of equipment, such as cameras or grippers, that you will not be using.

To avoid damaging the Pioneers please read the following rules:

- Unplug the charging cable from the robot **BEFORE** running your program.
- Do **NOT** deliberately drive the robots into either each other or obstacles.
- If you think the robot is going to hit something, Ctrl-C your program to stop it.
- Plug the charging cable back in during periods of inactivity.

Using Player and the Pioneers

To run code written for the simulator, on the real Pioneers, you need to make two changes to your code.

1. PlayerClient robot("localhost"). You should change 'localhost' with robotname.islnet where robotname is the name of the Pioneer you are using. eg bart.islnet.
2. RangerProxy should be changed to SonarProxy.

You should then recompile your code. Before trying to log in to your robot make sure it has been powered on for a few minutes. This should ensure that the on board computer has had time to boot up. From the command line type:

- ssh robotname.islnet. Where robotname is the name of the Pioneer.

You should be prompted for a password, this should be the same as your university password. If you have any problems logging in, notify a demonstrator. Once you have logged in, to run Player on the Pioneer you will need the driver file:

- wget http://users.aber.ac.uk/ttb7/modules/CS264/prac2/isl_pioneer.cfg
- player isl_pioneer.cfg

The player server should now be running on the Pioneer. You will now be able to run your program and it should connect to the Player server on your Pioneer. You need to make sure you run your program on the **desktop** not the Pioneer.

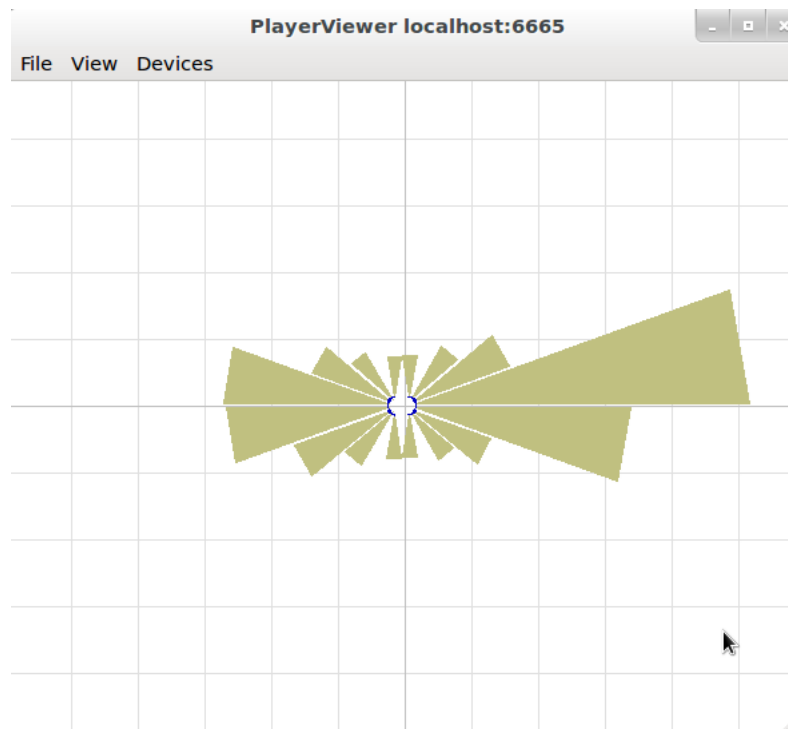
¹Position/pose estimation via wheel movement

Task 1 - From Simulation to Reality

Your first task is to run the code you wrote last week on the real Pioneer. Does it behave in the same way as on the simulator, how is it different? If you haven't already, finish writing the code necessary to turn to a specific angle and move a set distance.

How do the real values from the sonar compare to those in the simulator? Try running the original `simple.cpp` and looking at the sonar output. You can also make Player show you the current sonar readings:

- `playerv -h robotname.islnet --sonar:0`



Make your robot maintain a fixed distance, for example 1 m, from an object. Moving the object should result in the robot moving to compensate for the change.

Task 2 - Real World Mapping

By now you should have attempted to build an Occupancy Grid in simulation for the first practical report. Try it out on the real robots, does it work? Work on improving it until you consider it reliable enough to map a new environment successfully.

Document History

Version	Date	Author(s)	Description
1.1	Semester 2, 2013	Tom Blanchard	Initial Version