

Autonomous Rover: How to Interact with the Raspberry Pi

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1 Using SSH to connect to a Raspberry Pi from a Linux Computer

You can use SSH to connect to your Raspberry Pi from a Linux computer, a Mac, or another Raspberry Pi, without installing additional software.

You will need to know your Raspberry Pi's IP address to connect to it. To find this, type `hostname -I` from your Raspberry Pi terminal.

To connect to your Pi from a different computer type `ssh pi@<IP>` where `<IP>` is replaced with your IP address.

The IP address for my Raspberry Pi is 192.168.1.8 and the default password is `raspberrypi`.

2 Editing text files on a Raspberry Pi remotely from a Linux Computer

After connecting to the Raspberry Pi from your Linux computer, the command prompt on your Linux computer should look like `pi@raspberrypi:~ $`. Now you can access the directories in the Raspberry Pi remotely.

To test moving the rover, you need to edit a file called `RobotControl.py`. Go to the directory `/home/pi/catkin_ws/robot_control/src/` and open the function `RobotControl.py` in a text editor by typing `nano RobotControl.py` where Nano is the name of a command-line editor. Find the function called `self.ros_interface.command_velocity()` and type in 0.3 and 0.5 for the input arguments. It should look like `self.ros_interface.command_velocity(0.3,0.5)`. The first argument is the linear velocity in meters per second (0.3 m/s = 30 cm/s) and the second argument is the yaw rate in radians per second (0.5 rad/s). Save the file by typing `Ctrl+O` and close the editor by typing `Ctrl+X`.

To run the program, you need to open two terminals connected to the Pi through ssh. In the first terminal, run the command `roslaunch robot.launch robot.launch`. In the second terminal window, launch your `RobotControl`

code with the following: `roslaunch robot_control robot_control.launch`.
To stop the rover, type `Ctrl+C` to kill the program.

3 Motor calibration

Command the robot to travel at a speed of 0.3 m/s for 1 second and the measure the actual distance traveled. For 3 trials, the results are 28 cm, 29 cm, and