

# Robotics Students

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# Robotics Students

Robotics Students is a system to test robots' behaviors developed by engineering students.

To use it please follow the next instructions:

1. Using an Ubuntu-Linux operating system, unpack `robotics_students.tar.gz` in the user's directory.
2. Unpack `data_students.tar.gz` in the user's directory.
3. Open an X terminal and go to the directory where the programs are with the following command:  
`cd robotics_students`

Change the permissions of the file `robotics_students_make` with the following command:

```
chmod 777 robotics_students_make
```

Compile the source files with the following command:

```
./robotics_students_make
```

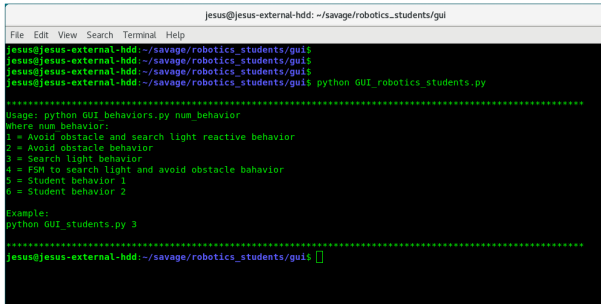
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During compilation is possible that some warnings will appear.

## 4. GUI usage:

If there were no critical compilation errors, go to directory gui and type the following command to see the system usage:

`python GUI_robotics_students.py`



```
jesus@jesus-external-hdd: ~/savage/robotics_students/gui
File Edit View Search Terminal Help
jesus@jesus-external-hdd:~/savage/robotics_students/gui$
jesus@jesus-external-hdd:~/savage/robotics_students/gui$
jesus@jesus-external-hdd:~/savage/robotics_students/gui$
jesus@jesus-external-hdd:~/savage/robotics_students/gui$ python GUI_robotics_students.py
*****
Usage: python GUI_behaviors.py num_behavior
Where num_behavior:
1 = Avoid obstacle and search light reactive behavior
2 = Avoid obstacle behavior
3 = Search light behavior
4 = FSM to search light and avoid obstacle behavior
5 = Student behavior 1
6 = Student behavior 2
Example:
python GUI_students.py 3
*****
jesus@jesus-external-hdd:~/savage/robotics_students/gui$
```

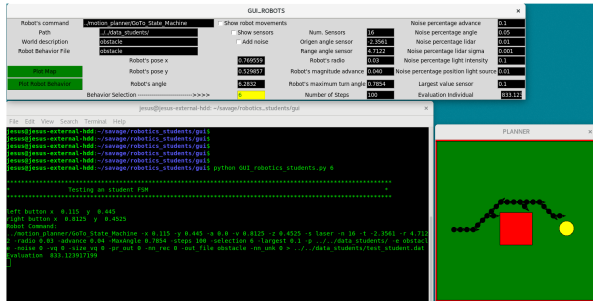
# GUI\_behaviors.py

5. Select the type of behavior to be tested after the command python GUI\_robotics\_students.py

For example to test "Student behavior 1", type the following command:

```
python GUI_robotics_students.py 6
```

In the PLANNER window select the robot's origin with the mouse's left button. Select the robot's destination with the mouse's right button.



# GUI\_behaviors.py

6. Different behaviors can be selected in the Behavior Selection option. In the field World description can be selected the environment where the simulated robot operates, there are 14 environments: obstacle, random\_1, random\_2,..., random\_13. When a new environment is selected push the Plot Map button to display it.

The result of robot's results can be seen again pushing button Plot Robot Behavior. To display the robot's sensors select the check button Show sensors.

# GUI\_behaviors.py

To display the movement of the robot step by step select the check button Show robot movements. Show robot movements. To add noise to the sensors and to the movement select the check button Add Noise.

The screenshot displays the GUI\_ROBOTS application interface, which is divided into several sections:

- Configuration Section:** Contains fields for Robot's command (set to `./motion_planner/GoTo_State_Machine`), Path (set to `./data_students/`), World description (set to `obstacle`), and Robot Behavior File (set to `obstacle`). There are checkboxes for "Show robot movements" and "Add noise".
- Sensors and Noise Section:** A table showing various sensor and noise parameters:

Parameter	Value
Num. Sensors	16
Origin angle sensor	2.3561
Range angle sensor	4.7122
Robot's radio	0.03
Robot's magnitude advance	0.040
Robot's maximum turn angle	0.7854
Number of Steps	100
Noise percentage advance	0.1
Noise percentage angle	0.05
Noise percentage lidar	0.01
Noise percentage lidar sigma	0.001
Noise percentage light intensity	0.1
Noise percentage position light source	0.01
Largest value sensor	0.1
Evaluation Individual	833.124
- Behavior Selection:** A dropdown menu showing "Behavior Selection" with a yellow highlight on the first option.
- Terminal Window:** A window titled "jesus@jesus-external-hdd: ~/savage/robotics\_students/gui" showing the execution of the program. It includes the command `python GUI_robotics_students.py 0` and the output of the program, which includes the robot's command and the evaluation result.
- Planner Window:** A window titled "PLANNER" showing a 2D environment with a green floor, a red obstacle, and a yellow robot. The robot's path is indicated by a series of blue dots.