

California State University Stanislaus
Department of Computer Science
Project #3

Teleoperation

In this project, you will create a Jupyter notebook file under the teleoperation directory. Please name the file as "Project3_Team#.ipynb", where # is your team number. Inside this notebook, you will create some Code cells to write Python codes and some Raw cells to write your notes and comments on your Python codes. You are also required to write a simple project report, including each team member's contributions to the project, what you have learn from this project, and what problems you find in this project. Please add this report at the end of your Jupyter notebook file as a Raw cell.

In this project you will drive JetBot remotely, view live streaming video, save and view snapshots!



The overall task is to create a control widget (user interface) with five buttons: Forward, Backward, Left, Right, and Snapshot as shown on the left of the above figure. When the Forward (backward) button is clicked, the robot will move forward (backward) at 50% speed for about 2 seconds, and then stop. When the left (right) button is clicked, the robot will turn left (right) about 30 degrees. When the snapshot button is clicked, a snapshot from the live video as shown in the middle of the above figure will be taken, saved, and displayed on the right of the above figure.

In order to accomplish the overall task, you need to do the following subtask.

The first subtask is to create the widget (user interface). We did a similar widget in the project 2. You can reference basic motion example. The widget in basic motion have the same layout with five buttons. You only need to rename the stop button to snapshot button. In this subtask, you also need to define the functions that will respond the button clicks on the forward, backward, left, and right buttons. You will consider the function that will respond to the snapshot button click in the third subtask.

The second subtask is to create an image widget and a camera instance, and then connect the camera instance to the image widget. Therefore, this image widget can be used for displaying the live video from the camera mounted on JetBot. Please study the teleoperation example for the coding details.

The third subtask is to create another image widget that will be used for displaying the snapshot. You also need to define the function that will respond to the snapshot button click. In this function, you need to save the snapshot image in a file under snapshot directory and assign the value of video image to the value of snapshot image. Please study the teleoperation example for coding details. Note that you need to make a very small change of the `save_snapshot(change)` function in the teleoperation example to make it to be able to respond your snapshot button click.

The last subtask is to display the control widget, the image widget for video, and the image widget for snapshot together horizontally as shown in the above figure. This can be accomplished by one line of code that looks like the code as below.

```
display(widgets.HBox([controls_box, video_image, snapshot_image]))
```

Submission: Softcopy of your notebook file, including your project report.

Due: 4/24/2020.

Important Note: Considering the difficulty for the teamwork with no face-to-face meeting, and only one JetBot robot available to each team, each team member may submit his/her code individually. But I still encourage each team to work together in some ways. I hope that you will let me know in your report that how does your team work together.

Another Note: It is possible to complete the coding of project without a JetBot robot as all the example codes are available online. A big advantage with having a JetBot robot is that you can run and test your code. It is fun to run your code on a JetBot robot!