ALBIR OPENMV\_BOT MANNUAL

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# Module repository

* <https://github.com/dragonflyneuro/ICL-BioEng-ALBiR-PixyBot>

# Hardware usage notes

we will cover some principles for the use of hardware:

* To minimize the weight and size of the robot, the onboard battery can only allow the robot to operate freely for up to 1-1.5hr during normal use. The battery hat has 5 leds to indicate the battery charge. Stop running the robot for charging when the battery reaches 20% level (or only one led on).
* While programming the robot, you may connect USB power to the battery hat to charge the battery and power the raspberry pi. Unplug the USB power only when you are ready to run the robot freely. You will have to shut down the Pi before unplugging.
* The current robot design requires a flat surface to run. Avoid tabletop if you worry about the robot running off the edge (or just be very mindful). Smooth floor is the best.
* While the Pi has a micro-HDMI port, we encourage you to access the operation system directly via WiFi. See instructions in this guide on how to set it up. The remote access and uploading/downloading files require very little data so connecting via a mobile phone hotspot should be sufficient.
* You could also work on the python code on your computer and upload to the robot via remote access.
* **PLEASE MAKE SURE TO RUN THE COMMAND sudo shutdown now or sudo reboot now to shutdown the Pi/reboot the Pi safely. Turning the battery HAT off, pulling the power cord or plugging/unplugging any USB or servos without shutting down properly may corrupt your SD card.**

# Running exercises

## Moving files to your robot

* Download files to your computer, then move them into your pi by navigating to Documents/ALBIR using the command cd Documents/ALBIR then dragging and dropping. This folder already has some library files you need to run the pixyCam.

(MAC) In order to send files to your Pi first disconnect from the Pi by typing the command ‘exit‘. Then use the following command: scp filename.py pi@<IP>, using the IP address you found earlier. Please note that you will have to specify the path where the file is saved on your laptop and the path to the folder on the pi where you would like the file to be saved. For example: scp /Desktop/AnimalLocomotion/filename.py pi@<IP> /home/pi/Documents/ALBIR

## Editing ALBIR scripts

1. You can either edit files on the Pi using nano <File name>.py or edit them on your computer by downloading the class files from Blackboard Learn or downloading them from the Pi using your SSHFS client.
2. If you are using your computer to edit, you can upload the files to the Pi using the SSHFS client.

## Running ALBIR exercises

* Navigate to Documents/ALBIR using the command cd Documents/ALBIR
* Run scripts using sudo python3 <File name>.py
* Prematurely end scripts using ctrl+c
* If it is a .m file run the script using MATLAB on your computer

## Setting up your pixycam

1. Install “PixyMon v2” on your computer (<https://pixycam.com/downloads-pixy2/>)
2. You can connect the pixyCam to your computer using a microUSB cable. **Please make sure to shut down the Pi when plugging/unplugging any USB peripherals OR the servos, as they are not designed to be hot-swappable and doing so may damage the Pi.**
3. Open PixyMon v2 and you should see a small stream of what the pixyCam sees.
4. Follow this guide to tune your PixyCam: <https://docs.pixycam.com/wiki/doku.php?id=wiki%3Av2%3Asome_tips_on_generating_color_signatures_2>
5. You can save and load settings to/from your computer to the pixyCam easily by using the save settings feature on PixyMon. This will help you adapt to different lighting conditions of your house and the in-person sessions quickly.

## Submitting

1. Submit your code files/videos using Blackboard Learn.
2. You must return your robot kit at the end of the term after the final assignment at South Kensington campus. The GTAs will arrange the recovery.

# Common errors and fixes