Using Muse 2016

For recording/streaming EEG Raw Data

Required Devices / Software

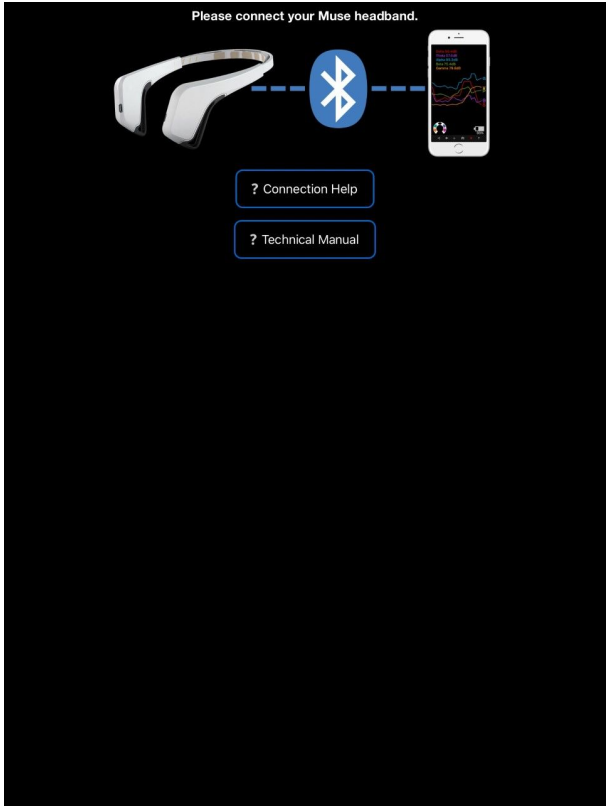
- Phone or Tablet
  - Need to install Mind Monitor App
- Computer
  - Need to install MuseLab (files in google drive folder)
  - Need to have python installed

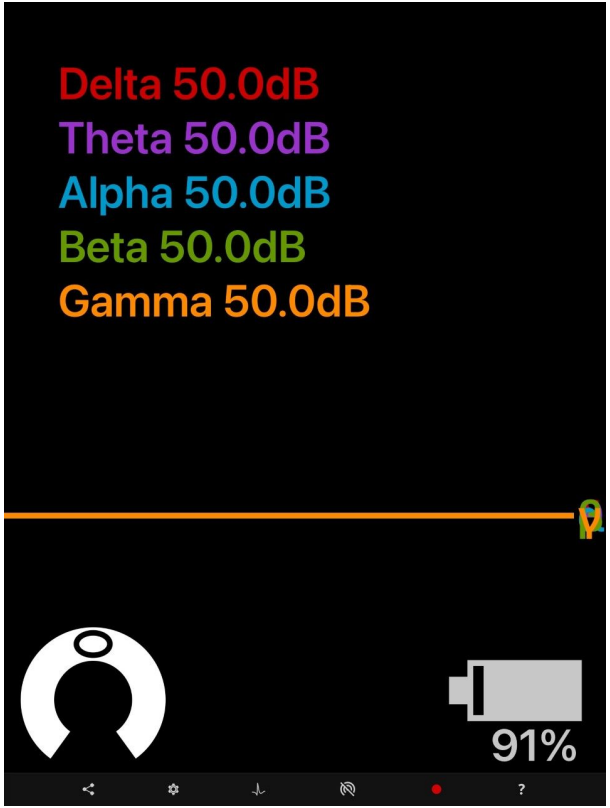
NOTE: My instructions are for using Windows 10, unsure if there are differences using MacOS

Also note: The Mind Monitor App and MuseLab both have recording functions to export to CSV, however control of duration and ability to do file naming based on classification is limited and more time consuming than using python script

1. Connect Muse to phone/tablet

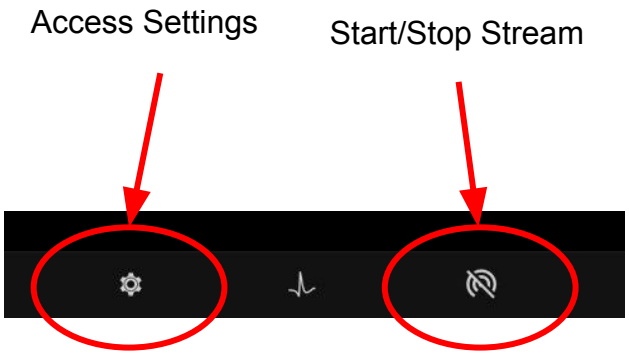
- Turn on the Muse and it should pair via bluetooth to the Muse Monitor app
- Once it is connected, the screen should change to the image on the left

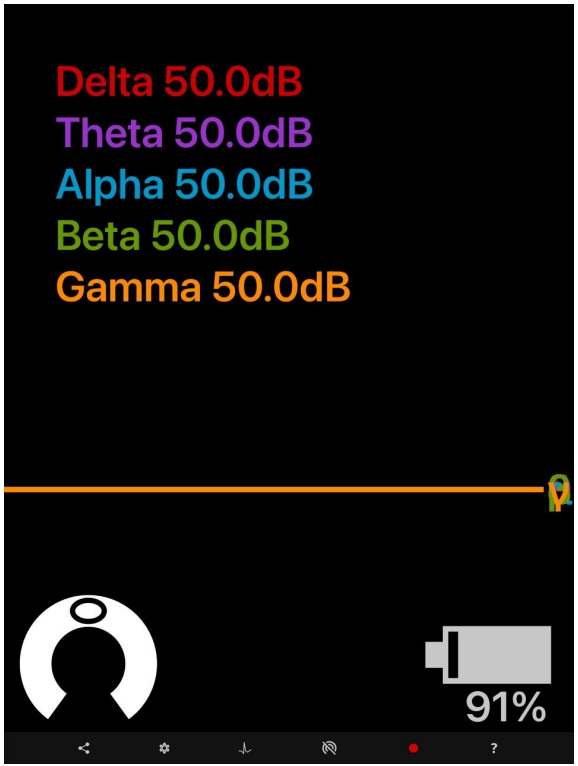


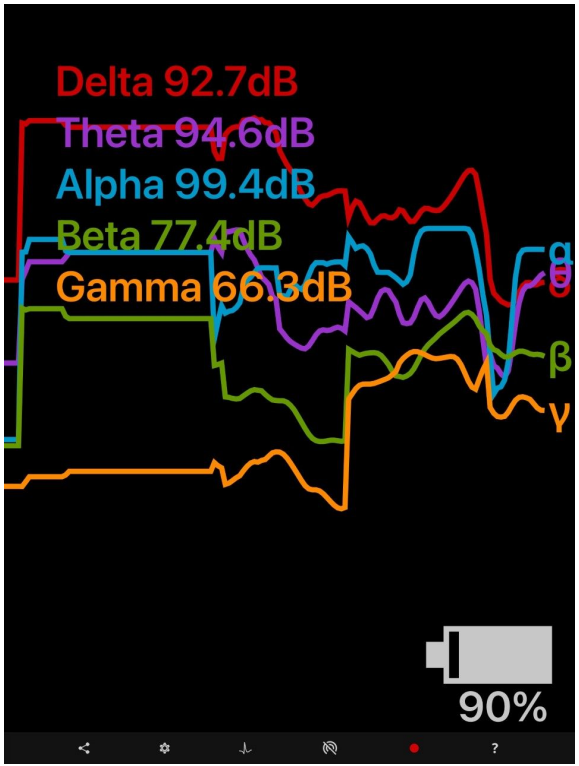


2. Using the Muse Monitor App

- Once the headset has a good connection to your head, the large icon in the bottom left corner will disappear

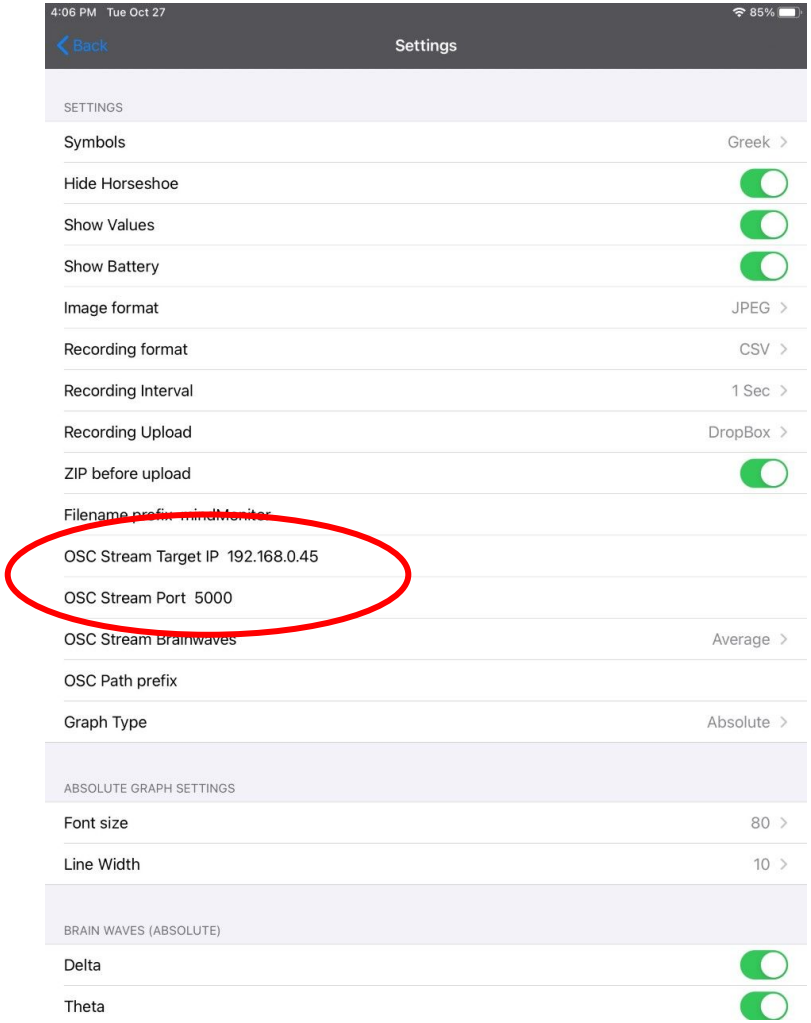






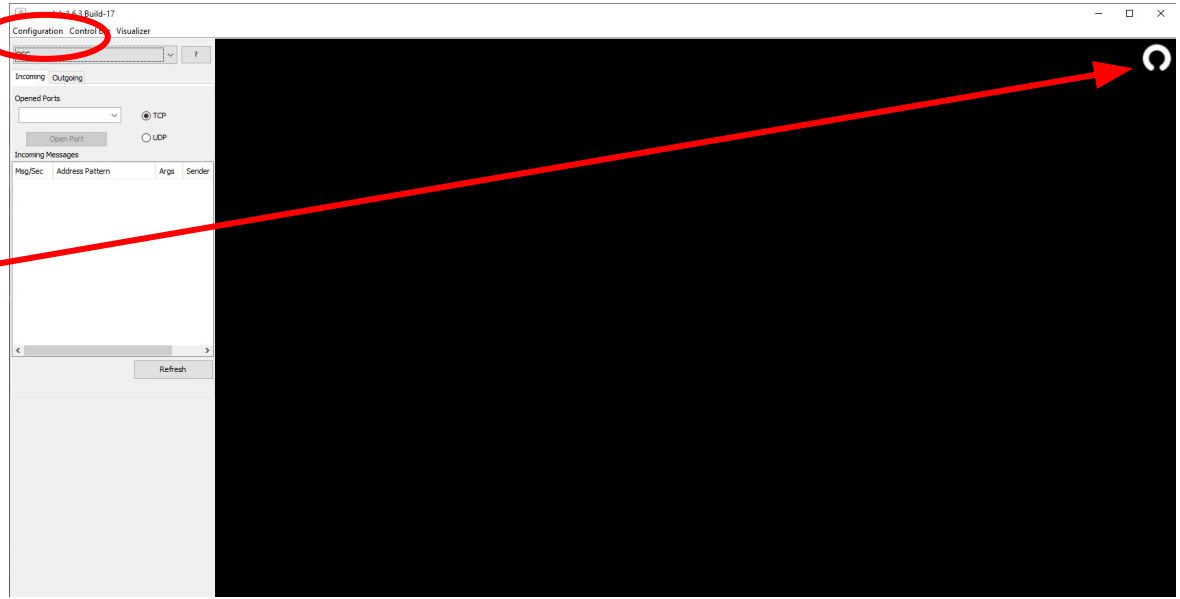
2. Using the Muse Monitor App Cont

- In order to stream to your computer, both devices must be connected to the same network
- If your computer has an ethernet connection, consider using your computer to create a hotspot for your phone or tablet, or switch to wifi
- OSC Stream Target IP must match the IP address of your computer
- Type *ipconfig* into the command prompt to check your IP address
- OSC Stream port must match the port used in MuseLab (we will use 5000)



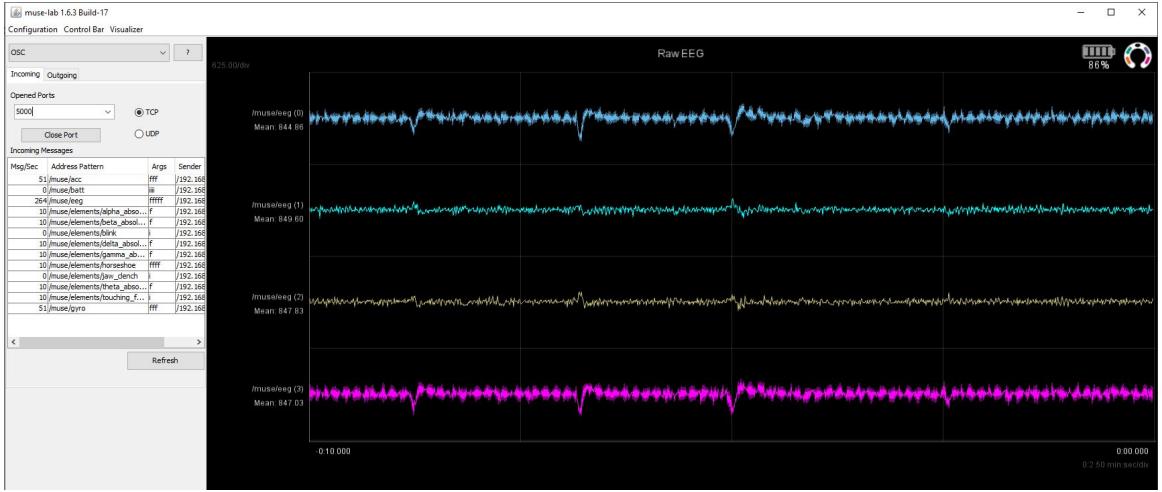
3. Using MuseLab Software

- You will need to load the configuration for the graphs
- The file can be found here
- The software also displays the same icon to show if you have a good connection. If all colours are filled in, the connection is good



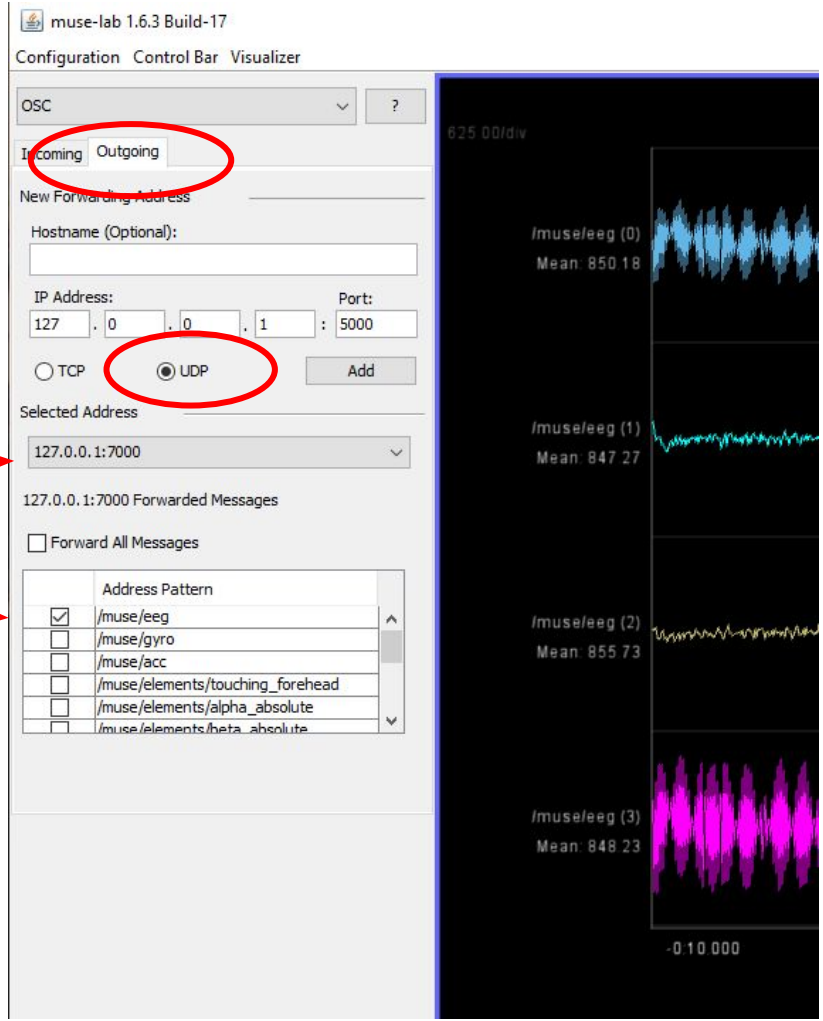
3. Using MuseLab Software Cont

- Open TCP Port 5000
- If the data is streaming correctly, it should look something like this
- If it is not streaming, try checking your settings on the Mind Monitor app and stopping and starting the stream on the app again
- Note: Keep in mind that if your computer is not using a static IP, it can change between uses. So you may want to double check this first, if it is not streaming.



4. Using MuseLab Software Cont

- To enable an outgoing stream to python, select the outgoing tab
- Change the port to 7000 UDP and select Add (7000 needs to match code in Python)
- Only select the eeg data and horseshoe to stream



5. Using Muse with Python

- Run code for associated method

a) SSVEP

5. a) - SSVEP Data Collection - Step 1

Open the SSVEP Data Collection.py file and scroll to the main() function at the bottom.

Change the subject to your initials and folderPath to a valid folder path where you will save all your files

Complete trials 1 to 48. Modify startTrialNum and endTrialNum if you do not want to do all these trials at once and only want to do selected trials in between, or leave it as shown to do all the trials at once

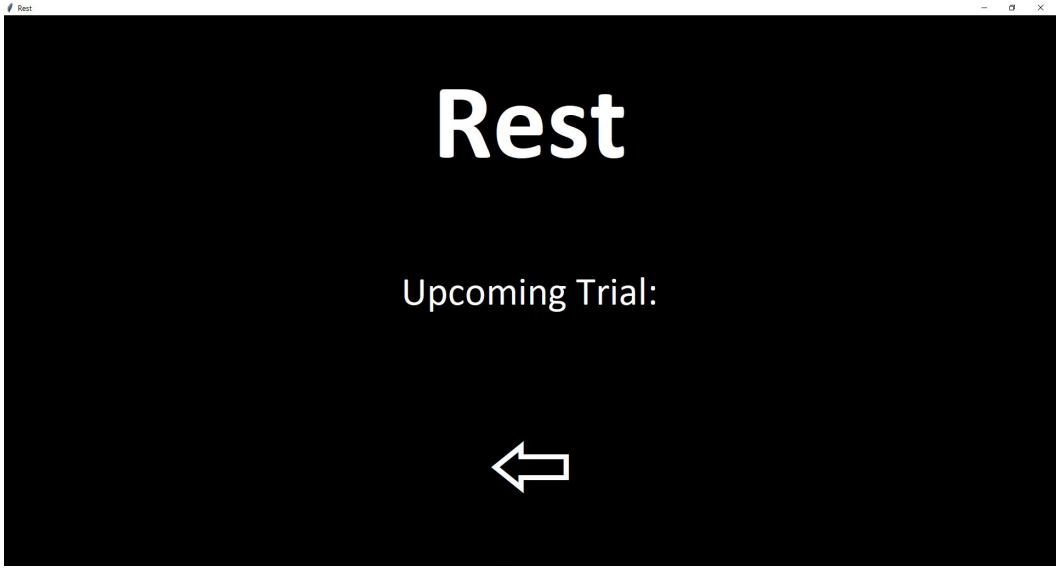
Run the program

```
def main():
# Enter your name and a folder path to save the EEG recording files to
# Run through trials 1 through 48 (you may want to go through it as 4 sets of 12 or 6*8 etc. rather than 1*48)
# If data collection was poor for any individual trials,
# edit startTrialNum and endTrialNum accordingly to redo those trials
    subject = "SD"
    folderPath = r"C:\Users\Stephanie DiNunzio\Documents\EEG Recordings\\"
    startTrialNum = 1
    endTrialNum = 48

    runMultipleTrials(startTrialNum, endTrialNum, subject, folderPath)
    print("Bad trials:", bad_trials)
```

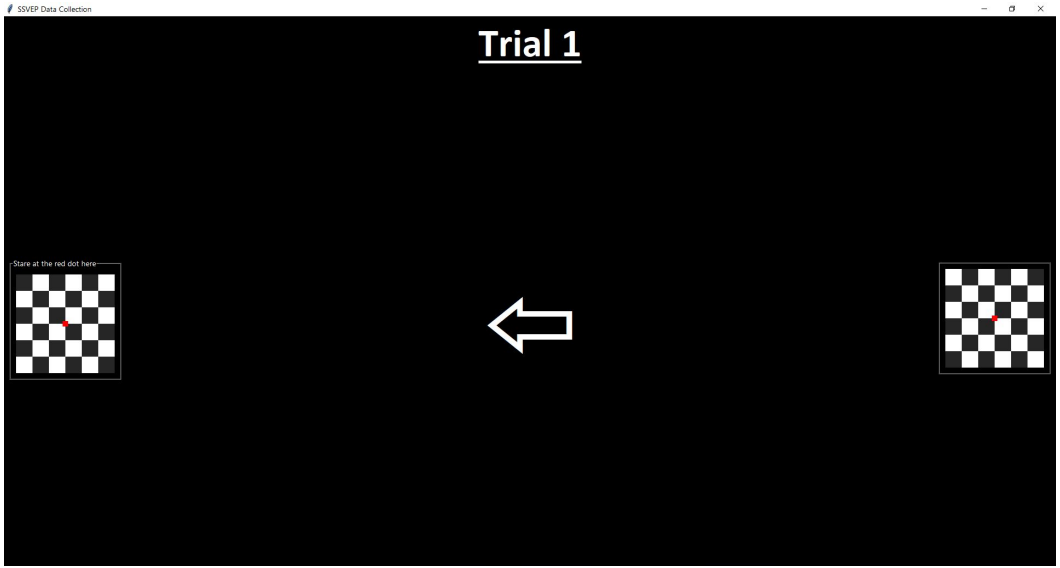
5. a) - SSVEP Data Collection - Step 2

At the start of each trial, a rest screen will show for 10 -15s . EEG data will be recorded as you rest. The rest screen also informs you which side of the screen you will be looking at in the next step.



5. a) - SSVEP Data Collection - Step 3

Stare at the flashing checkerboard and red dot on the side of the screen indicated to you. EEG data will be recorded as you do this



5. a) - SSVEP Data Collection - Step 4

After steps 2 and 3 have been completed for all the trials chosen in step 1, check the Python console to see if any recordings had a poor connection.

If there is a message similar to the one shown below, go back to step 1 and repeat those particular trials