Natalia Sempere 2025

Testing the classifier

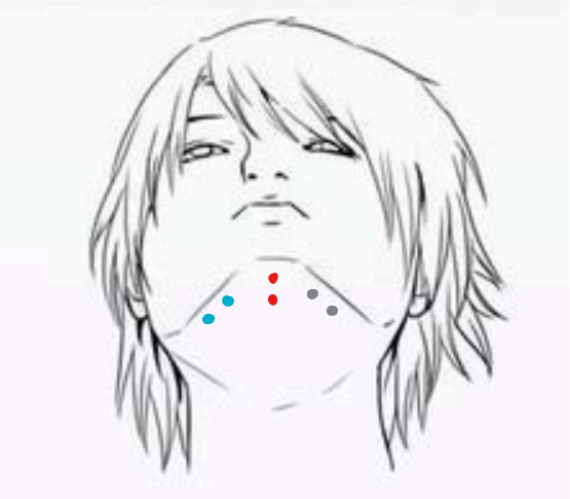
iTongueO project

Preparing the environment

1. Download the project from here: [HyperDecahedron/tongue_emg_xr_project: Project to identify tongue's position as an XR input.](#)
2. Prepare your environment to execute a python code in tongue_project/scripts.

Electrodes

1. Take 7 electrodes. If the brand is Ambu, they don't require additional gel. If the brand is 3M, add a bit of conductive gel to the center.
2. Place the electrodes. The image below should be interpreted as a mirror (blue dots are your left, gray dots are your right).

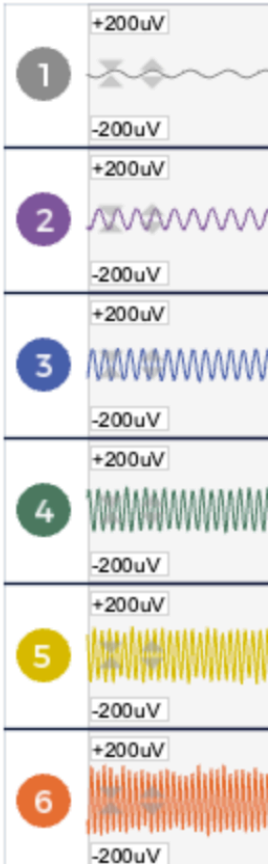


   a. Place 1 electrode (bias) in your mastoid. The wire should be black.
   b. Place 2 electrodes for **Channel 1 (red in the picture)** in the **center** of the submental triangle. If the board was not modified, the wires should be red and brown (N1P).

c. Place 2 electrodes for **Channel 2 (gray in the picture)** in your **right side** of the submental triangle. If the board was not modified, the wires should be white and gray (N2P).
d. Place 2 electrodes for **Channel 3 (blue in the picture)** in your **left side** of the submental triangle. If the board was not modified, the wires should be blue and purple (N3P).

Online classification

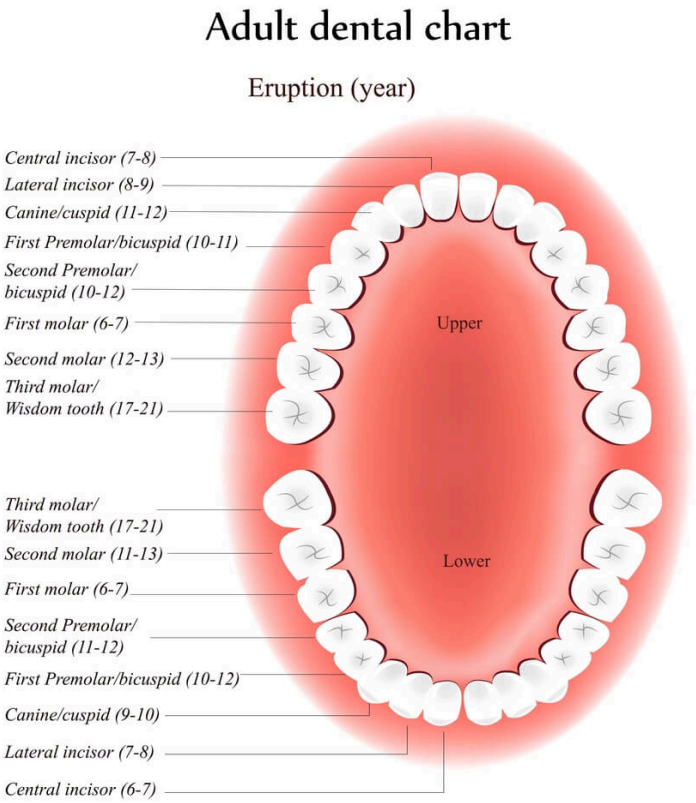
1. Turn on the board, connect the dongle and open OpenBCI GUI.
2. **Set off all channels except for channels 1, 2 and 3**. To do this, click on the icon of each number (I cannot open the GUI without the board, but these little numbers should be gray from 4 onwards).



3. Open Hardware Settings and **set SRB2 Off for channels 1, 2 and 3**. Click 'Send' to save the settings
4. Open the widget for Networking and select **UDP** and **TimeSeriesRaw**.
5. Start the session.
6. Start the UDP networking.
7. Launch the python script "**real_time_6_classes.py**" in **tongue_project/scripts.**
8. Test the classes by pressing your teeth with the tip of the tongue, according to the following table.

Natalia Sempere 2025

Class	Meaning	Tooth
l	left	Upper Left Third Molar
lf	left front	Upper Left First Premolar
f	front	Upper Between the Central Incisors
rf	right front	Upper Right First Premolar
r	right	Upper Right Third Molar
s	swallow	Swallow or fake the movement by pressing your submental triangle firmly upwards
n	none	Tongue is resting



Natalia Sempere 2025

How to record data & train a new classifier

1. With the same electrodes setup, launch the script "**keylogger_7_classes.py**" in tongue_project/scripts.
2. In OpenBCI GUI, start the session.
3. Record 20 samples of each class. To record a sample, press firmly on the tooth and then press the correspondent key to log the timestamp.
    3.1. To record 1 "**none**" press **N** on the keyboard.
    3.2. To record 1 "**left**" press **L** on the keyboard.
    3.3. To record 1 "**left-front**" press **K** on the keyboard.
    3.4. To record 1 "**front**" press **F** on the keyboard.
    3.5. To record 1 "**right-front**" press **E** on the keyboard.
    3.6. To record 1 "**right**" press **R** on the keyboard.
    3.7. To record 1 "**swallow**" press **S** on the keyboard.
4. When finished, stop the session and the keylogger.
5. Open the Jupyter Notebook "**6_classes_train_continuous_TEMPLATE.ipynb**" in tongue_project\notebooks.
    5.1. In the first cell, update the emg_path with the path to your recorded emg samples.
    5.2. In the same cell, update the keylogger_path with the path to the timestamp annotations. They should be in tongue_project\scripts\data\annotations.

```
# Update your EMG data in this path
emg_path = "C:/Quick_Disk/tonge_project/data/Recordings_18_06_cont_1/data.csv"

# Update your annotations data in this path
keylogger_path = r"C:\Quick_Disk\tonge_project\scripts\data\annotations\annotations_18_06_cont_2.csv"
```