Natalia Sempere 2025

Testing the classifier

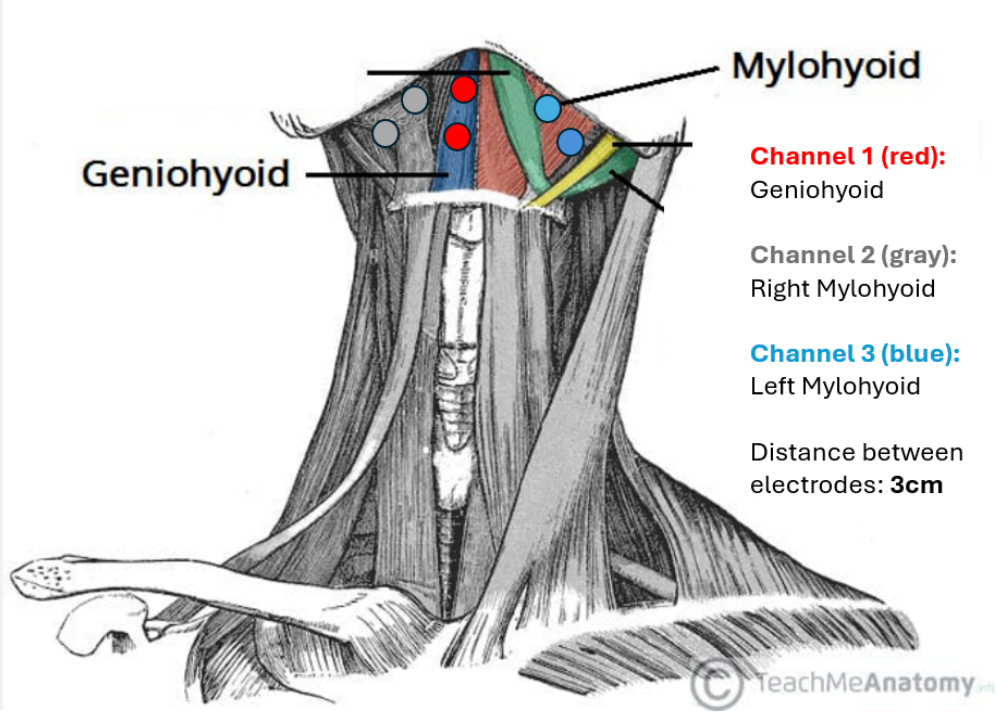
Project title to be announced

Preparing the environment

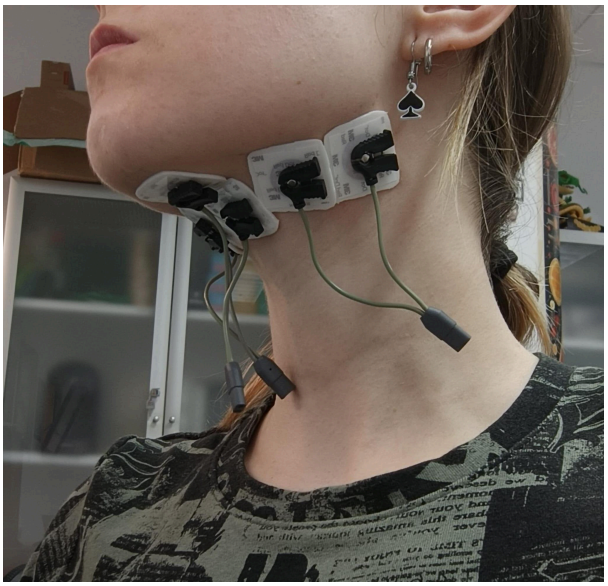
1. Download the project from here: [HyperDecahedron/tongue_emg_xr_project: Project to identify tongue's position as an XR input.](#)
2. Prepare your environment to execute a python code in tongue_project/scripts.

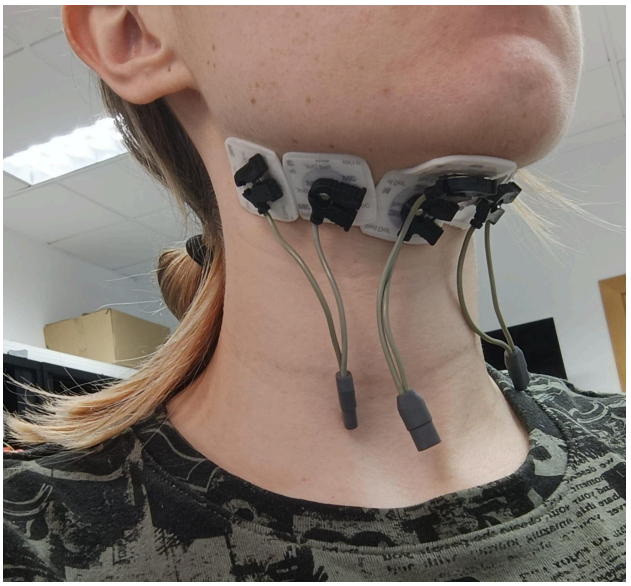
Electrodes

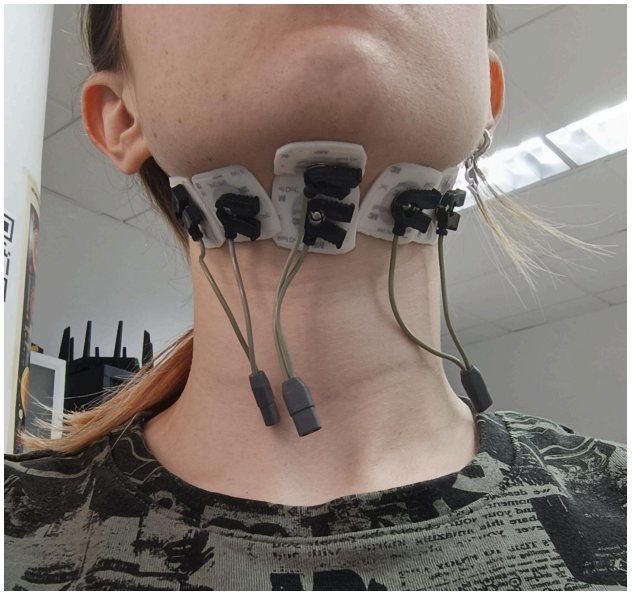
1. Take 7 electrodes. If the brand is Ambu, they don't require additional gel. If the brand is 3M, add a bit of conductive gel to the center.
2. Place the electrodes. Note: The distance between electrodes is 3 cm. They are placed as close to each other as possible.



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).







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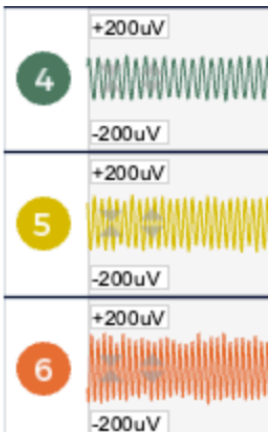
Online classification

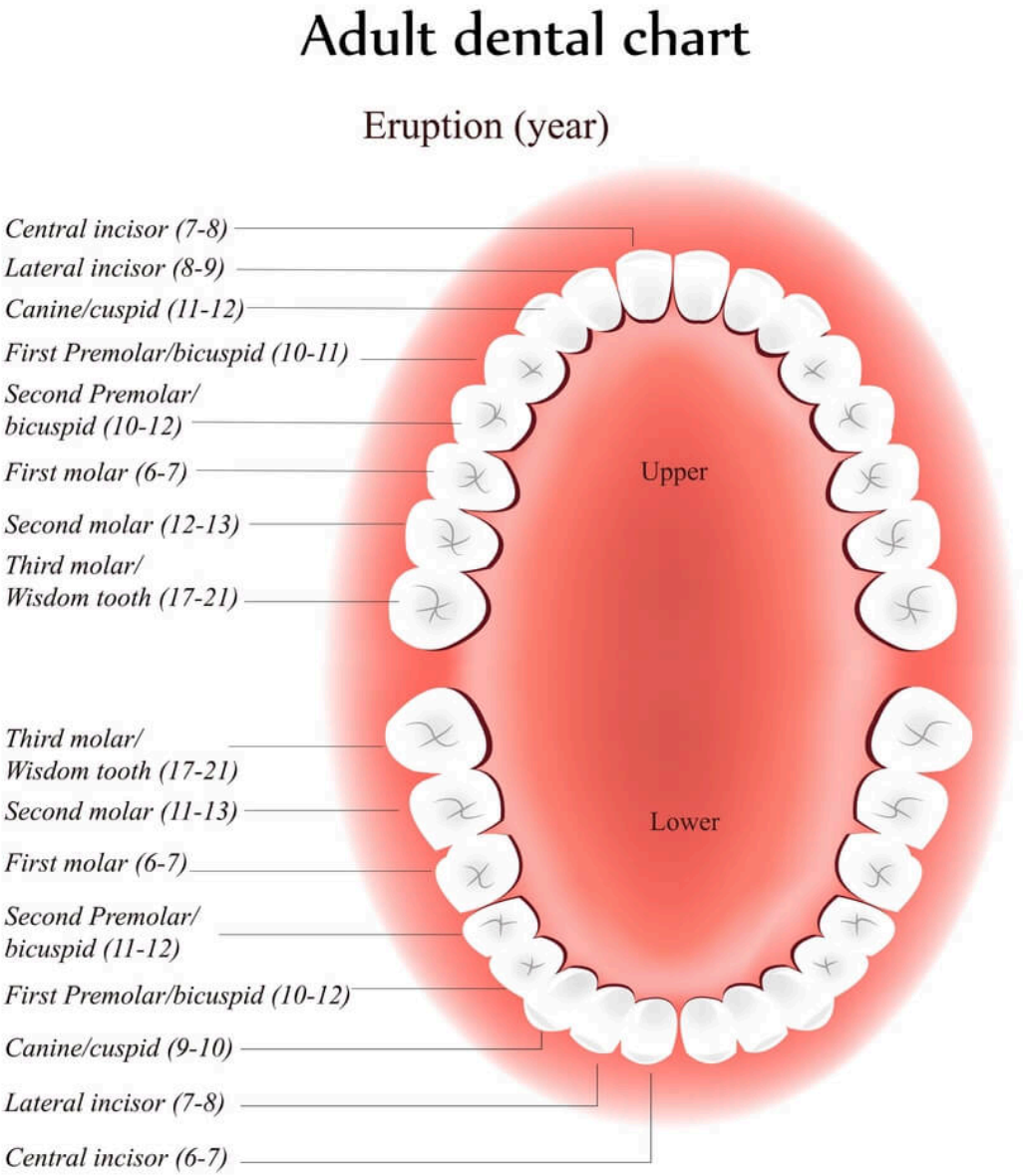
1. Turn on the board, connect the dongle and open OpenBCI GUI.
2. **Set off all channels except for channels 1, 2 and 3**. To do this, click on the icon of each number (I cannot open the GUI without the board, but these little numbers should be gray from 4 onwards).



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.

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

Adult dental chart



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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"
```