Python files

To run the following Python files you must:

- uncompress the downloaded files MAINTAINING the existing directory tree
- set, in the file utilities.py the variable data_dir to the root of the directory tree

List of Python files

processBehavior.py

processes behavioral data and produces panels for Figure 1

process_IFPs_responsive_AND_selective_cond_1_vs_cond_2_multiple_contrasts.py

This is the omnibus processing file. It does not directly generate any figure but it processes raw IFPs data to generate files containing a list of the responsive and selective electrodes. These files are then used by other Python files to perform further processing or to produce figures for the paper.

By appropriately setting the value of Boolean variables in this file one can run the analysis for any of the three contrasts reported in the paper. In addition, one can run a shuffling analysis to obtain the null-hypothesis distribution of the number of responsive and selective electrodes.

analyze_and_plot_response_times_cond_1_vs_cond_2.py

computes the number of responsive and selective electrodes in the four brain regions (occipital, parietal, temporal and frontal) and plot their distributions by brain region. It takes as input files produced by process_IFPs_responsive_AND_selective_cond_1_vs_cond_2_multiple_contrasts.py and it generates several panels a d statistical analyses for results in Figures 3, 6, and 7

analyze_response_times_with_anatomical_location.py

processes data and generates Figure 7C in the paper.

plot_results_shuffling_analysis_multiple_contrasts.py

plots the results of the shuffling analyses shown in Figure S6. The to-be-plotted data are generated by the omnibus file process_IFPs_responsive_AND_selective_cond_1_vs_cond_2_multiple_contrasts.py.

analyze_elecs_pos_mirc_vs_submirc_and submirc_vs_submirc_post

generates and plots the results shown in Figure S3

Data Description

Epoched data are saved in the files **subjxx_all_channels.mat** where xx is the subject number between 1 and 12 included.

These files contain two variables:

Total_Epoch_Data is a 3D matrix with dimensions # of channels x # number of trials x # number of times samples (each time sample is 1ms)

electodes_names is a list of strings representing the unique channels' identifiers

Electrodes' locations are saved, for each subject, in the files **subjxx_localization.xlsx** in the directory **electrode locations**, where xx is the subject number (between 1 and 12 included).

Each file is an Excel spreadsheet reporting, in each row, the channels' characteristics (channel number, area, brain lobe, brain position, etc.)

The sequence of trials are stored in the files **subj1_behavior.xlsx** in the directory **behavior**, where xx is the subject number (between 1 and 12 included).

Each file is an Excel spreadsheet reporting, in each row, the trial's characteristics (session number, block number, trial number, condition, stimulus category, stimulus name, etc.)