Assignment 3. Extracting meaning from EEG data via Fourier Transform

Submission deadline: Monday, 13 March 2023, 23:59

Submission format:

- *.ipynb* file;

Grading criteria:

- channel or channels are selected correctly: +4 points,
- code is functional: +2 points,
- channel matched to cortex activity and frequency range: +1 points,
- statistical test is conducted: +1 points,
- well-structured and commented notebook with descriptions and justifications of your actions: +2 points;

Data:

- data contains two files with recorder EEG activity,
- experimental activity is the same for both files,
- each files represent separate human subject,
- 10-10 electrode system for EEG recording,
- sampling rate for EEG is 1000 Hz,
- 32 electrodes;

Task

In this assignment you will have to work with EEG data. Your work here is to identify key activity and compare found activity for two different human subjects. You are allowed to use any methods and techniques you learned during the course. Your assignment contains several steps:

- identify redundant channels with no activity and exclude them from next steps,
- from remaining channels select one or two channels with key activity,
- identify key frequencies range,
- identify cortecies or cortex channel or channels correspondent to,
- extract slice of key activity,
- do the same for another file,
- compare extracted slices of key activity using statistical test;

Constraints:

- No constraints, feel free to experiment,
- If you have doubts about some method or technique, contact me;

References:

- https://isaacmenchaca.github.io/2020/02/07/EegTF.html
- https://en.wikipedia.org/wiki/Neural_oscillation
- https://www.sciencedirect.com/science/article/pii/S1388245718300907
- https://www.ninds.nih.gov/health-information/public-education/brain-basics/brain-basics-know-your-brain
- https://asp-eurasipjournals.springeropen.com/articles/10.1186/s13634-015-0251-9
- https://dalpsychneuro.github.io/NESC_3505/
- https://mne.tools/stable/index.html