

Investigating the effects of background beats on visual attention: an EEG and behavioural study of Lo-Fi Hip Hop - Project Folder Guide

This is a project data folder comprising of participant raw data, processed data, processing pipelines and scripts in Python, Jupyter and Matlab, SPSS analyses and questionnaire data.

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1. Project Structure

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The Project folder comprises of three data folders (**data**, **posner_analysis** and **eeg_data**), a **scripts** folder and **sounds** for the audio stimuli.:

- **root/data** - folder with raw EEG and Behavioural data for each participant divided into three parts (each part consisting of 3 blocks on the attentional task, total of 9 blocks per participant), with the following data structure:

```
root dir
|
|---data
|   | survey_answers.csv (questionnaire answers)
|   | basic_descriptives.ipynb (jupyter notebook)
|   |
|   |---par_1
|   |   |
|   |   |---eeg_data
|   |   |   | part_1.mat
|   |   |   | part_2.mat
|   |   |   | part_3.mat
|   |   |
|   |   |---posner_data
|   |   |   |---part_1
|   |   |   |   | part_1.csv
|   |   |   |---part_2
|   |   |   |   | part_2.csv
|   |   |   |---part_3
|   |   |   |   | part_3.csv
```

- **root/posner_analysis** - pre-processed Behavioural data. After the final pre-processing data pipeline, each participant's Behavioural data was cleaned from any unnecessary columns and appended into a combined **behavioural_data.csv** file. The table in **rt_mean_over_conditions.csv** has the mean of all participants' reaction times over both the visual and sound factors. Jupyter notebooks hold the data processing pipelines. There is also an SPSS analysis file.

```
root dir
|
|---posner_analysis
|   | posner_preprocessing.ipynb
|   | final_preprocessing.ipynb
|   | append_raw_data.ipynb
|   | rt_mean_over_conditions.csv
|   |
```

```

|---par_1
|
|---data
|   behavioural_data.csv
|---spss
|   two_way_anova.sav

```

- **root/eeg_analysis** - pre-processed EEG data. After processing and cleaning the raw EEG data with Pandas, Jupyter, NumPy and MNE - all data was appended and divided into blocks per each sound condition.

```

root dir
|
|---eeg_analysis
|   append_raw_data.ipynb
|   eeg_preprocessing.ipynb
|
|---par_1
|
|---blocks
|   lofi.fif
|   silence.fif
|   white.fif
|
|---FieldTrip_processing (data after FieldTrip pipeline)
|
|---post_field_trip_processing
|   restructuring_fieldtrip_data.ipynb
|   append_left_right_ERP_channels.ipynb

```

Note! - **root/eeg_analysis/post_field_trip_processing** - data restructured and appended after FieldTrip analysis, also holds two data pipelines.

2. Installation

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1. Ensure you first have Python 3.7.3 installed on your computer.
2. Create a new folder for the project. That will be the root project folder.
3. In the folder open a command line terminal and create a virtual environment for the correct packaging of the libraries by writing `python -m venv env` in the terminal.
4. Install the dependencies from the **requirements.txt** file by:
 - Enter into the virtual environment from the terminal with - `env/scripts/activate.ps1`
 - Using the **pip** python package manager to install the dependencies by invoking `pip install -r requirements.txt` in the terminal.

3. Usage

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In order to browse and look into the code and data processing pipeline methodologies, you would need to open Jupyter on your computer. This can be done by:

1. Open the command line terminal in the root folder of the project.
2. Open Jupyter by calling `jupyter notebook` in the terminal.
3. Browse to any of the **.ipynb** files and open them with Jupyter.

4. Credits

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- **Dr Johanna Zumer** - Project Supervisor - for helping with theoretical basis of the project, for guidance with methodological direction and contributing with Matlab FieldTrip EEG data processing and analysis pipelines.
- **Ivan Gerov** - Project Lead - data collection, Behavioural and EEG data processing and statistical analysis, developing of Posner attentional task with PsychoPy.