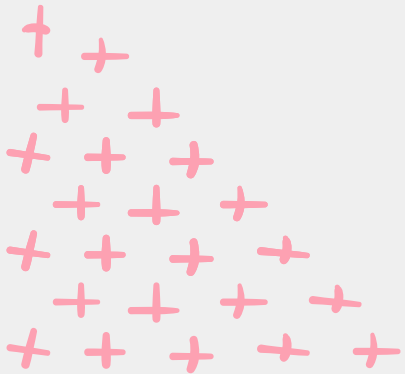


EEG-BASED MAJOR DEPRESSIVE DISORDER DETECTION



Tatosh Sofiia



-Problem



Lack of early diagnostic and effective therapeutic solutions for youth mental health.

-Goals

- Identify the correlation between P300 and MDD diagnosis
- Distinguish the difference between MDD patients and HC based on stimuli response

Steps:

01

Perform artefacts removal, filtering and signal transformation for further statistical features extraction

02

Identify the correlation between P300 and MDD diagnosis

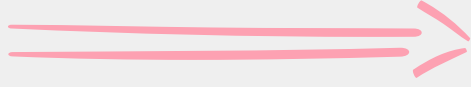
03

Distinguish the difference between MDD patients and HC based on stimuli response

04

Train ML and / or DL models to differentiate MDD and Healthy Control patients





ERP and P300

Event-related potential

- Lasts for about a second
- Represents the reaction on a certain stimuli




P300

- Secondary component of ERP
- Third positive peak
- Occurs around the 300 ms after a stimuli

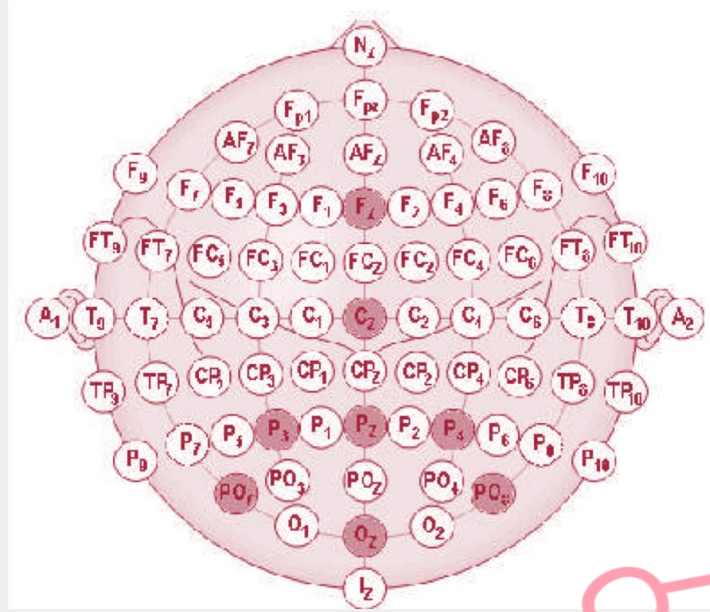




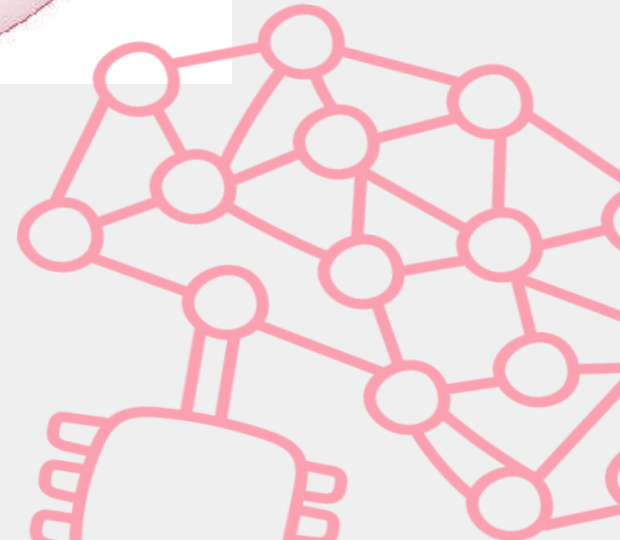
Oddball task

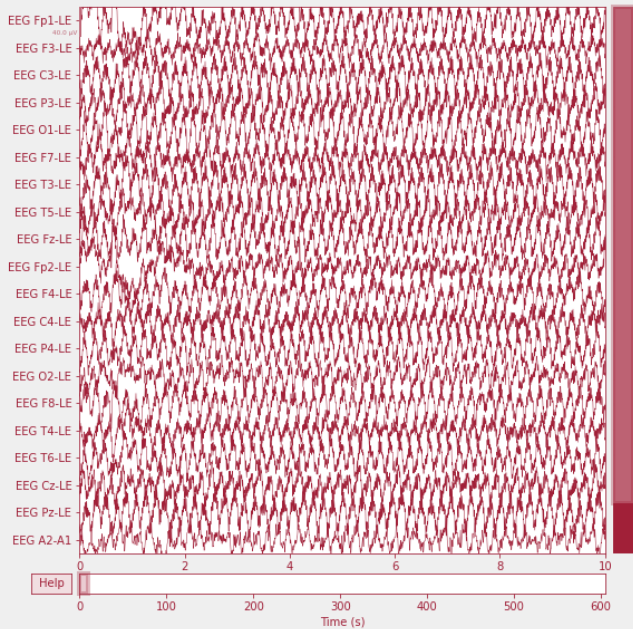
<i>Name Stimuli</i>	<i>Number of Occurrence</i>	<i>Shape of Stimuli</i>
Standard	314	
Distractor	45	
Target	41	

Data Processing

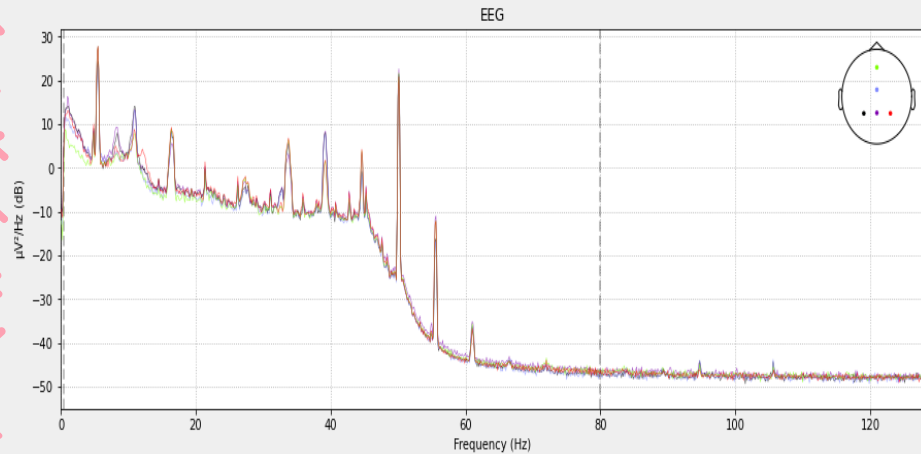


8 main channels
Parietal lobe (P3, P4, Pz)

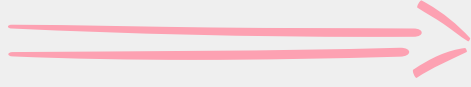




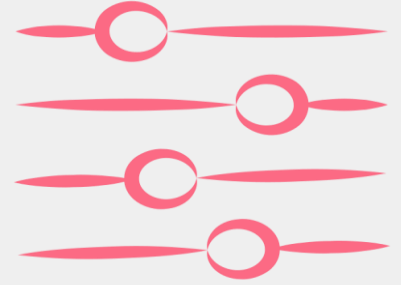
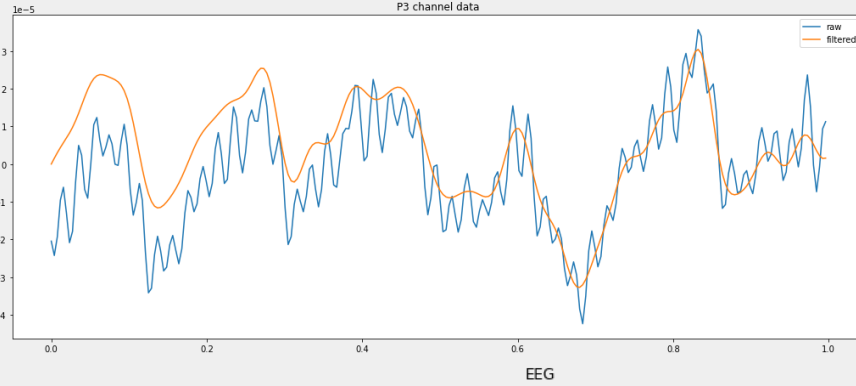
Raw EEG data of
a Healthy Control



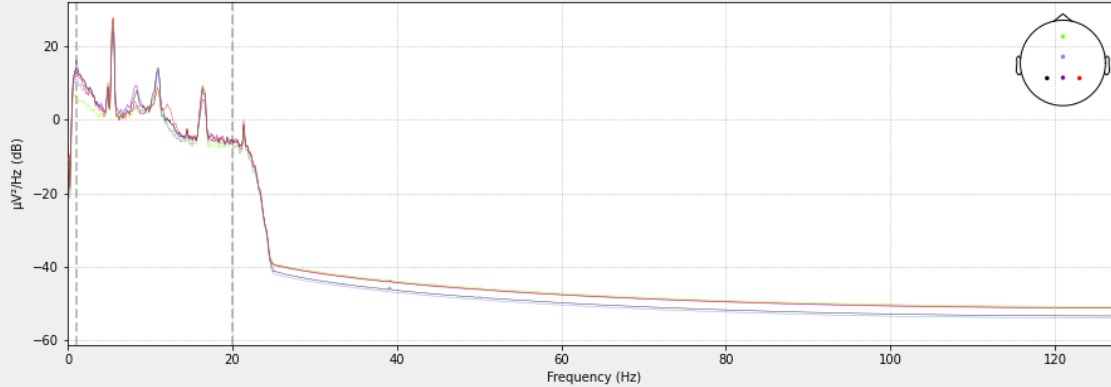
PSD of a Healthy
Control (five
channels)



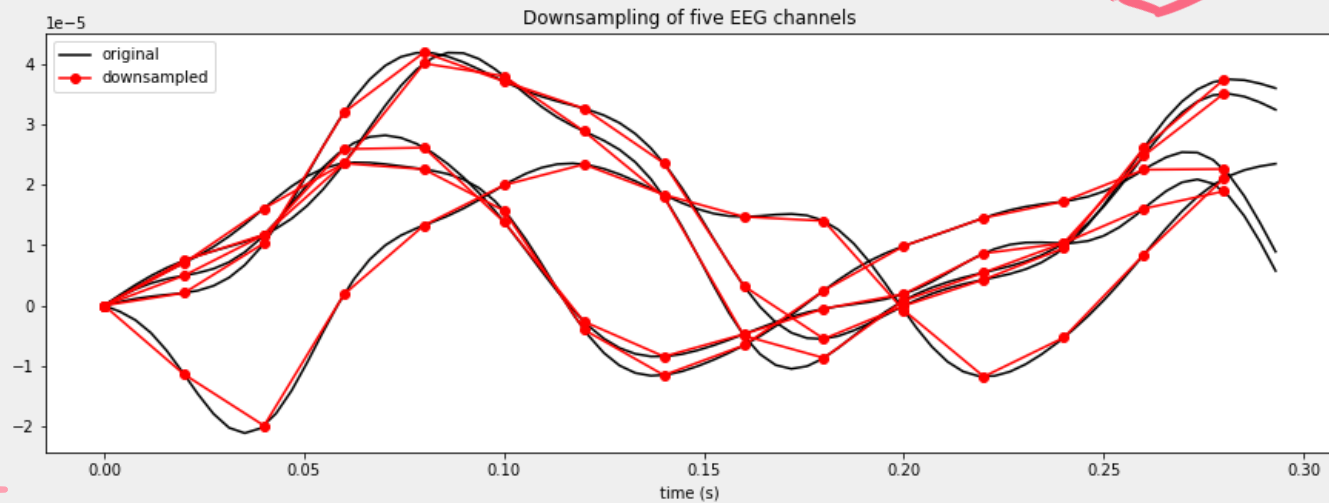
Bandpass filter



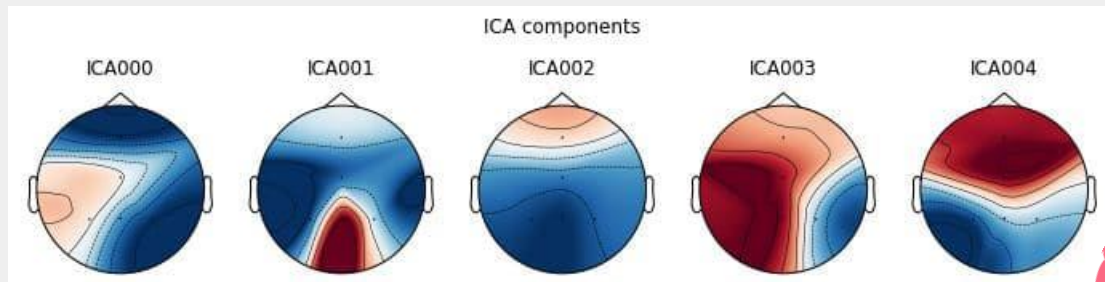
PSD of a Healthy
Control (five channels)
after [1-20Hz]
bandpass filter



Downsampling



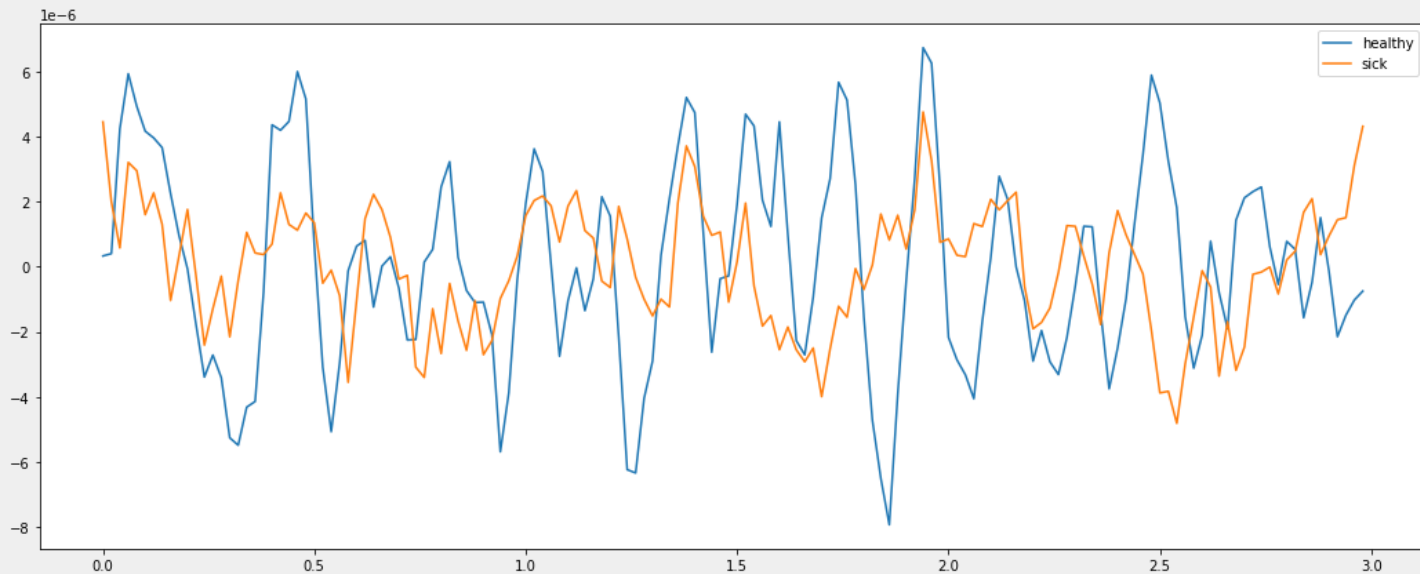
ICA



P300 potential regions



- Iterative peaks selection
- Three seconds region averaging



Classification

Logistic
Regression

SVM

KNN

Random
Forest



Results

96.4%

of accuracy with Random Forest

A+

Blockers

- No event channel given (had to predict stimuli by myself)

- Only 61 records

- No statistical data about patients

