

Cairo University

Faculty of Computers & Artificial Intelligence

Brain Computer Interface (2022/2023)



Project

Competition link: https://www.bbc.de/competition/iv/desc_1.html, You are required to implement a machine learning **models** that classify between 2 classes, left hand and right hand movement for each person based on the dataset provided in this link

Delivery Notes

- This is a group project of 3 members
- All students should work and fully understand everything in the code
- Due date is on 31/12

Dataset Description

Berlin BCI dataset is for recording the EEG signal of motor imagery for the right hand and left hand movement, the data has training data and evaluation data, but the evaluation data has no information about the trials structure, so we will work only on the training(calibration data) for both training and testing

You will find 7 files named BCICIV_calib_ds1_\$, the \$ states for (a, b, c, d, e, f, g), each file is corresponding for the EEG data of a different person with the following details

- Data are provided in **Matlab** format (*.mat) containing variables
- *cnt*: the continuous EEG signals, size [time x channels]. The array is stored in datatype INT16.
- *mrk*: structure of target cue information with fields (the file of evaluation data does *not* contain this variable)
 - *pos*: vector of positions of the cue in the EEG signals given in unit *sample*, length #cues
 - *y*: vector of target classes (-1 for class one or 1 for class two), length #cues
- *nfo*: structure providing additional information with fields
 - *fs*: sampling rate,
 - *clab*: cell array of channel labels,
 - *classes*: cell array of the names of the motor imagery classes,
 - *xpos*: x-position of electrodes in a 2d-projection,
 - *ypos*: y-position of electrodes in a 2d-projection.
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- Number of channels is 59

Evaluation Criteria

For each BCICIV_calib_ds1_\$ file, build a machine learning model that classify between right and left hand movement. Use a **cross validation** technique on the calibration data with $k=5$.

You are required to provide 7 accuracies each one corresponding to one person. Please note you will use the same pipeline on all data you Don't need to implement different model for each person (unless you like to do that)