1 File structure

Files with EEG records are placed in eight folders according to what was done in the stimulation part of the measurement:

1. lhce - Movement with left hand with close eyes.
2. lhcemi - Movement imagery with left hand with close eyes.
3. lhoe - Movement with left hand with open eyes.
4. lhoemi - Movement imagery with left hand with open eyes.
5. rhce - Movement with right hand with close eyes.
6. rhcemi - Movement imagery with right hand with close eyes.
7. rhoe - Movement with right hand with open eyes.
8. rhoemi - Movement imagery with right hand with open eyes.

2 Measurement process

The whole EEG scenario for measurement consists of 8 cycles that are the same as the file structure. At the start of each cycle, the subject is in the resting phase for 1 minute. After this phase, the subject enters a stimulation phase that lasts 2 minutes, where the subject moves wrist movement or movement imagery with left or right hand. The subject performs the given task after a five second interval. The subject is notified of the phase change by a green LED. The entire measurement process took approximately 90 minutes.

3 The measuring technology used

BrainAmp DC amplifier from brain products was used. The next part was a microcontroller STM324F429I-DISCO board. To this board was connected an EKG/EMG shield from Olimex, whose output is an analog signal, which is converted to an A/D converter of the above mentioned STM board. An EEG cap fitted with Ag/AgCl electrodes according to a 10-20 system. At the end BrainVision Recorder software was used.

3.1 BrainVision

The BrainVision recorder software was used to record EEG data, which saved each EEG record in three individual, dependent files. There are *.eeg, *.vhdr and *.vmrk files.

The *.vhdr file contains all important measurement settings. This means, for example, the number of channels and their designation, the sampling interval (always 1 KHz was used) or in what data type the EEG data is saved (e. g. INT_16). It is basically a header file, so it refers to the other two files.

The *.vmrk file stores all recorded markers to search for epochs. In our case there are four types of markers, which are marked with numbers 1, 2, 4 and 8.

Marker with number 1 is in the resting phase, similarly number 2 indicates that the marker is in the stimulation phase. The number 4 indicates the beginning of the resting phase and at the end the marker with the number 8 indicates the end of the resting phase.

The last *.eeg file is binary and stores all eeg data from all measured channels. Therefore, after only nine minutes of recording, this file size is approximately 20 MB.