

Event Related Potentials (ERP)-based Random Speller

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Experimental paradigm

Twenty healthy subjects (aged 24-32, 12 males, 8 females) participated in the experiment. None of the participants had a previous history of psychiatric, neurological, or other pertinent diseases. Participants were seated 60 cm in front of a 19" LCD monitor (60 Hz refresh rate, 1280 × 1024 resolution) on which the stimuli were presented.

The interface layout of the speller followed the original design of the RC speller. Thirty six character symbols ('A'-'Z', '1'-'9', ',') were equally spaced on screen in a configuration of 6 rows and 6 columns (see Figure 1). Individual columns/rows of characters were flashed sequentially. A single iteration of flashing all rows and columns was considered a sequence. As such, each sequence consisted of 12 flashes: 6 flashes from rows and 6 flashes from columns. For each selection of a target character, a maximum of ten sequences (i.e. 120 flashes) was allotted without prolonged inter-sequence intervals.

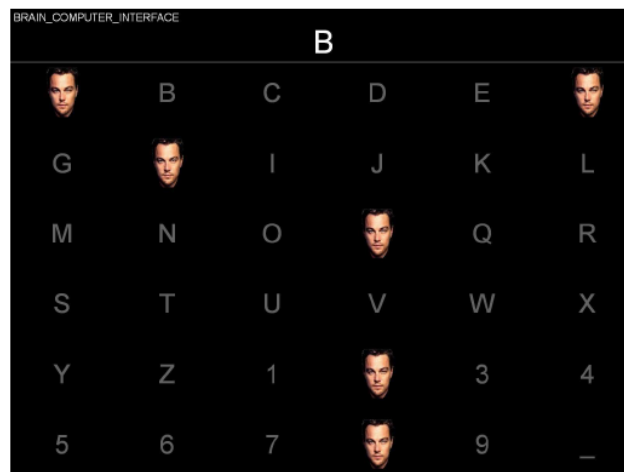


Figure 1. ERP Speller

Data recording

EEG was recorded with 24 channel Ag/AgCl actiCAP EEG and EOG electrodes (Brain Products, Germany) at a sampling rate of 500 Hz. The following were the measured channels according to the International 10-20 system: Fp1, Fp2, F7, F3, Fz, F4, F8, FC5, FC1, FC2, FC6, C3, Cz, C4, CP5, CP1, CP2, CP6, P3, Pz, P4, O1, Oz, O2, EOG1, and EOG2 (see Figure 1). EOG electrode configurations were as shown in Figure 2, with two bipolar electrodes Fp2-A (EOG1) and Fp1-B (EOG2) used for recording movements of each eye. EOG signals were then down-sampled to 32 Hz with a 5th order digital Chebyshev filter.

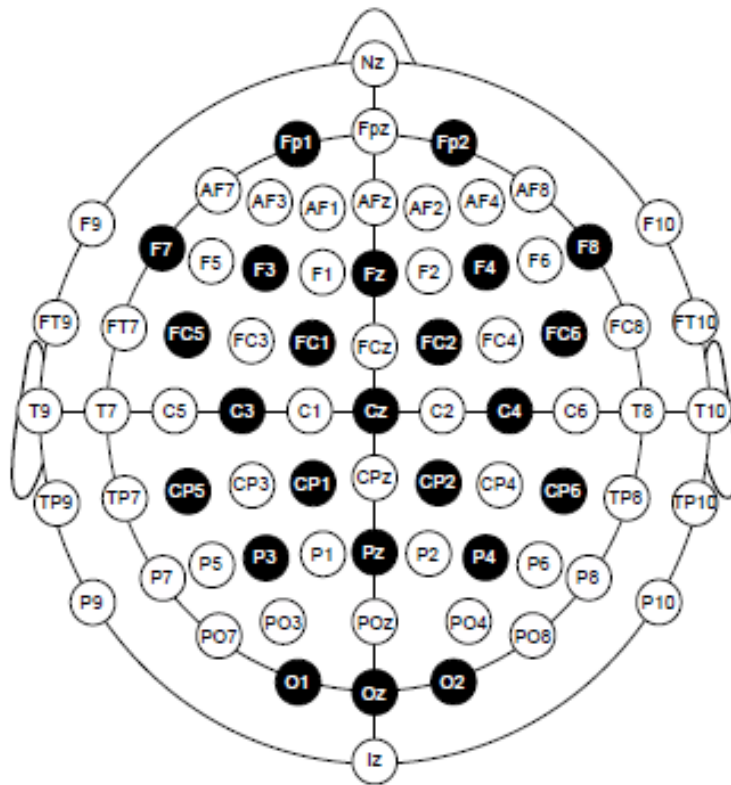


Figure 2. Placements of the 24 electrodes used in our experiment (reference: FCz, ground: Fpz)

Data file description

We provide raw data that can be converted to any form. All data sets are basically stored in the General Data Format for biomedical signals, one file per subject. Each subject in the one folder contains three pieces of data. The EEG data is stored in a binary .eeg file. It consists of 24-channels which all “measured” a sinusoid signal. The files with .vhdr and .vmrk directly belong to the .eeg file specifying additional information. In contrast to the actual data, they are not in a binary format, so you can open them. The vhdr-file contains general additional information and the vmrk file contains name and time point of the markers you see above.