

Experimental Paradigm for EEG signals recordings (Classic motor imagery)

EEG Experimental Paradigm:

EEG signals will be recorded non-invasively from different healthy and right handed **volunteers** using our FDA certified g.USBamp amplifier available at our lab NST.

The cue-based screening paradigm consists of **three** different **motor imagery** tasks namely the imagination of the movement of left hand, right hand, both hands and rest (relaxation). Each session will last **1.5 hours** and will comprise **4 runs** of **12 minutes** separated by short **breaks** of **10 minutes**. One run consists of **72 trials** (24 for each of the three possible MIs) yielding a total of **288 trials** per session.

Each motor imagery (One complete trial) is **10 seconds**. The subject will sit in a comfortable armchair in front of a computer monitor as shown in figure 1. At the beginning of a trial ($t=0s$), the screen is black and nothing is displayed yet. At ($t=3s$), a cue (dot) will appear on the black screen and the subject has to be ready for imagining a movement. At ($t=4s$), the cue in the form of an arrow pointing or **virtual arm** has to be displayed either on the left, right, or on both sides (both hands) with a **short acoustic warning** tone at $t=4.5s$ (1 kHz, 500 ms) that has to be presented **simultaneously**. The subject **must close his eyes** and start imagining the same movement (at $t=5s$) as the cue moved and maintain that imagination for **3 seconds**. At ($t=8s$), the screen will be black again and a second short acoustic warning tone for **500ms** will be presented which means that the subject has to open his eyes, stop the imagination and **relax** for **1.5s**. No movement execution is requested, the subjects have to keep their right hands fully supported on the "home" position. The same experiment will be repeated several times during 12 minutes before the first break. All subjects will be given written informed consent and the collected data will be used only for research purposes. All data will be stored and processed locally (at NST) **anonymously** as **S1, S2, . . . , Sn**. All experiments will be conducted at our laboratory NST during different four time slots. The background noise level will be maintained around 37–39 decibels.

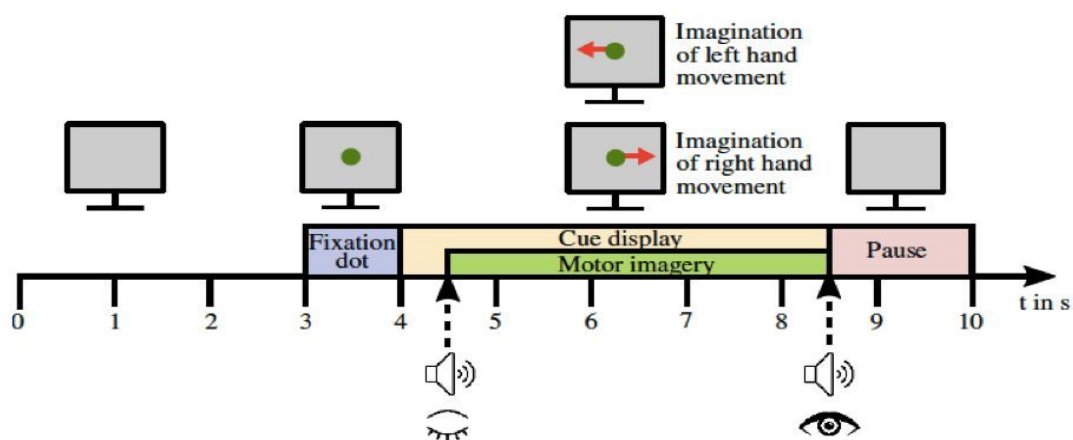


Figure 1: Experimental paradigm and recording setup of motor imagery movements from EEG signals