DUPE MIBCI: Database with User’s Profile and EEG signals for Motor Imagery Brain Computer Interface research

Pauline Dreyer, Aline Roc, Sébastien Rimbert, Fabien Lotte, Léa Pillette

To cite this version:

Pauline Dreyer, Aline Roc, Sébastien Rimbert, Fabien Lotte, Léa Pillette. DUPE MIBCI: Database with User’s Profile and EEG signals for Motor Imagery Brain Computer Interface research. BCI 2023 - 10th International BCI Meeting Balancing Innovation and Translation, Jun 2023, Bruxelles, Belgium. hal-04125666

HAL Id: hal-04125666
https://hal.science/hal-04125666
Submitted on 12 Jun 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
**DUPE MIBCI: Database with User’s Profile and EEG signals for Motor Imagery Brain Computer Interface research**

**Pauline Dreyer¹*, Aline Roc¹, Sebastien Rimbert¹, Léa Pillette², Fabien Lotte¹**

¹ Inria, LaBRI (CNRS, Univ. Bordeaux, Bordeaux INP)
² Univ. Bordeaux, CNRS, EPHE, INCIA, UMR5287 F-33000 Bordeaux, France
*200 avenue de la Vieille Tour, 33405 Talence, France. E-mail: pauline.dreyer@inria.fr

Introduction: The strong observed variations in BCI performance between participants remain a critical BCI topic that is yet to be fully understood and addressed [1]. To do so, BCI research transparency and efficiency needs to be supported by open access databases of electroencephalographic (EEG) signals collected during BCI training experiments. Also, the inclusion of detailed BCI users’ profile data in a large public database is regrettably scarce in the field. Therefore, we shared a large database as the result of several experiments conducted using the same Motor Imagery (MI) BCI protocol, that we present below.

Material, Methods and Results: Our database contains EEG signals from 87 participants. It also contains the participant’s online performances, responses to 6 questionnaires related to demographic information, spatial abilities, pre- and post-experiment user states (e.g. fatigue, mood, motivation), learning style [2] and personality and cognitive profile [3]. We provide information on the study design and instructions, methods, and codes used to conduct the studies (scenarios and scripts used to run the experiments with the free and open-source BCI platform OpenViBE [4]). To ensure data quality and/or transparency, the raw signals were all replayed and double-checked by an experimenter. In addition, we computed topographic event-related spectral perturbation (ERSP) between 8-30 Hz for each subject and phase, to check for possible unusual ERD/ERS patterns. It enabled us to visualize possible problems in some EEG signals and annotate the data accordingly.

Discussion: Such database could prove useful for various studies, including but not limited to: 1) studying the relationships between BCI users’ profiles and their BCI performances, 2) studying how EEG signals properties varies for different users’ profiles and MI tasks, 3) using the large number of participants to design cross-user BCI machine learning algorithms or 4) incorporating users' profile information into the design of EEG signal classification algorithms. In addition, a branch of BCI and EEG research is dedicated to designing signal processing algorithms to detect, reject or clean noise in EEG signals [5] or to designing machine learning algorithms robust to such noise.

Database available at: https://doi.org/10.5281/zenodo.7554429

Acknowledgment: This work was funded by the European Research Council with the project BrainConquest (grant ERC-2016-STG-714567).

References: