BNCI Horizon 2020

Deliverable:	**D5.6**	
Title:	**BCI database**	

Work package:	WP5
Due:	M6
Type:	☑ PU[1] ☐ PP[2] ☐ RE[3] ☐ CO[4]

Main author:	Clemens Brunner (TUG)
Other authors:	Gernot Müller-Putz (TUG)
Abstract:	This deliverable describes the current state of our BCI database.
Keywords:	Database

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[1] Public

[2] Restricted to other program participants

[3] Restricted to a group specified by the consortium

[4] Confidential, only for members of the consortium

1   Introduction

The aim of our BCI database is to provide publicly accessible BCI data. This is useful for benchmarking machine learning and signal processing algorithms, developing software as well as testing new methods before implementing them into an online BCI system. Most importantly, data from different end users will be provided, which will give BCI developers the possibility to adapt their algorithms to specific end users. It should be noted that public data from end users is not yet available until today. In addition, artifacts and atypical brain patterns are very common in data from end users, which should be correctly handled by the BCI.

The database can be found on our website under "About BCIs" – "Database" (http://bnci-horizon-2020.eu/index.php/about/database). Currently, we provide links to the last three BCI Competitions (namely the BCI Competition II [1], III [2], and IV [3]). Furthermore, a link to benchmarking data sets provided by Team PhyPA (http://www.phypa.org/benchmarking.html) is available.

2   Implementation

2.1   Current state

After many internal discussions, we decided to put up links to existing data sets on our website as an initial step. Currently, there is no single place that collects (links to) public BCI data sets. To fill this gap, the BNCI Horizon 2020 website will create and maintain a comprehensive list of BCI data sets. Figure 1 shows a screenshot of the database website as of April 25 2014.
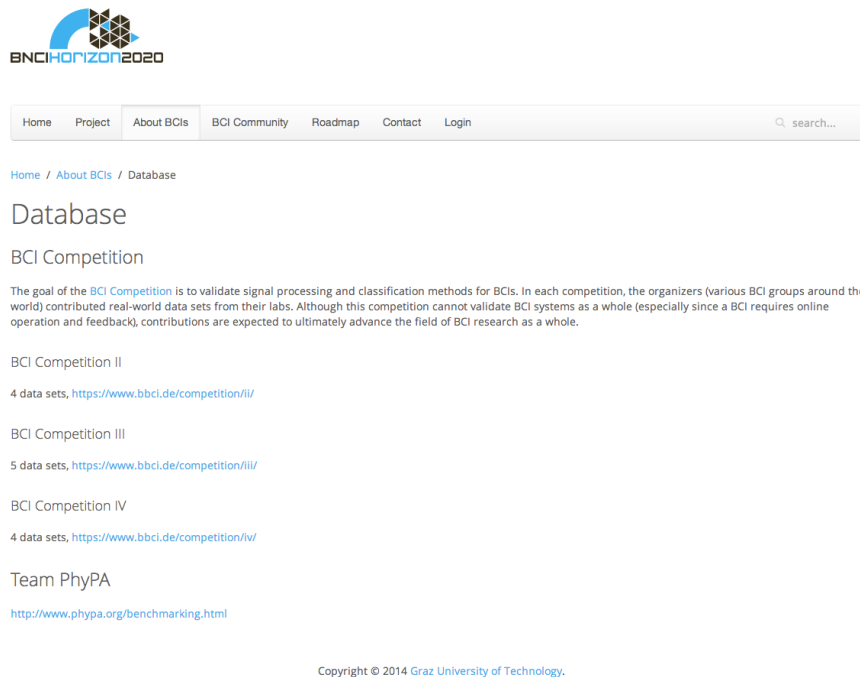

Figure 1 – Database website.

2.2   Extending the database

Our original plan was to upload several unpublished BCI data sets recorded and owned by individual BNCI Horizon 2020 consortium members. For example, Benjamin Blankertz (TUB) offered to contribute a large ERP BCI speller data set consisting of a large number of subjects. Furthermore, we are trying to resurrect the first BCI Competition data, which is currently unavailable because the hosting website is down. Other partners have also agreed to contribute data from their labs, including TUG and UNIWUE.

2.3   Issues

The discussions about populating the database have led to some issues that need to be addressed before we can publish new data sets on our website. For example, many older BCI studies with healthy users have been conducted without explicit approval to share the data. In addition, informed consent forms signed by participants are sometimes not available any more or do not include permission to publish the data. Moreover, we need to address both national and international laws regarding privacy, ethics, and medical issues. Finally, many data sets have been recorded with support by national or international funding agencies, and we have to check if publishing these data is in accordance with the terms of funding.

We recommend that BCI experiments adhere to the Declaration of Helsinki [4], which includes procedures to protect the privacy of participants, principles to handle the data, guidelines for the treatment of participants, and so on. This should be the minimum standard each published BCI data set in our database should conform to. Of course, as mentioned above, we will probably have to require institutional review board (IRB) approvals and possibly other measures, which have to be assessed first.

3   Next steps

Our next steps will be to come up with guidelines and recommendations on how BCI experiments must be conducted if the data is to be published on the Internet. Such recommendations might also be a useful reference for the protocols and ethics proposals for future studies. For example, each (anonymized) data set on our website must include the IRB approval, the inclusion/exclusion criteria, a detailed description of the study design, and a copy of the informed consent form. These guidelines will be published on our project website, and we believe that they will be very useful for BCI researchers. A detailed description will be presented with Deliverable 5.7 (M8). Also, we are currently discussing more potential data sets from our consortium to be included in the database.

4   References

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[4] World Medical Association Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects, available online at www.wma.net/en/30publications/10policies/b3