

Brain Products goes BCI

Brain Products & Team PhyPa present Brain-Controlled Computer Game at MEDICA 2008

by Stefanie Rudrich, Marketing

Brain-Computer-Interface (also known as Human-Machine-Interaction) has become a popular research area in neurophysiology over the last years. And, of course, Brain Products has gotten more and more involved in the BCI field as well. In the context of last years' MEDICA in Düsseldorf/Germany, it was publicly demonstrated that we are indeed able to provide everything you need for BCI experiments.

In cooperation with Thorsten Zander and Sebastian Welke (Technical University of Berlin / Human-Machine Systems / Team PhyPa) we showed a brain-controlled computer game at our booth.

The goal of the game: The more relaxed the player, the higher is his score! Well, this probably sounds pretty easy, but in fact is trickier than you may think if the player is not sitting in a lab but in a huge and crowded exhibition hall being surrounded by lots of different noises and impressions. Anyone, who tried to play the game at our booth, will confirm this, for sure!

However, let's take it step by step. During the game the player is wearing a headband with 5 (active) electrodes only (Electrode Positions: PO7, POZ, PO8, Fp1 and Fp2). After a four minutes training session, in which he/she alternately has to relax and focus on letters that appear on a TV screen, the actual game starts. The player now tries to relax actively; his/her level of relaxation is displayed on the screen - first by a rising bar, later by a flying comic-panda (see our video for details: www.brainproducts.com/bcimedica.php). So, the more relaxed the player is, the higher will the comic panda be kicked and thus the higher is the player's score.



Now, let's have a closer look at the technical and scientific background of this "entertaining" demonstration: One part of the training session asks the player to close his/her eyes and relax moving the subject's alpha waves to their maximum. The other part of the training session makes the player to concentrate and focus on a demanding task („read the letters that form a word on a flickering background“). During this interval the subject's level of alpha should be at its minimum.

While the player goes through the training process an algorithm programmed by Team PhyPa (Thorsten Zander and Sebastian Welke) calculates a classifier for the player that discriminates between the two induced states "relaxation" and "concentration". When the player actually starts playing the same classifier is used to determine how well the player is performing (i. e. how high his level of relaxation is); this is then visualized by the rising bar and the "jumping comic panda" on the TV screen.

To prove that there is no fake our booth staff randomly asked the player questions while he/she was trying to relax. And, in every single case this made the level of relaxation drop or respectively the rising bar on the screen shrink immediately.

MEDICA attendees were obviously pretty interested in and impressed of our little demonstration. And even we were a little surprised – but very happy – about how well the EEG recording and the classifier worked, given the bad recording conditions in the exhibition hall. For sure you can imagine ... it was great fun for everybody to compete in being relaxed. ●



Support Tip

How to keep your PowerPack well and fit

by Dr. Robert Störmer, Technical Support Manager

The PowerPack* was originally designed to feed the BrainAmp in MR environments. Over the years the PowerPack enjoyed increasing popularity even for laboratory applications, in faraday cages, MEG cabins and mobile use. In labs where the mains tends to destroy the BrainAmp mains power supply by voltage peaks or where the mains voltage dips if the neighbor lab charges the TMS coil, is the PowerPack the method of choice.

* article numbers: BP-02610, BP-02615, BP-02620

Given correct operation, the PowerPack is an extremely economic and long-lasting purchase. The maintenance is simple:

- Use it. Preferably the whole day. It feeds two amps >15h and has a deep discharge protection.
- Charge it. Charge it directly after use. Don't worry about memory effects. You can't overcharge the PowerPack, even over the weekend.

There is only one certain way to destroy the PowerPack within weeks: If you forget it in your cupboard. This misuse is not covered by warranty.