

Tips and tricks of the trade

Post processing biological data with EEGLAB

Photographers usually post-process their photos. By doing this, they often change reality. This is not what a scientist really wants to do. However, some events have singular characteristics so sharpening raw data is necessary and could even reveal new concepts and ideas.

Lab Hint

“Sharpening in a biological sense may be defined as the elimination of noisy artefacts and data problems. We are preparing an analysis of Electroencephalogram (EEG) data in which noise should be eliminated (e.g. the electricity net noise at 50 Hz) and trying to fix event-related potential signs in the data stream. As we are trying to post-process them further on, clearing and identifying the data is critical for our study.

To eliminate the noise we are using the open source programme “EEGLAB” developed by Arnauld Delorme and Scott Makeig, Director of the Swartz Center for Computational Neuroscience at the University of California. EEGLAB is a matrix-orientated programme that runs on the well-established and easy-to-use suite for post-processing raw data, “Matlab”. EEGLAB, which is delivered as a “Matlab-Toolbox”, helps to clear the data and identify event-related potentials in EEG data sets. It also allows the user to read EEG raw data sets. EEGLAB enables you to visualise EEG data

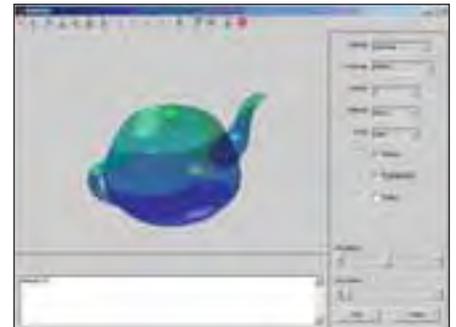


Sharpens data with EEGLAB: Matthias Faix

without expensive software, usually distributed with EEG recording machines.

EEGLAB contains typical elements from other programming languages. It runs both on Windows and many UNIX machines. You

don't need to worry about the speed of your data analyses. If a timing problem occurs you simply switch to another high-class machine. EEGLAB also supports University servers with parallel architecture, enabling developers to add new functions to the programme and hand them over to the campus. Because the suite is ready for use with the operating systems UNIX and X11, it is quite simple to work with on a diskless station. If you would like to familiarise yourself with EEGLAB, just enter “demo” on the command prompt and it will offer you

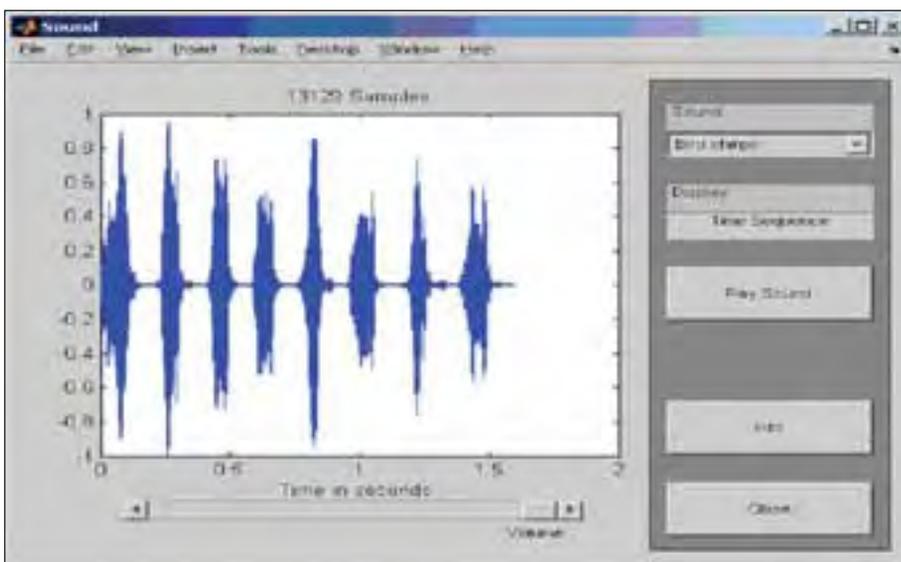


Visualisation of a real object. A highlight is the ad hoc change of the visual characters of the object.

a bulk of interesting demos. Of course its main focus lies on matrix operations, which are essential for a process called independent component analysis (ICA), used in our project. The main advantage of EEGLAB, however, is the availability of many analytical packages called toolboxes. Included are tools like “Fast Fourier Analyses” or “OCR-effects”. Another terrific application is, for example, the sound demo.

EEGLAB identifies distinct signs in the data stream and uses a pattern recognition algorithm to ease post-processing of the data. Accompanied by Scott Makeig's group, we are using EEGLAB to identify “eye artefacts” which are well described in literature. We believe that hidden brain effects may emerge while post-processing the data. As we have a large amount of EEG data, we are in the process of establishing a data warehouse to predict problems in the brain before they actually occur.”

(Matthias Faix and Johannes Rentzsch, Klinik und Hochschulambulanz für Psychiatrie und Psychotherapie, Charité Berlin, Campus Benjamin Franklin, Germany)



Sound of a bird singing in the sky. EEGLAB not only visualises the sound, it plays it, too.

Do you have any useful tips?

Contact us at:

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