

Multimodal measurements, combining methods, or co-registration of signals from different sources are routinely performed in many labs. If two signals have similar characteristics – comparable time resolution – it is a natural wish to merge these signals and process them together, even if they were recorded by independent systems. The BrainVision Analyzer 2.0.3 makes the first step on this road by offering the Add Channels transformation, which makes it possible to import and synchronize co-registered data streams, e.g. eye tracker data, to the EEG.

The first version of the Add Channels module supports three types of eye tracker data: Tobii, ASL and SMI, and more will follow. Needless to say, since the module is part of Analyzer, the synchronization works offline.

The whole process is based on common markers which are sent to both recording systems at the same time. In an ideal case, the experiment control software (E-Prime®, Presentation® etc.) handles the triggering: it sends the same marker to the EEG and eye tracker hardware at the beginning and at the end of the experiment. In theory any stimulus control software can be used – like the software part of the eye tracker package – as long as it is able to send triggers to both systems at the same time.

The Add Channels module finds the common markers, resamples, shifts and fits, in other words, synchronizes the eye tracker data to the EEG points. These steps are necessary because the signals were recorded by independent systems. Their main clocks may have different offset, speed, and accuracy. The sampling rates are typically different or even irregular in some cases.

All these mismatches between the datasets have to be taken into account when they are merged.

Some shift might remain between the EEG and the imported eye tracker data even after the Add Channels has synchronized the markers perfectly. This shift might be induced by the difference of the marker propagation times, especially if the eye tracker is using software connections to get triggers. However, with the powerful tools of the Analyzer, the shift can be precisely measured and corrected. Since the eye tracker data and part of the EEG data originated from the same source, the cross correlation between the frontal EEG channels and the eye tracker data shows the magnitude of the shift. The Add Channels transformation is able to move the eye tracker data during the import; so all remaining error can be eliminated.

One more feature should be mentioned. During the eye tracker data processing, certain events can be marked, e.g. saccades, fixations, blinks, entering or leaving a region (area) of interest, etc. If they are stored in the data file, the Add Channels can import them as well. The events can be very useful during the EEG analysis, for example they make it possible to quickly identify the EEG trials in which the subject was really focusing on the target, or to identify EEG activity related to the saccades.

The Add Channels transformation, like the Video EEG module, is licensed separately; it has to be purchased additionally to the main Analyzer software. Furthermore it requires a Sentinel HASP dongle. For more information please contact our sales team (sales@brainproducts.com) or your local dealer. ●