ACOBI: A tool for fNIR data processing and visualization

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Abstract

Functional near-infrared spectroscopy (fNIR), which assesses changes in the relative levels of oxygenated and deoxygenated hemoglobin, has increasingly been used to assess neural function in the cortex. In addition to technological developments, data analytic and brain mapping tools need to be developed in order to better understand the relationship between the fNIR signal and brain activity and to allow researchers and clinicians to better interact with their data.

Analysis for Cognitive Optical Brain Imaging Studio (ACOBI) is a standalone software program that has been developed to address this challenge. ACOBI is a post-processing environment that encompasses analytic and visualization techniques devoted to a better understanding of the relationship between brain activity and fNIR signals. Current visualization techniques include methods for single- and multiple-frame topographic views of fNIR data based on our previous work. [1]

In this study we have implemented a scripting engine as an extendable framework and multiple-frame visualization technique that includes video presentations synchronized to the data acquisition timing of individual frames representing time-locked oxygenation/blood volume changes. Currently, we are working on the development of new modules to enhance the data processing power of ACOBI which will allow the users to extract relevant features from fNIR signals and perform statistical analysis on them for within and across subject comparisons.

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Reference: