“lyngby” – a modeler’s Matlab toolbox for spatio-temporal analysis of functional neuroimages

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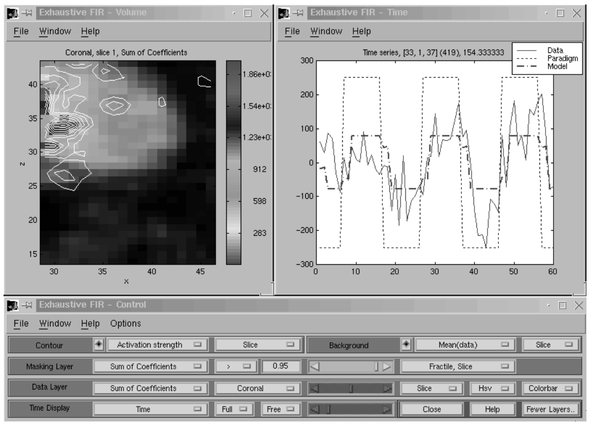
Introduction

Functional mapping by fMRI and PET provides unique access to spatio-temporal patterns of activity in the working human brain. However, the intricate combination of biological and engineering mechanisms involved in the acquission of functional brain images gives room for rich and expanding modeling research activity (see e.g. [1] for a recent review of modeling tools). To further this research we have developed a software toolbox based on the popular Matlab platform.

Our toolbox, lyngby, provides multiple models for spatio-temporal analysis of image sets including:

- Single pixel activity maps: t, F, and KS tests.
- Single pixel hemodynamic response models: Lange-Zeger [2], FIR filter [3], and artificial neural networks.
- Clustering: time series, correlation [4], feature [5].
- Multivariate models: CVA [6], CRA [7], artificial neural networks [8].



The figure shows an example of the lyngby graphical user interface. Furthermore, we have created templates for swift integration of user defined models. This provides functional imaging modelers with a unique opportunity to integrate their own models in a rich context of standard models for evaluation of model biases and robustness (see e.g. [9]).

Availability

lyngby is freely available to the functional brain imaging community for non-commercial use, and we invite you to email lyngby@hendrix.imm.dtu.dk to obtain further information and a personal passcode to the lyngby Web site. lyngby consists of approximately 340 Matlab functions, including functions for loading of several standard file formats; preprocessing tools for removing time trends, inter-repetition offsets etc.; modeling and visualisation of brain maps (summary images) in single or multiple slices. The toolbox documentation is available in postscript form (including installation guide): http://hendrix.imm.dtu.dk/software/lyngby.

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