

E Abstract

Full-Text PDF

Linked References

? How to Cite this Article

O Complete Special Issue

Go

About Us

# International Journal of Biomedical Imaging

### Table of Contents About this Journal Submit a Manuscript



- Abstracting and Indexing
- Aims and Scope
- Article Processing Charges
- Articles in Press
- Author Guidelines
- Bibliographic Information
- Contact Information
- Editorial Board
- Editorial Workflow
- Reviewers Acknowledgment
- Subscription Information

## Open Special Issues

- Published Special Issues
- Special Issue Guidelines

Call for Proposals for Special Issues

International Journal of Biomedical Imaging Volume 2006 (2006), Article ID 27483, 7 pages doi:10.1155/IJBI/2006/27483

Intervention Models in Functional Connectivity Identification Applied to fMRI

João Ricardo Sato, <sup>1, 2</sup> Daniel Yasumasa Takahashi, <sup>3</sup> Ellison Fernando Cardoso, <sup>2, 3</sup> Maria da Graça Morais Martin,<sup>2,3</sup> Edson Amaro Júnior,<sup>2,3</sup> and Pedro Alberto Morettin<sup>1</sup>

<sup>1</sup>Departamento de Estatística, Instituto de Matemática e Estatística, Universidade de São Paulo, São Paulo 05508-090, Sp, Brazil

<sup>2</sup>Laboratório de Neuroimagem Funcional (NIF), Lim 44, Faculdade de Medicina, Universidade de São Paulo, São Paulo 05403-001, Sp, Brazil

<sup>3</sup>Departamento de Radiología, Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo 05403-001, Sp, Brazil

Received 31 January 2006; Revised 26 June 2006; Accepted 26 June 2006

## Abstract

Recent advances in neuroimaging techniques have provided precise spatial localization of brain activation applied in several neuroscience subareas. The development of functional magnetic resonance imaging (fMRI), based on the BOLD signal, is one of the most popular techniques related to the detection of neuronal activation. However, understanding the interactions between several neuronal modules is also an important task, providing a better comprehension about brain dynamics. Nevertheless, most connectivity studies in fMRI are based on a simple correlation analysis, which is only an association measure and does not provide the direction of information flow between brain areas. Other proposed methods like structural equation modeling (SEM) seem to be attractive alternatives. However, this approach assumes prior information about the causality direction and stationarity conditions, which may not be satisfied in fMRI experiments. Generally, the fMRI experiments are related to an activation task; hence, the stimulus conditions should also be included in the model. In this paper, we suggest an intervention analysis, which includes stimulus condition, allowing a nonstationary modeling. Furthermore, an illustrative application to real fMRI dataset from a simple motor task is presented.

Copyright © 2009 Hindawi Publishing Corporation. All rights reserved.