



Journal Menu

- 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 2007 (2007), Article ID 13963, 12 pages
doi:10.1155/2007/13963

Research Article

Multimodality Data Integration in Epilepsy

Otto Muzik,^{1,2} Diane C. Chugani,¹ Guangyu Zou,³ Jing Hua,³ Yi Lu,³ Shiyong Lu,³
Eishi Asano,⁴ and Harry T. Chugani⁴

¹Carman and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Detroit Medical Center, Wayne State University, Detroit 48201, MI, USA

²Department of Radiology, Children's Hospital of Michigan, Detroit Medical Center, Wayne State University, Detroit 48201, MI, USA

³Department of Computer Science, Wayne State University, Detroit 48201, MI, USA

⁴Department of Neurology, Children's Hospital of Michigan, Detroit Medical Center, Wayne State University, Detroit 48201, MI, USA

Received 13 September 2006; Accepted 8 February 2007

Academic Editor: Haim Azhari

Abstract

An important goal of software development in the medical field is the design of methods which are able to integrate information obtained from various imaging and nonimaging modalities into a cohesive framework in order to understand the results of qualitatively different measurements in a larger context. Moreover, it is essential to assess the various features of the data quantitatively so that relationships in anatomical and functional domains between complementing modalities can be expressed mathematically. This paper presents a clinically feasible software environment for the quantitative assessment of the relationship among biochemical functions as assessed by PET imaging and electrophysiological parameters derived from intracranial EEG. Based on the developed software tools, quantitative results obtained from individual modalities can be merged into a data structure allowing a consistent framework for advanced data mining techniques and 3D visualization. Moreover, an effort was made to derive quantitative variables (such as the spatial proximity index, SPI) characterizing the relationship between complementing modalities on a more generic level as a prerequisite for efficient data mining strategies. We describe the implementation of this software environment in twelve children (mean age 5.2 ± 4.3 years) with medically intractable partial epilepsy who underwent both high-resolution structural MR and functional PET imaging. Our experiments demonstrate that our approach will lead to a better understanding of the mechanisms of epileptogenesis and might ultimately have an impact on treatment. Moreover, our software environment holds promise to be useful in many other neurological disorders, where integration of multimodality data is crucial for a better understanding of the underlying disease mechanisms.

[Abstract](#)[Full-Text PDF](#)[Linked References](#)[How to Cite this Article](#)[Complete Special Issue](#)