



Lightweight XML-based query, integration and visualization of distributed multimodality brain imaging data

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J.F. Brinkley, MD, PhD^{1,2,3}, A.V.Poliakov, PhD¹, E.B. Moore¹, L.T. Detwiler, MS¹, J.D. Franklin, MS¹, D.P. Corina, PhD⁵, G.A. Ojemann, MD⁴

¹Structural Informatics Group, Dept Biological Structure, ²Medical Education and Biomedical Informatics, ³Computer Science and Engineering, ⁴Neurosurgery, University of Washington, Seattle, Washington, ⁵Dept Linguistics, University of California at Davis, Davis, California

1. Introduction

With the proliferation of brain imaging modalities and the inability of any one lab to be expert in all modalities or to acquire sufficient data from a single population, there is a need to integrate distributed sources of brain imaging data. We have developed a "lightweight" approach to integration that does not require a central mediator.

2. Driving neuroscience problem

Language organization in the brain. Multiple types of data are acquired on patients undergoing neurosurgery for epilepsy. Each data type alone has shown correlations with behavioral and demographic factors. An interest is to integrate these separate sources in order to gain insights that could not be obtained from a single source alone.

3. Approach

Separately maintained local or remote data and knowledge sources are encapsulated in web services (WS), and made to appear as XML for access by a distributed XML-based query engine (DXQ). Distributed XML queries are dispatched to the separate data sources, the results of which are combined by DXQ, and then converted to various formats for visualization or offline analysis.

4. An example query: Is there any difference in CSM semantic naming errors in the temporal lobe for males versus females?

5. Express the query in a distributed form of XQuery

6. Dispatch the query components to separate data and knowledge sources

11. Combine the individual results into a final XML document

12. Visualize the final XML results in multiple ways.

