The Brede Wiki: A social neuroinformatics web-service with structured information from neuroscience

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Introduction

Experience with the Brede Database (http://neuro.imm.dtu.dk/services/bredeatabase/) shows that data entry is a bottleneck. The Brede Database contains neuroinformatics data from 186 neuroimaging papers and the entire data entry constitutes a time consuming task for a single person. A wiki with immediate access to the entered information may encourage other researchers to contribute. The application of wikis has already spread in other areas of bioinformatics, see, e.g., WikiProtein, WikiGenes and SNPedia.

A bioinformatics application, Gene Wiki, has shown how to automatically construct the so-called templates of MediaWiki to display structured information about genes in Wikipedia (Huss, III, Orozco, Goodale, Chunlei, Batalov, Vickers, Valafar & Su 2008). Off-wiki scripts can query, download and extract data contained in MediaWiki templates and perform statistical analysis on the data (Nielsen 2007, Nielsen 2008*a*), and with the large-scale DBpedia database an Internet user can perform complex queries to information in the templates of Wikipedia (Auer, Bizer, Kobilarov, Lehmann, Cyganiak & Ives 2008).

Method

Wikis can be employed in multiple ways (Leuf & Cunningham 2001). The present application, Brede Wiki, use MediaWiki on a local server. In the Brede Wiki templates store the structured information from neuroscience papers and editors may add free format text. Template definitions format the data so it is presented as tables on the formated wiki-page. To allow for a relative easy translation with regular expressions to SQL tables the templates do not nest, has only lowercase field names and the values of the fields have no formating wiki-markup. As with other wikis data and text may be entered incrementally, and, e.g., a specialized template can indicate incomplete Talairach coordinates entry.

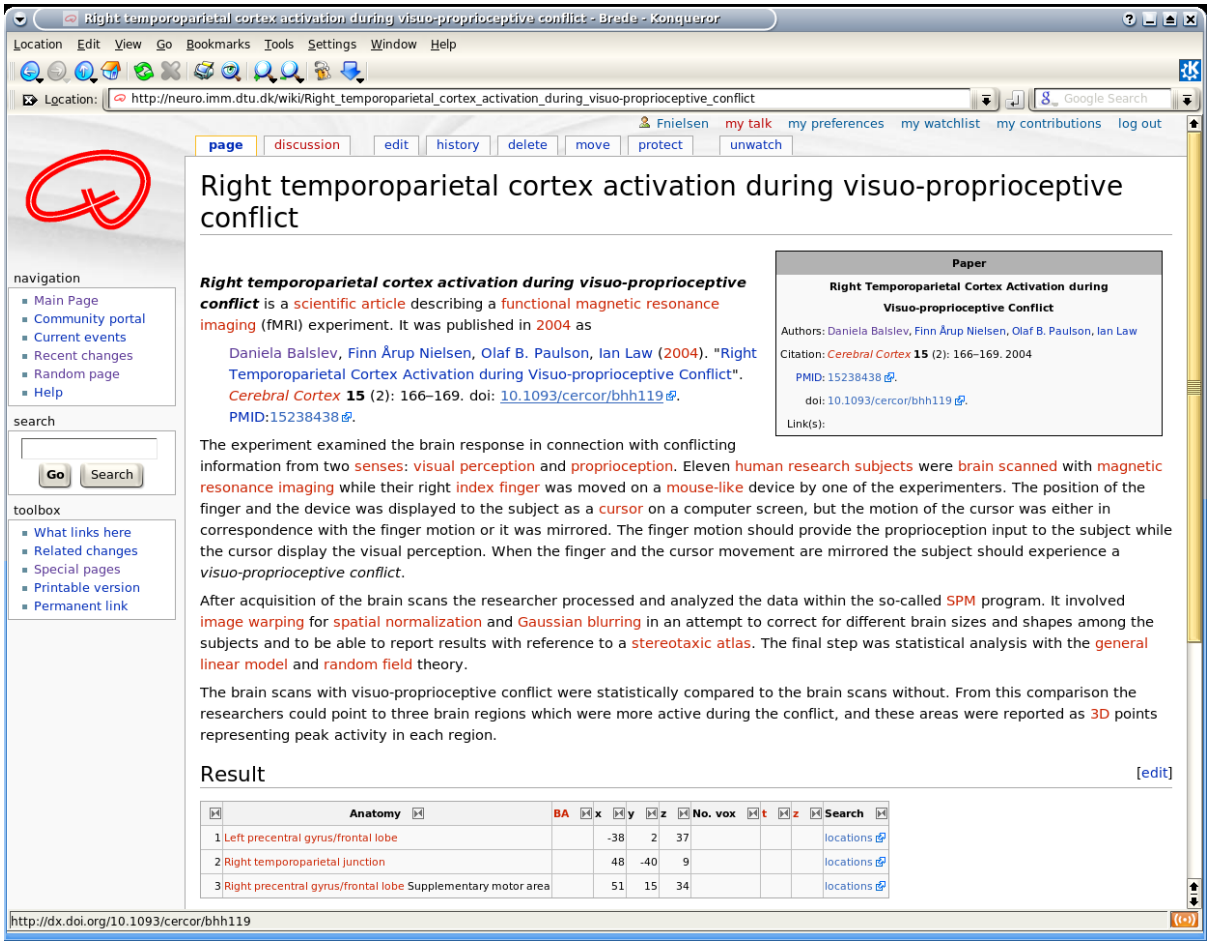

Figure 1: Screenshot of Brede Wiki displaying a wiki article about a scientific article. The bottom of the screenshot shows the list of Talairach coordinates.

Results

I have defined templates for papers, Talairach coordinates, brain regions, journals and researchers and setup sixteen papers mostly from functional neuroimaging. From a given PMID a web-service can format information from Pubmed for inclusion in the Brede Wiki. A Matlab script can extract coordinates from SPM5 and format them in the Talairach coordinate template format. Adding the coordinates to the Brede Wiki this way may take less than a minute. An off-wiki Python script can extract all Talairach coordinates embedded in the wiki. It takes about five seconds to fetch the 132 coordinates presently defined. A fielded wiki for personality genetics (Nielsen 2008*b*) may also export its data in the MediaWiki template format for direct inclusion in the Brede Wiki.

Conclusion

A wiki promises a solution for the problem of data entry and data sharing in neuroscience. The templates of MediaWiki offer a flexible way to represent structured information. Such data can be analyzed albeit off-wiki.

The wiki operates from http://neuro.imm.dtu.dk/wiki/ and its content is available under triple copyleft licences with GPL, GFDL and Creative Commons BY-SA, so entered text and data may be included in, say, Wikipedia or a GPL-licensed program.

References

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