BredeQuery Plugin for SPM5 – User's Guide

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Contents

List of Figures

Chapter 1

User's Guide

1.1 Introduction

The Brede Database is a neuroinformatics database. It contains taxonomies of brain functions and brain regions as well as coordinate set results from neuroimaging exeriments. Within the Brede Database users can query neuroimaging information by *activation coordinate*.

BredeQuery plugin allows the users to perform an automatic query to the Brede database directly from the SPM5 (Matlab) environment. When activated by the user, coordinates inferred by SPM5 are identified by the BredeQuery plugin and input to the Brede Database as a query.

Coordinates obtained in SPM5 in MNI space are converted by the BredeQuery plugin using one of transformations

- Brett transformation

  http://imaging.mrc-cbu.cam.ac.uk/imaging/MniTalairach

- Lancaster method

  'Bias between MNI and Talairach coordinates analyzed using the ICBM-152 brain template.' - Lancaster, JL et al. - Human Brain Mapping - November 2007; 28(11):1194-205

In the next sections you can find the guidelines for installing the plugin in the SPM5 environment (Section 1.2), a detailed description of the functionality of the plugin (Section 1.3), and some useful hints for the new user.

1.2 Installing BredeQuery plugin

The BredeQuery plugin package consists of the **BredeQuery** folder, where all the plugin's source files are located (Matlab files and BredeXMLExporter.jar file). The only thing which should be done to use BredeQuery plugin from SPM5 is to copy the **BredeQuery** folder into the **toolbox** folder in SPM5 software directory. Afterwards, SPM5 should be restarted and the BredeQuery plugin will appear in the Toolbox pop-up menu of the SPM5 graphical user interface under the name: BredeQuery (Figure 1.1).

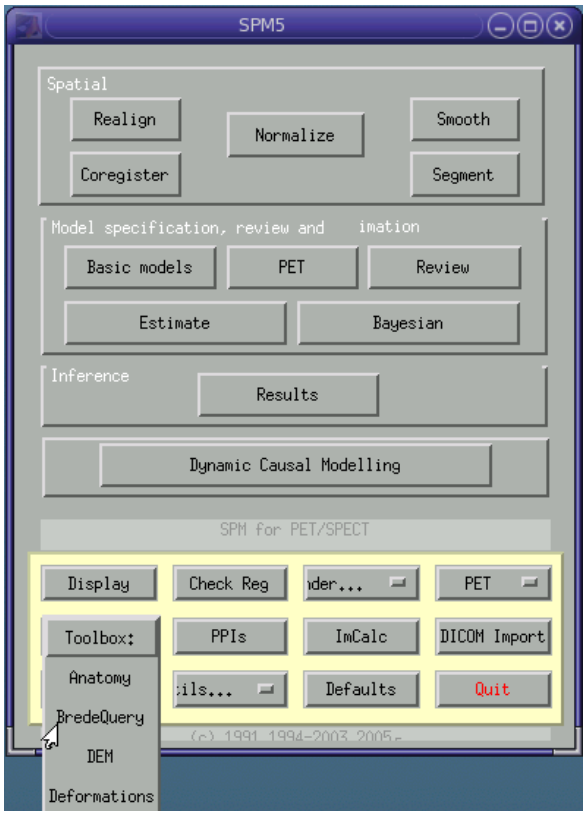

Figure 1.1: SPM5 screenshot - BredeQuery plugin

1.3 Working with the BredeQuery plugin

The work with BredeQuery plugin starts when you select BredeQuery in SPM5 (as it is shown on Figure 1.1) and the BredeQuery plugin GUI will appear (Figure 1.2):

1.3.1 Automatic grabbing of the coordinates from SPM5

Coordinates retrieved in the SPM5 are available to the BredeQuery plugin. If there exists an SPM5 window with inferred coordinates a left mouse click on the **Grab co-ordinates** button in the BredeQuery plugin will result in an automatic display of these coordinates inside the plugin (Figure 1.3).

As mentioned above, the coordinates can also be transformed from MNI space to Talairach space if necessary. In the Figure 1.3 there is a pop-up menu which enables the user to choose the appropriate transformation. Up to now, there are three options: lancaster, brett and none.

The BredeQuery plugin offers further the opportunity to grab the SPM5 coordinate of the 'red arrow' (i.e., the coordinates table entry colored red) and select/mark it on the coordinates list in the plugin. Such action is executed after clicking the Mark button in the Automatic grab panel. Just after the red arrow coordinate is selected, the user can query it in the Brede Database

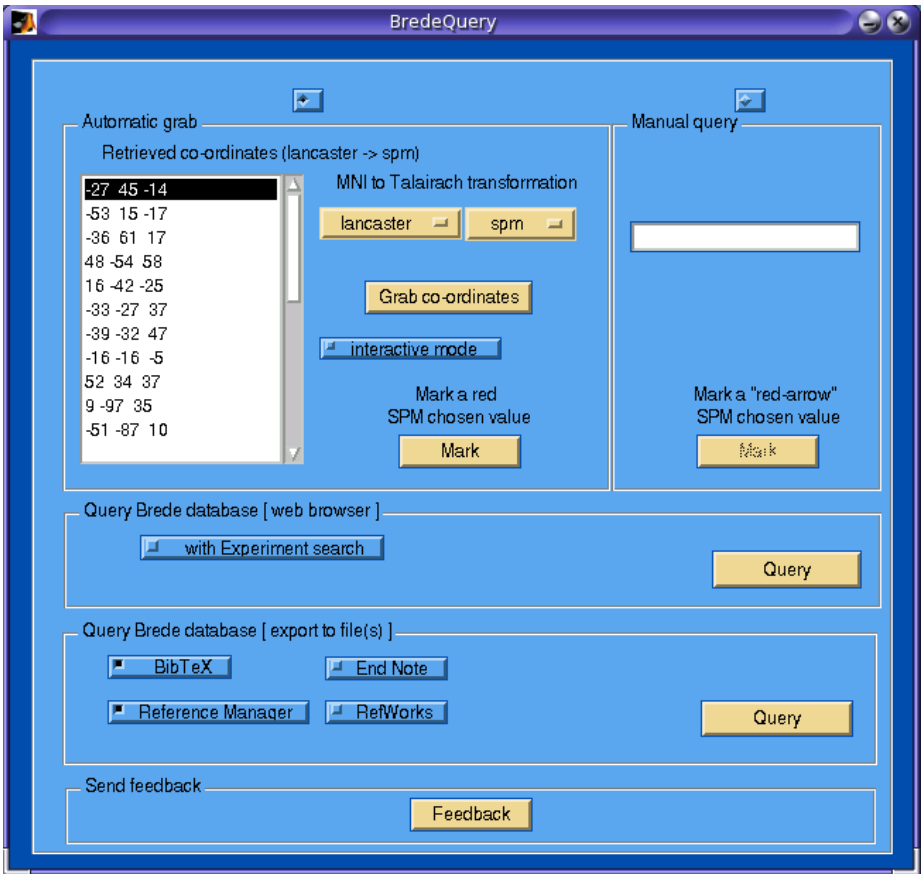

Figure 1.2: BredeQuery plugin graphical user interface

(see Section 1.3.2). If you select a location manually (represented with the 'red arrow' in SPM5) on any of the the cross-sectional brain images, its coordinate value can be easily grabbed by switching to the Manual query panel and pressing a Mark button.

The last, but not least feature is the interactive mode. It is disabled by default, but it can be activated by the user by checking the **interactive mode** checkbox. While it is checked, any selection of the coordinate on the list inside the BredeQuery plugin will result in an automatic ''red selection'' of the related coordinate in the SPM results window.

1.3.2 Querying The Brede Database

The Brede Database can be queried from BredeQuery plugin in two different ways: using the coordinate(s) grabbed from SPM5 or through a manual query where coordinates are inserted by hand (see Figure 1.4).

The result found by the Brede Database for a query is always a set of articles which include activation location with similar coordinates to these from the query. The BredeQuery plugin gives to the user two different ways of showing the results: through the webpage or through the direct export of the query result

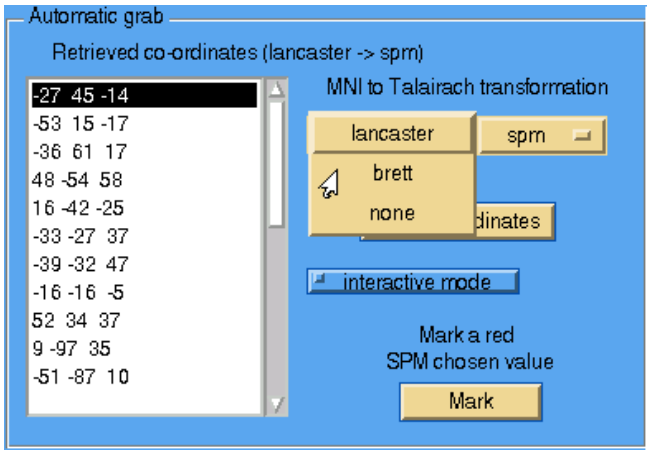

Figure 1.3: BredeQuery plugin: Coordinates grabbed from SPM and changed according to the chosen transformation.

to the well-known bibliography file formats like: BibTeX, Reference Manager, RefWorks, EndNote etc. An XML file with the results can also be obtained. The two different methods (Figure 1.5) of showing the query results are described below.

Query result in a web browser

The first method of showing the Brede query results is displaying them in a web browser inside the Matlab environment: The Brede webpage containing the query results. Such a query can be performed not only for one location's coordinates, but also for a conjunction of locations.

In order to select more than one location from the list of grabbed coordinates, the user must keep the CTRL key pressed while selecting the locations by left mouse clicking. If manual query is used the user can specify more than one location by separating them with a semicolon ';'. For example, the following manual query: '45 6 3;44 -5 3' will give the result for point 45 6 3 and for point 44 -5 3. The result of a simple Brede query is presented on Figure 1.6.

Additionally, you can select the **with Experiment search** checkbox. In this case one more web browser window will appear with the experimental search query result, where the articles are searched using the conjunction of points option. An example of an experimental Brede query for two locations is presented on Figure 1.7.

Importing query results to different file formats

The results of the Brede Database query can also be automatically exported to a file. As mentioned, four file formats are available: BibTeX, Reference Manager, RefWorks and EndNote (Figure 1.5).

The only limitation of such a search is that it can be performed for a single location only. If more locations are selected in the coordinates list only the first selected location will be queried.

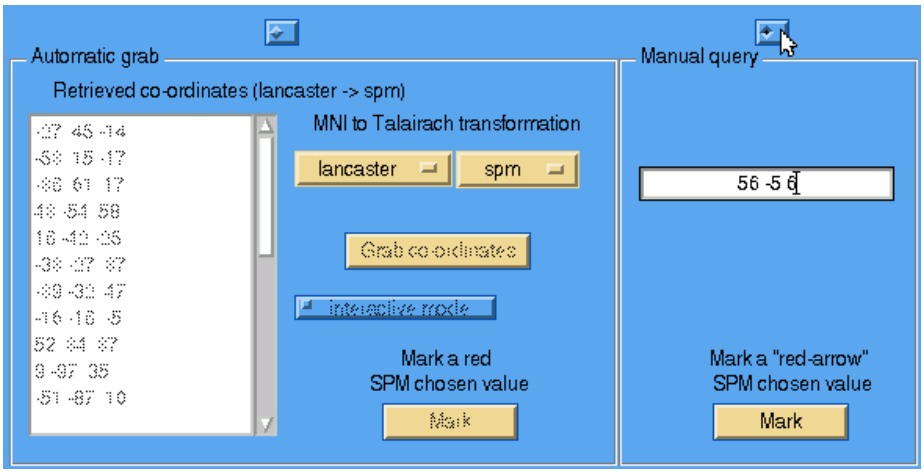

Figure 1.4: Automatic grab of coordinates vs. manual querying (coordinates inserted by hand)

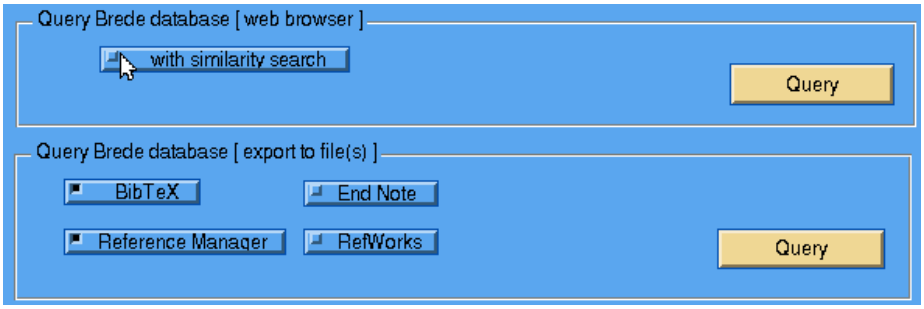

Figure 1.5: Two methods of showing Brede database query results: web-browser and export to files

After the **Query** button is pressed, the dialog will appear and the path to the directory where the exported files should be placed must be specified by the user (Figure 1.8). After confirming with the OK button. Note: The file export process can take about 3 to 5 seconds. In the selected directory the results are grouped in the folder, which name is created according to the following pattern: *BredeQuery-<month_day_year>-<hh.mm>* where hh.mm represents the time of creation.

Besides the exported files, the folder will also contain the **BredeQuery.xml** file with the query results and the **BredeQueryInfo.txt** file. **BredeQuery-Info.txt** file contains the necessary information about the query performed, point coordinates and MNI to Talairach transformation used.

1.4 Summary

This is a beta-version of the BredeQuery plugin. We continue to work on it to add more useful functionality. All suggestions and advice will be warmly

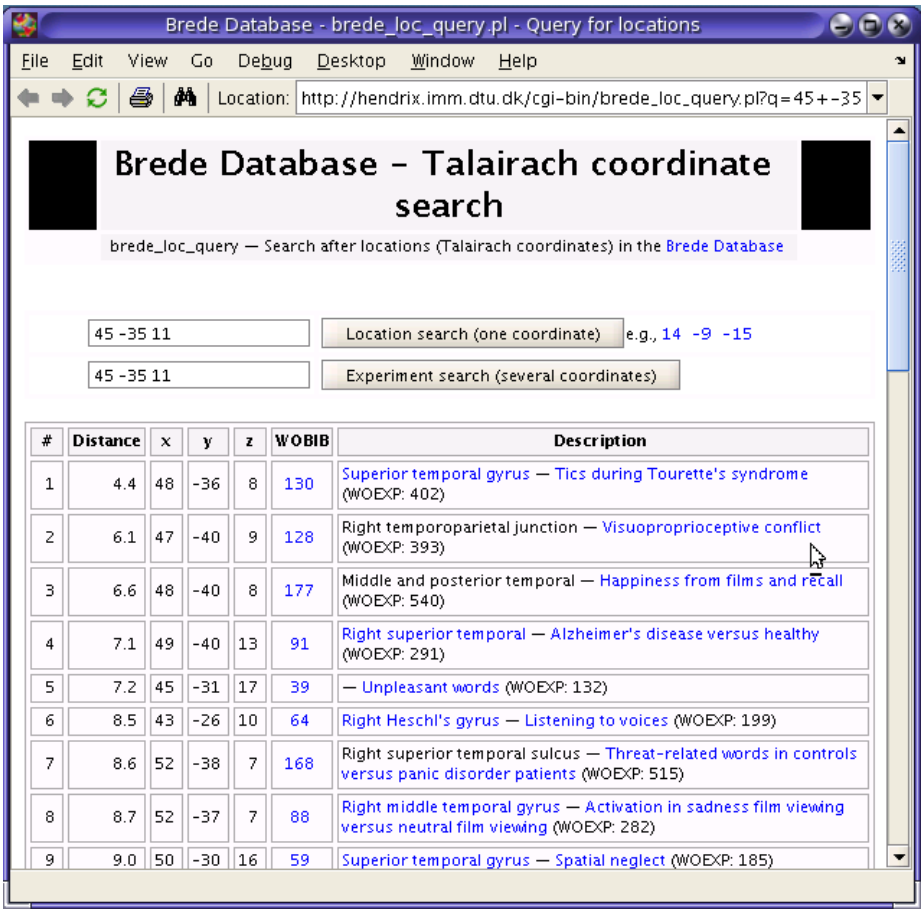

Figure 1.6: Simple Brede query - result displayed in a web browser

welcomed. For your convenience a feedback web-based form has been created. To fill the feedback form simply click the **Feedback** button and add your suggestions and comments. Should there be any additional comments or questions, please send them to bw@imm.dtu.dk.

Thank you in advance! We hope you will enjoy working with BredeQuery plugin!

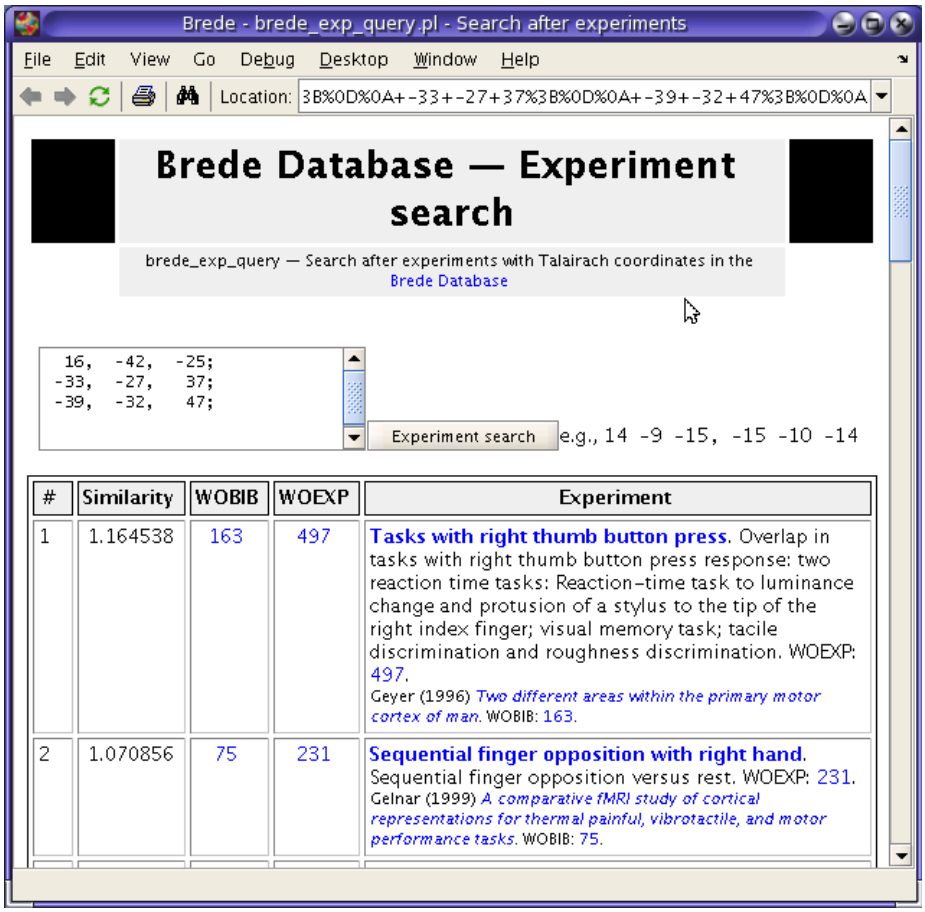

Figure 1.7: Experimental Brede query - result displayed in a web browser

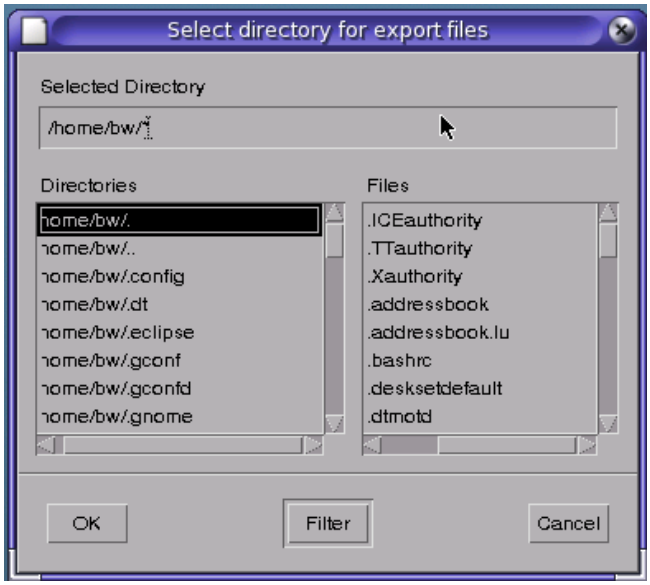

Figure 1.8: Select directory for exported files dialog