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Usability of Visual Information Retrieval Metaphors for Object-Oriented Databases

Ph.D. Thesis – **abstract only**

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♥ to my Family ♥

Abstract

The methods for information retrieval must be adequate to a kind of data that are to be queried, as well as to a kind of target users. This observation is especially important in case of naive users (computer non-professionals), who are not able (or just do not want) to learn sophisticated methods requiring significant learning effort and high computer education. In contrast to retrieval engines addressing raw text data such as Google (that are indeed very easy for naive users), a lot of novel technologies address structured data (e.g. XML/RDF repositories or object-oriented databases). Thus there is a need for user interfaces allowing querying and browsing such structured data. However naive users cannot deal with sophisticated retrieval methods and metaphors, especially using keyboard-oriented languages such as SQL, OQL or XQuery, and script languages for formatting retrieval output. Usually, such users prefer working with some kind of a user-friendly visual interface. The problem is amplified by the fact that the amount of data to work with and nowadays users' expectations regarding application's functionalities and easiness of use, are much bigger than in the past.

In this dissertation we propose a set of graphical metaphors, which are the result of our investigations into easy in use and yet powerful visual querying and browsing capabilities. The research has been done on the basis of a working prototype called Mavigator. The basic research thesis that we want to promote is that such an interface must solve five basic issues:

- How to present to the user the data that are to be queried or browsed, and how to limit the user view only to those data that are pertinent to his/her current interests?

- Which graphical metaphors are relevant for querying and browsing the data and how the result of the user actions is to be recorded?

- How the result of the querying and browsing is to be presented to the user?

- How the user interface could support user awareness, i.e. how to reduce the danger that the user will be lost after some actions that he/she had performed?

- How to extend existing application's functionality?

All the presented issues are critical in the sense of *usability*, i.e. ability of the interface to be accepted by a wide community of end users. It is likely that neglecting any of the above issues will undermine the sense of building such an interface.

Our implemented solution allows us to make general conclusions concerning this kind of user interfaces with respect of all of the above issues. Because database (XML, RDF) schemas tend to be very complex, the first general thesis is that the user should have the possibility to reduce and customize his/her view on data that are to be queried. We propose the Virtual Schemas module that allows the user to customize database schema, in particular, to change data names, to add new associations, to remove some attributes or classes, etc. The solution is based on views defined in the query language SBQL. As information retrieval and browsing visual metaphors we have assumed intensional navigation (in a schema graph), extensional navigation (in an object graph) and storing intermediate and final querying/browsing results in persistent annotated baskets. The Mavigator's Active Extensions module solves the third of the above issues. It allows the programmer to extend ad hoc existing core functionalities (in particular, to display the retrieval result in any graphical form) through a fully-fledged programming language (in Mavigator - C#). Concerning user awareness we have proposed several methods such as undo functions, recording the history of user work, etc.

The proposed solutions are compared with the state of the art where we have shown that the problem of easy-to-use graphical interfaces is extensively investigated and that we offer new solutions.

More information:

http://www.mtrzaska.com/modules/wfdownloads/viewcat.php?op=&cid=9