A Personalized Visualization Tool for Geo-referenced Information

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ABSTRACT
We are developing a prototype for the visualization of geo-referenced information. The data is organized in several topics. The user interactively selects the geographical region and the topics he/she is interest on. The main features of this prototype are: filtering mechanisms to control the amount of data displayed; representations with different levels of detail selected according to the scale of representation. In order to include semantic criteria to reduce the amount of data to display, we use a degree of interest function.

Categories and Subject Descriptors
H.5.2 [**Information Interfaces and Presentation**]: User Interfaces – *graphical user interfaces.*

General Terms
Design, Experimentation.

Keywords
Visualization, filtering mechanisms, degree of interest function.

1. INTRODUCTION
Our goal is to display geo-referenced information organized in several topics. We adopted the approach described in [1] using an architecture that will enable the integration with the geo-search engine that is being developed by XLDB Group [2].

The user interactively selects which topics he/she is interested on. In addition, the user can zoom and pan over a map in order to select a geographical region. The available data is displayed on the map. However, if there is a large volume of data to display, the image will be unintelligible. So filtering mechanisms are required to reduce the amount of data to display. One filtering mechanisms is to reduce the number of topics selected. But the most important feature is to reduce the number of data displayed according to the users´ interest. To achieve this purpose we have adopted a degree of interest function [3].

2. DEGREE OF INTEREST FUNCTION
The value of a degree of interest function (DOI) in a point x depends on the *a priori* importance of the point, API(x), and on the distance between x and the current focus, y: DOI(x|y)=API(x)-D(x,y) [3].

In our prototype the focus is always the centre of the display area. When the operation mode pan is enabled, the point selected by the user will move to the centre of the display, so the user can change the focus easily. Each topic corresponds to a database table that can have several attributes. So, for each topic, the *a priori* importance corresponds to one of its attributes. To reduce the number of displayed elements, the user interactively selects the range of DOI results.

3. GRAPHICAL REPRESENTATION
In the display area, a map is displayed with different levels of detail according to the representation scale. Over this map, the elements corresponding to the selected topics will be displayed. For each topic, a list of symbolic representations is defined. Each representation has an identifier and is associated with a range of representation scales. Each data element of a given topic is associated with the different representations available for the topic and respective range of scales. The scale of representation is automatically adjusted with zoom operations.

4. ARQUITECTURE
The architecture of the system follows the Internet client/server model and is composed by the following components: Apache Server with PHP support; MapServer - server that renders the maps to display in the user interface; MapScript - library of PHP classes that establishes the communication between Apache Server and MapServer; MySQL database – component used to store a common database with the topic data, and graphical representations scales; PVScript – PHP classes that make the personalization of the information accordingly to the user input and the stored information; Graphical user interface written in PHP and HTML.

5. REFERENCES
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