

Improving Spatial OLAP systems with Chorems

Tutors

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Context

In [4] the authors claimed that the potentialities of chorems (as visual schematized representation of territory from both geometric and semantic points of view) could permeate different and interesting research fields. Indeed, works described in [3, 2] prove to be in support of such an assertion because several domains have been involved by the research carried out so far, concerning chorems and the role they can play as means of (but not limited to) decision making support. In particular, recent results have demonstrated that chorems can be used to both catch a thematic global view of a territory and its phenomena [5], and investigate a single phenomenon by accessing data characterizing it [3]. An example of chorem for France is shown in the following figure.

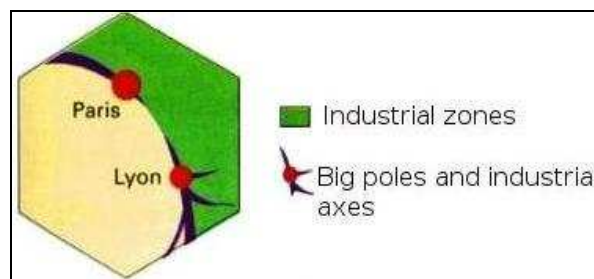


Figure. Example of a chorem for France

On the other hand SOLAP systems [1] integrate OLAP and Geographic Information System (GIS) functionalities in a unique framework in order to take advantage from the analysis capabilities of spatial data. SOLAP redefines main OLAP concepts. In particular, spatial data in OLAP dimensions brings to the definition of spatial dimension, non-geometric dimension, spatial geometric dimension (i.e. members with a cartographic representation) or mixed spatial dimension (i.e. combine cartographic and textual members). When the studied subject of the decision process is the spatial information itself, then the concept of spatial measures must be introduced. Thus, SOLAP systems can be used to summarize huge volume of spatial data.

Goal

The goal of the stage is to carry out supporting users' tasks through advanced solutions and systems, and describe how chorems can be used to perform analysis about spatio-temporal phenomena through a simple and immediate approach which extends visualization and interaction capabilities of Spatial On-Line Analytical Processing (SOLAP) systems. As a matter of fact, user's interaction with the topmost level of a SOLAP application is usually meant to display information by outputting results in order to visually analyze them.

Plan

The student has to:

1. Study chorems types and their formalization using ChorML [2,3,4,5]

2. Propose a first integration of the OLAP tool JPivot and Mapserver (using past work of tutors)
3. Propose mapping of chorems into the spatio-multidimensional model
4. Extend the system with the chorem visualization

Skills

The following skills are welcome:

1. ROLAP Server,
2. MDX
3. JSP, PHP
4. Postgres/PostGIS
5. Mapserver

Location

Cemagref

Campus des Cézeaux, 63172 AUBIERE Cedex , France

Remuneration

417 € per month

Reference

[1] Bédard Y (1997) Spatial OLAP. Proc. of 2nd Forum annuel sur la R-D, Géomatique VI: Un monde accessible, 13-14 November, Montréal, Canada

[2] D. De Chiara, V. Del Fatto, R. Laurini, M. Sebillio, G. Vitiello “Visual Analysis of Spatial Data through Maps of Chorems”, in Proceedings of the 15th International Conference on Distributed Multimedia Systems – Workshop on Visual Languages and Computing VLC2009, San Francisco (USA), 10-12 September 2009. KSI Skokie Illinois, pp. 295-300

[3] Del Fatto V., Laurini R., Lopez K., Sebillio M., Vitiello G., “A chorem-based approach for visually synthesizing complex phenomena”, in *Journal of Information Visualization*, vol. 7, n. 3, 2008, pp. 253-264. Andrienko G., Andrienko N., Dykes J., Fabrikant S. and Wachowicz M. (Eds). Palgrave Macmillan Journals.

[4] Laurini R., Milleret-Raffort F., and Lopez K., “A Primer of Geographic Databases Based on Chorems”. Workshop on Reliability in Decentralized Distributed Systems (RDDS) LNCS 4278, pp. 1693 – 1702, 2006. © Springer-Verlag Berlin Heidelberg 2006.

[5] Coimbra Rocha A. (2008). “ChorML: XML Extension for Modeling Visual Summaries of Geographic Databases Based on Chorems”. Thèse de Master, INSA de Lyon, 2008.