Detection, Integration And Correction Methods For Homologous Geographic Objects

Bilal Berjawi - LIRIS
Outline

• **UNIMAP Project**
  • General Information
  • Definitions
  • Issues
  • Multidisciplinary

• **Current Methods for POIs Integration**
  1. Practitioners Method
  2. Computer Science Method
  3. Collaborative Method

• **Conclusion**
# UNIMAP Project - General Information

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<tr>
<th>Project</th>
<th>Integration of Location-Based Services of Several Providers</th>
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<tr>
<td>Financed By</td>
<td>LabEx Intelligences des Mondes Urbains (IMU)</td>
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<td>Duration</td>
<td>03/2013-02/2016</td>
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<th>Consortium</th>
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<tr>
<td>LIRIS - Database CNRS UMR 5205</td>
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<td>Tourist offices of Rhône-Alpes</td>
<td>Rhône-Alpes Tourisme, OnlyLyon Tourisme et Congrès, Saint-Etienne Tourisme</td>
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<td>Other partners</td>
<td>LIRIS – GRAMA, Brescia University- Italy</td>
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UNIMAP Project - Definitions

Point of Interest (POI):
is a specific point location that someone may find useful or interesting (e.g. Tour Eiffel)

Location-Based services (LBS):
allow people to find nearby POIs based on their geographic location

Examples of LBS providers:

UNIMAP Project - Issues

Provider 1  
DB1

Provider 2  
DB2

Provider n  
DBn

Maps legends Integration

Spatial Data / Metadata Integration
UNIMAP Project - Issues - Motivation Example

- Positioning
- Attributes names
- Structure
- Legends
- Different values
- Missing values
This presentation only focuses on the POIs integration part of project
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Current Methods for POIs Integration
Practitioners Method

1. Geographic experts visit places on the ground in order to check and validate POIs positioning and attributes

2. Memberships for POIs in tourist companies’ databases
Current Methods for POIs Integration
Practitioners Method - Example

Strategy of SITRA database

Managing:

- Any touristic POI in Rhône-Alpes can apply for a membership
- Each tourist office manages POIs in its area

Using:

- Everyone benefits from SITRA database for personal uses (Web application, Desktop application, API)

Reference: http://www.sitra-tourisme.com/
Current Methods for POIs Integration
Practitioners Method - Analysis

Pros:
- Produces accurate data
- Very efficient for a limited region

Cons:
- Hard to apply in a large area
- Do not guarantee an efficient data updating process
- Expensive method
Current Methods for POIs Integration

Computer Science Method

Helps to detect homologous objects exist in different data sources in order to integrate/correct them.

[Image of a software interface with text and mappings]
Current Methods for POIs Integration

Computer Science Method - Example

Schema matching and ontology matching:

- COMA++ combines various similarity measures to select the correspondences between the schemata
- Cupid uses machine learning techniques to discover these correspondences
- ...

Object matching:

- FEBRL is a common process to remove duplicates in databases
- ...

References:

• David Aumueller and Hong Hai Do and Sabine Massmann and Erhard Rahm. Schema and ontology matching with COMA++. In SIGMOD 2005.
Current Methods for POIs Integration

Computer Science Method - Analysis

Pros:

- Handles large scale data
- Guarantees an frequent data updating process
- Less expensive

Cons:

- Mainly helps in detection of homologous objects
- Not usable by non expert users (Tuning)
- Not yet adapted for geographical homologous objects
Current Methods for POIs Integration
Collaborative Method

1. Data are opened for everybody
2. Everyone can add/edit/delete POIs
Current Methods for POIs Integration

Collaborative Method - Example

Potlatch 2 Editor for OpenStreetMap

Add/Edit/Delete POIs Using web application

Reference: http://www.openstreetmap.org/
Current Methods for POIs Integration

Collaborative Method - Analysis

Pros:
- Public Shared data
- Not expensive
- Data’s size and repartition depend on users contributions (Urban area)

Cons:
- Data’s size depends on users contributions (Rural area)
- Data inconsistency
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Conclusion

- UNIMAP aims at providing LBS in which data and concepts are aggregated from multiple sources

- Issues with heterogeneity at data, schema and legend levels

- State of the art of detection and integration homologous geographic object
  - Practitioners, Computer Science and Collaborative methods
  - Combination method

- Perspectives
  - Use Computer Science method to detect POIs & invent new method to integrate them
  - Evaluate our work by the practitioners
  - Update and correct the results using the Collaborative and Practitioners methods
Thank You For Attention

Any Questions... Just Ask!

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