Mapping-Chains for Studying Concept Shift in Political Ontologies

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Outline

• What is concept-shift
• Why is it interesting to study this?
  – An application in communication science
• How do we study it?
  – Instance-based ontology mapping
  – Experiments and methodological remarks
• Conclusions

Underlying Research Questions

• What are suitable structures for representing mapping chains?
• Can instance-based ontology mapping provide useful mapping-chains expressing concept shift, and
• How can we evaluate those chains?

Women’s role in society?

The city of Berlin
The Phone

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Politics is Networking

Politics is perceived via media

NET Analysis

Media study by Semantic Network Analysis
Communication Scientists at the VU study influence of media on the political opinion
- Election campaigns
  - Thousands of newspaper articles
  - Party manifests
Example studies and findings

- Election campaign study:
  - Who is determining the subjects...
  - Who is teaming up ...
  - Who is more credibility ...
  - Is there internal dispute within parties

Concept shift matters

- Suffragettes said that women’s role in society is unacceptable
- Pope says that women’s role in society is unacceptable

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IBOM

- Instance-Based Ontology Matching

IBOMBIE

- Instance-Based Ontology Matching by Instance Enrichment

Instance enrichment
Once we have a (fake) doubly annotated corpus, we calculate similarity between concepts (e.g., using Jaccard similarity).

**Mapping chains**

**Representing concept shift**

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**Experimental Data: Elections in NL**

<table>
<thead>
<tr>
<th>Year</th>
<th>Articles</th>
<th>Concepts used</th>
<th>Concept manually mapped to existing concepts</th>
<th>Added news concepts</th>
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<tr>
<td>1994</td>
<td>1502</td>
<td>103</td>
<td>154</td>
<td>37</td>
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<td>1998</td>
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<td>80</td>
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<td>2008</td>
<td>5128</td>
<td>580</td>
<td>154</td>
<td>201</td>
</tr>
</tbody>
</table>

+ Thousands of newspaper articles annotated per election campaign

+ Goldstandard (wrt 2006)

**Base Experiments**

<table>
<thead>
<tr>
<th>Year</th>
<th>manually matched</th>
<th>Concepts matched</th>
<th>MRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>154</td>
<td>102</td>
<td>0.47</td>
</tr>
<tr>
<td>2003</td>
<td>201</td>
<td>136</td>
<td>0.58</td>
</tr>
</tbody>
</table>
1st example

- Top 1 chains depend uniquely on confidence values, which are rather dubious at best.
- Top 1 chains are more interesting objects of study when more drastic shifts occur.

1st discussion

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- Top 1 chains are more interesting objects of study when more drastic shifts occur.

2nd example & discussion

- Association versus similarity in extensional methods?

3rd & 4th example

- Communication scientists find this useful
- Once a chain has gone wrong, it is useless

3rd and 4th discussion

- Communication scientists find this useful
- Once a chain has gone wrong, it is useless

Final example: kites

- Restricts false chains
- Branching factor matters
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Conclusion

• “Anecdotal” evidence that:
  – Concept-shift matters
  – Ontology Matching can capture that shift at least partially
  – Mapping chains are useful structures
• Open question
  – Association versus similarity
  – Evaluation methodology