A Resemblance Study of Test Collections for World-altering Semantic Web Services

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Outline

• Introduction
• Test Collections
  – Available Test Collections
  – Portal
  – Web Crawlers
• Contests and Challenges
• Related Work
Semantic Web Services

• Web services described and annotated with machine-processable semantics
Semantic Web Services Categories

- **Categories**
  - Information Providing
    - weather conditions, news provider
  - World-altering
    - Credit card charging, Booking tickets
Semantic Web Services Categories, cont.

- Difference
  - World-altering services affect
    - something in the real-world (world-altering effect)
    - knowledge of the agent (knowledge effect)
World-altering Web services

- **Precondition**: A world state needed before the execution of a service
- **Effect**: A world state generated after the execution of a service
Test Collections

- A gathering of a reasonable number of services
- Production
  - Manual
  - Automatic
- A practical Web service testing approach to be applicable in the real-world needs realistic test data
- An ontology of used concepts is required
SWS-TC

- Generated manually by Ganjisaaffar and Saboohi in 2006
- 241 semantic services, mostly real Web services
- 30 world-altering services (SWRL)
- A unified ontology
OWLS-TC

- Klusch, Kapahnke et al. developed it in 2005
- Actively being improving, 4th version Sep. 2010
- 1083 semantic services in OWL-S
- 54 world-altering services (SWRL, and PDDL)
SAWSDL-TC

- Klusch and Kapahnke
- It was first converted from OWLS-TC
- SAWSDL
- The number of world-altering services in this test collection is unknown
100 Services

• Ayse Basar Bener, Volkan Ozadali, and Erdem Savas Ilhan created the Test Collection
• Specific to their research (Not a public TC)
• 100 semantic services in OWL-S
• 39 world-altering services (SWRL)
Fractions of two service categories

<table>
<thead>
<tr>
<th>Service Category</th>
<th>SWS-TC</th>
<th>OWLS-TC (SWRL)</th>
<th>OWLS-TC (PDDL)</th>
<th>100 Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>World-altering</td>
<td>30 (12%)</td>
<td>54 (5%)</td>
<td>54 (5%)</td>
<td>39 (39%)</td>
</tr>
<tr>
<td>Information-providing</td>
<td>211 (88%)</td>
<td>1029 (95%)</td>
<td>1029 (95%)</td>
<td>61 (61%)</td>
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<tr>
<td>Total</td>
<td>241</td>
<td>1083</td>
<td>1083</td>
<td>100</td>
</tr>
</tbody>
</table>
## Test Collections' Summary

<table>
<thead>
<tr>
<th>Test Collection Name</th>
<th>SWS-TC</th>
<th>OWLS-TC (SWRL)</th>
<th>OWLS-TC (PDDL)</th>
<th>SAWSDL-TC</th>
<th>100 Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of services</td>
<td>241</td>
<td>1083</td>
<td>1083</td>
<td>1080</td>
<td>100</td>
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<tr>
<td>Number of services with</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Precondition</td>
<td>10</td>
<td>158</td>
<td>158</td>
<td>Unknown</td>
<td>41</td>
</tr>
<tr>
<td>Result (Effect)</td>
<td>30</td>
<td>54</td>
<td>54</td>
<td>Unknown</td>
<td>39</td>
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<tr>
<td>Both</td>
<td>7</td>
<td>46</td>
<td>46</td>
<td>Unknown</td>
<td>39</td>
</tr>
<tr>
<td>Last version</td>
<td>1.1</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ontology</td>
<td>A Single, Unified</td>
<td>Multiple</td>
<td>Multiple</td>
<td>Multiple</td>
<td>Multiple</td>
</tr>
<tr>
<td>Semantic Service Description Language</td>
<td>OWL-S 1.1</td>
<td>OWL-S 1.0, OWL-S 1.1</td>
<td>OWL-S 1.0, OWL-S 1.1</td>
<td>SAWSDL</td>
<td>OWL-S 1.1</td>
</tr>
<tr>
<td>Precondition and Result (Effect) Language</td>
<td>SWRL</td>
<td>SWRL</td>
<td>PDDL</td>
<td>Not applicable</td>
<td>SWRL</td>
</tr>
</tbody>
</table>
OPOSSum

• An online portal for semantic services
• It assembles data from SWS-TC, OWLS-TC and some other sources
• It presently contains over 2800 descriptions for more than 1500 services
• Not being improved and updated
• No facility to search for world-altering services
Web Crawlers

- Traditional Web Services
  - Seekda’s Web Services portal (28000 services)
- Semantic Services
  - SouSuo
  - Our crawler
Contests and Challenges

- SWS Challenge
- S3 (Semantic Service Selection)
  - OWLS-TC, SAWSDL-TC
- IEEE WSC (Web Service Challenge)
  - Test set generator
- SEALS – SWS
  - OWLS-TC, SAWSDL-TC
Conclusion

- There is a need for a Test Collection containing a reasonable number of service descriptions in different formalisms including both information-providing and world-altering services, especially:
  - OWL-S described services with SPARQL
  - A test collection for WSMO/WSML
  - A test collection for WSMO-Lite
Related Work

• (U. Kuster, and B. Konig-Ries, 2008) elaborates the needed features of test collections applicable for an evaluation of semantic Web service approaches.
  - Their paper lacks the required characteristics of world-altering services to be included in test collections.

• To the best of our knowledge, there is not any other similar work on test collections of SWS.
Q & A