WSColab: Structured Collaborative Tagging For Web Service Matchmaking

Maciej Gawinecki

Curriculum: Computer Engineering and Science

Tutor: Prof. Giacomo Cabri

Research done in collaboration with:
Marcin Paprzycki and Maria Ganzha
Systems Research Institute, Polish Academy of Sciences

International Doctorate School in Information and Communication Technologies

Università degli Studi di Modena e Reggio Emilia
Real World Problem

• Help user in finding Web service realizing required functionality

\[ \text{calculate}(\text{US\_zip\_1}, \text{US\_zip\_2}) \]

Application \quad \text{distance} \quad \text{Missing Web service}
Scale of the Problem

- Number of Web services grows
- Now: 28,451 services online to search

Number of service found by SeekDa.com during the last 39 months
Approach #1: Finding Interface-Compatible Service

Service Request

\[
\text{calculate} \quad \begin{cases}
\text{US\_zip\_1}, \\
\text{US\_zip\_2}
\end{cases} : \text{distance}
\]

Service Candidate

\[
\text{getDistance} \quad \begin{cases}
\text{longitude\_1,} \\
\text{latitude\_1,} \\
\text{longitude\_2,} \\
\text{latitude\_2}
\end{cases} : \text{miles}
\]

Problems:

- missing functionality semantics [Dong2004]
- vocabulary problem [Furnas1987, Dong2004]
Approach #2: Browsing Web Service Categories

- More precise than interface compatibility test
- Problems:
  - complex for a user
  - no authority for classifying - who classifies?
from Real World Problem...

- Help user in finding Web service realizing required functionality
- Current approaches fail

...to Research Problem

- Find a schema for effective classification of Web services of similar functionality
Solution: User Classifies Service Documentation with Tags

Returns an estimated distance between two given locations. Works worldwide.

This service has the following inputs:
- "Location1" of type geographic point: Latitude and longitude of the first location.
- "Location2" of type geographic point: Latitude and longitude of the second location.

This service has the following outputs:
- "distance" of type distance: The estimated distance between the given locations in miles, km and feet.
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Scaling Solution: *Structured Collaborative Tagging*

- For: *behaviour*, **input** and **output** of a service

- Users → Behaviour tags → Web services
  - distance
  - distance_calculator
  - geographic
  - length
  - US
  - CalculateTrip_geonames.org
  - GetDistance_serviceobjects.com
Collecting Tags: Web Service Tagging Portal

http://mars.ing.unimo.it/wscolab/new.php
Collecting Tags: Results

- 12 days of experiment
- 50 services from Jena Geography Dataset [Kuster2009]
- 27 tagging users:
  - our colleagues
  - community related to SOA, software engineering
- 2541 annotations collected in total
Finding Web Services: Returning Services of Matching Tag Cloud

- categorization-based matchmaking

In

- zip, zip_code, postal_code, location, location_zip_code

Out

- distance US, distance_in_km

- distance, miles, driving_distance, distance_in_miles

- distance_calculator, geographic_length

Service Request

Service Candidate
from Real World Problem...

- Help user in finding Web service realizing required functionality
- Current approaches fail

...to Research Problem

- Find a schema for effective classification of Web services of similar functionality

...to Evaluation of Solution

- Is my classification schema REALLY effective for finding Web services of similar functionality?
Evaluation: S3 Contest


- 6 different matchmakers using different formalism to describe Web service functionality

- Evaluated over the same test collection:
  - 50 service candidates
  - 9 service requests
Effectiveness (nDCG curves)

- A user can find relevant services faster with WSColab than with other matchmakers
A user can **actively interact** with WSColab matchmaker to find the right Web service.
Many Thanks to Taggers :-)

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THANK YOU!

- Questions?

- Wanna tag?
  http://mars.ing.unimo.it/wscolab/new.php

- Want to learn more
  http://www.ibspan.waw.pl/~gawinec/wss/wscolab.html