Web Service Competition: A New Approach to Service Selection

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Web Services

Business Web Service

• (Server-site) Data Service: processes client data completely at the server site.
• (Client-site) Task Service: processes client data partially or completely at the client site using the enterprise agent.

Task Services

• We define “Task” formally as a triple:
  \[ \text{Task} = \langle \text{Task Model}, \text{Task Knowledge}, \text{Task Data} \rangle \]
  - **Task Model**: what to do (Business Process Models)
  - **Task Knowledge**: how to do it (Business Rules & Actions)
  - **Task Data**: resources (Business Data)

  - **Task Service** performs a task at the client site; it implies that some of the task data should remain at the client site since they can not be transmitted efficiently to the provider.
    - Privacy and security issues
    - Large client data files

Extended SOA Model

- **Service Representative (SR)** is a software agent that performs a task on behalf of a service provider at the client site.

Currently Web Services are Server-Side.
• Not an efficient choice for:
  - Sensitive Client Data
  - Large Volume Client Data
  - Real Time Client Data

Web Services: Promising but not Conclusive

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Cloud Computing and Mobile Devices promoting web service applications.
Motivations – Service Discovery

1. Service descriptions that are provided by service providers may not be trustworthy or accurate enough.

2. Service descriptions are usually expressed globally, while service features such as performance and accuracy are different for different clients, depending on their needs and contexts.

3. Less well-known services are not given an opportunity to show their features.

4. Service features vary with different measures and are obtained under different situations. Therefore, they cannot be simply and fairly compared based only on their descriptions.

Web Service Competition

High level view of the proposed web service competition.

Service Competition Desk

WS-Competition Architecture

The competition desk holds a competition among the service representatives of the candidate services using the test cases and policies submitted by the client.

Service Representatives

Task Service Competition

Candidate Services

1. Pixel-based SD
2. Block-based SD (using color features)
3. Block-based SD (using texture features)

Test Cases

(image, expected result)

Competition Policies

<table>
<thead>
<tr>
<th>Factor</th>
<th>Weight</th>
</tr>
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<tbody>
<tr>
<td>Accuracy</td>
<td>0.8</td>
</tr>
<tr>
<td>Time</td>
<td>0.2</td>
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Experiment 1

Experiment 2

Task Service Representative
Task Service Competition - Results

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<td>(face1, ..., target face) -&gt; (Yes/No, confidence)</td>
<td>Accuracy, Confidence, Competition factors, Time</td>
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Data Service Competition

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Discussions

1. The proposed web service competition does not intend to replace the traditional web service selection approaches.
2. Service competition can not be offered free of charge for the pay-by-use services because of costs associated with tests of the competition desk. However, some services provide free trials or test versions of their web services which can be used by the competition desk.
3. The competition desk can be provided as a web service search engine where the service client sends a query request including the category of services as well as the search criteria (competition factors).
4. The introduction of an actor in the SOA model and the associated tests may increase the required time for service selection. However, in most of the cases, service selection includes a long-term agreement between the service client and the service provider.

Thank You