Chapter - 10
Applications of Semantic Web

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Outline

- Overview
- Semantic Web Applications
- Semantic Web Services
- Semantic Search
- e-Learning
- Semantic Bio-Informatics
- Enterprise Application Integration
- Knowledge Base
Overview

Web is always expanding …

Data on December 2013,

- 14.3 Trillion - Webpages, live on the Internet.
- 48 Billion - Webpages indexed by Google.Inc.
- 14 Billion - Webpages indexed by Microsoft’s Bing.
- 672 Exabytes - 672,000,000,000 Gigabytes (GB) of accessible data.
- 43,639 Petabytes - Total World-wide Internet Traffic in the year 2013.
- Over 9,00,000 Servers - Owned by Google.Inc, the Largest in the world.
- Over 1 Yotta-byte - Total data stored on the Internet (Includes almost everything).

Overview

● Increase in Size of Web => Increase in Information Content => Difficult to
  ○ Search
  ○ Access
  ○ Manage
  ○ Maintain

● Solution: Making Machine-processible semantic
Semantic Web Applications

- Web Based applications that take the advantage of semantic content
  - content with information + metadata

- How to make Machine-processible?
- How to make transfer content among different applications?
Semantic Web Applications

- Web Based applications that take the advantage of semantic content
  - content with information + metadata

- How to make Machine-processible? \(<=\) Ontology and Logic Languages
- How to make transfer content among different applications? \(<=\) XML + RDFS
  - XML provides Syntactic Interoperability
  - RDF(s) provides Semantic Interoperability
Applications of Semantic Web

- Semantic Web Services
- Semantic Search
- e-Learning
- Semantic Bio-informatics
- Enterprise Application Integration
- Knowledge Base
Semantic Web Services

- Brings data and program together
- Interoperability protocols

Currently, it involves human integration.
- Semantic Web vision: to automatic this process through the user of Machine Processing.
- OWL-S can meet this goal.
Semantic Search

Two Approaches

- Semantic Web with metadata
- Latent Semantic Indexing

Semantic web Metadata:

- Semantic Network using RDF + OWL
- In semantic Network, meaning of content is better represented and logical connections are formed between related content.
Semantic Search - LSI

Examines other documents to see similar Words.

SQ: fast Italian cars

Similarity:

Car or Cars => automobile , vehicle, roadster

Fast => Powerful, speedy

Italian : Ferrari or Lamborghini
eLearning

- **Moved from Scattered Applications to Collaborative Environment**
  - Important aspects it to achieve interoperability - Semantic Web

- **Recommendation of Personalized Information**
  - Based on student/teacher preferences, knowledge etc

- **Tools - IRC**
  - Use of Semantic Web - ability to Work Across distributed environment
Semantic Bio-informatics

● Semantic web- a tool for life scientists
● W3C announced formation of HCLSIG (Health Care and Life Science Interest Group)
  ○ aims to help life scientists tap the potential benefits of using Semantic web technology
  ○ Develops and applies standard semantic web specifications related to healthcare and life science problems.

  ○ a standard for data exchange format for metabolic, signaling, genetic regulatory and genetic pathway information
Enterprise Application Integration

- Success of large-scale, industry-wide enterprise integration efforts depends on the enterprise application integration (EAI) standards.

<table>
<thead>
<tr>
<th>Current Standard</th>
<th>Semantic Web Standard</th>
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<tbody>
<tr>
<td><strong>Currently Standards: XML based - Syntax Based</strong></td>
<td><strong>OWL-DL language is employed to formally define business document content models</strong></td>
</tr>
<tr>
<td>○ limited reasoning capabilities supported by syntactic structure</td>
<td>○ Allows automated Reasoning method provided by DL reasoner</td>
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<tr>
<td>○ Requires Human interaction</td>
<td></td>
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Knowledge Base

Knowledge Based System  = Knowledge Base + Inference Engine

KB: facts about the world

IE: reason about those facts and user rules to deduce new facts

- Cycorp - intend to sell products and services using its inference engine
- OpenCyc - Open Source, largest and most complete knowledge base
  - www.opencyc.org
Thank You