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).

Source: http://www.factshunt.com/2014/01/total-number-of-websites-size-of.html

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
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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.

- Biological Pathways Exchange (http://www.biopax.org/)
  - 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.

Current Standard	Semantic Web Standard
- Currently Standards: XML based - Syntax Based - limited reasoning capabilities supported by syntactic structure - Requires Human interaction	- OWL-DL language is employed to formally define business document content models - Allows automated Reasoning method provided by DL reasoner

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