Introduction to Semantic Technologies

Semantic Web, Ontologies, Semantic Technologies

Semantic Technologies

"Semantic technologies" (ST) is a general term for any software that involves some kind and level of understanding the meaning of the information it deals with.

Examples

 A database that will return Ivan as a result of a query for "?x relativeOf Maria", when the fact asserted was "Maria motherOf Ivan"

Examples (2)

- A search engine that can match a query for "bird" with a document mentioning "eagle"
- A navigation system that is more intelligent than the one we already have

Understanding

- Very diverse techniques used to deliver "understanding"
- **Different kinds of understanding** (or "intelligence") of different types of information could be targeted, e.g.:
 - What are the relations between two persons, based on web and corporate documents?
 - Which chemical compounds have specific side effect, when used to cure hart diseases, based on clinical studies and biomedical databases?

Understanding (2)

- What matters for ST are efficiency and robustness
 - Is it cheaper and faster to solve a problem with ST?
 - Many of the tools are young and immature (compared to, say, RDBMS)
 - Implementing ST solutions often requires higher initial investment

Sceptical Point of View

 There is nothing you can do with ontologies that cannot be done without them

BTW, there is also nothing you can do on Java than cannot be done on C++ or Assembler

Positive Point of View

 "Semantic Web technologies could revolutionize enterprise decision making and information sharing"

Positive Point of View (2)

"ST can genuinely enhance your organization's ability to find, integrate, and store information. The time has come for application development professionals to build a pragmatic strategy for slowly integrating this new way of thinking into those projects where information provides the greatest value"

Semantic Web

- SW is being developed by the W3C, in collaboration with a large number of researchers and industrial partners
- The Semantic Web is the abstract representation of data on the WWW, based on the RDF and other standards
- <u>http://www.w3.org/2001/sw/</u>,
 <u>http://www.SemanticWeb.org</u>

Semantic Web (2)

 "The Semantic Web is an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation." [Berners-Lee et al., 2001]

Semantic Web (3)

- The spirit:
 - Automatically processable metadata regarding:
 - the structure (syntax) and
 - the meaning (semantics) of the content
 - Presented in a standard form
 - Dynamic interpretation for unforeseen purposes

Semantic Web (4)



Semantic Web vs. WWW



Semantic Web is a Model of the World



Annotations

Embedded markup





Standoff References



Hyperlink

Document-level

Character-level