

# Adding semantics to the Web

February 15 2005

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"The Web will become more than what we see on our computer screens, it will become a place where computers interact with each other and where meaning is attached to information." That is the vision behind a cutting-edge Semantic Web project.

For Richard Benjamins, the coordinator of the IST project ESPERONTO, the future of the Semantic Web lies in it becoming "something akin to ambient intelligence" with the meaning of digital information understandable not only by humans but by any computer-embedded device.

"This will reduce information overload, and make information more easily accessible to more people at lower cost," Dr Benjamins, Director of R&D at ISOCO in Spain, notes.

## The ESPERONTO toolkit

The ESPERONTO project is due to end in February having developed tools to allow anyone to upgrade normal Web content into Semantic content by making data machine-readable, while providing applications for end-users to be able to use this enhanced content.

"In essence we take non-structured digital information and turn it into structured information," Benjamins says. "We developed a knowledge parser that reads texts and finds out what they mean. For example it can read an article on CORDIS and see a person's name and then automatically link that name to information about the person, projects they have worked on, or articles they have published..."

At the infrastructure level, the project also developed a unified query interface that acts as an intermediate layer between different ontologies to ensure that content presented in any format can be interpreted and used, including multimedia and multilingual information. It also developed a tool to allow semantic data to be continuously and automatically updated – “one of only five or six such commercial systems in the world,” according to the coordinator.

## **Effective use of data**

ESPERONTO has gone much further than just creating semantic content, however, it has also provided tools to use that data effectively in a wide range of scenarios.

“From the user point of view one result is semantic search with a natural language interface that allows users to search for content based on meaning and not on keywords - it is a question and answer system that provides you with an answer rather than a list of documents,” Benjamins explains. “If you ask the search engine what is the gross domestic product of this country, it will come back to you with the answer to that question rather than documents containing those words.”

A similar technique has also been employed by the project to create a Semantic Web portal where the content is not just a group of interlinked Web pages but a structured collection of data that users can navigate semantically, something that is particularly useful in the case of large portals and databases with vast amounts of information.

## **ESPERONTO in action**

The ESPERONTO tools were validated in three test cases, covering a broad sample of application areas, which the project partners see as key

markets for Semantic Web technology.

“One involved deploying the system at the Residencia de Estudiantes in Madrid, a cultural institution with a lot of historical information dating from the time when artists and authors stayed there. Much of this content has not been available to the public and has only recently been digitalised,” Benjamins explains. “We created a 3D visualisation portal that allows users to navigate between the content based on the authors and artists’ relationships with each other. It lets users determine who wrote or painted what and when, and who inspired whom. The Residencia has included this technology in their three-year strategic plan and has committed itself to disclosing its cultural content through this method.”

The two other case studies focused on enhancing information about research funding opportunities available on a portal run by the Catalan regional government, and on providing information gathering services in the pharmaceutical industry to identify possible new applications of existing drugs and therapies as well as hypothesise about new treatments for unmet medical needs. In both cases the trials proved the advantages of using Semantic Web technology as a way to save time and money.

“By enriching existing content and keeping it updated automatically, we are providing a money saving solution because companies and institutes do not need to have employees working full time to search for information and keep content up to date,” the coordinator says.

“Semantic Web technology in this regard is not so much about adding new features - even though it does that – it is about reducing the time and money spent on acquiring and finding the data you are looking for.”

For Benjamins those advantages will be the major incentive for Semantic Web technology to be adopted on a broad scale, on a short to mid term.

“I believe it will evolve along the lines that the existing World Wide Web has,” the coordinator says. “First with researchers using and developing it; then early adopters being pioneers in employing the technology - I expect we may have at least one success story in that area within a year - and then, once they have proven its value, it will become mainstream.”

Source: IST Results

Citation: Adding semantics to the Web (2005, February 15) retrieved 10 April 2024 from <https://phys.org/news/2005-02-adding-semantics-web.html>

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