SEWASIE

Semantic Webs and AgentS in Integrated Economies

Introduction

SEWASIE is implementing an advanced search engine that provides intelligent access to heterogeneous data sources on the web via semantic enrichment. This can be thought of as the basis of structured secure web-based communication. SEWASIE provides users with a search client that has an easy-to-use query interface, and which can extract the required information from the Internet and to show it in a useful and user-friendly format. From an architectural point of view, the prototype will provide a search engine client and indexing servers and ontologies.

There are many benefits to be had from such a system. There will be a reduction of transaction costs by efficient search and communication facilities. Within the business context, the system will support integrated searching and negotiating, which will promote the take-up of key technologies for SMEs and give them a competitive edge.

The Business Scenario

Throughout Europe, much of the industrial fabric is made of small and medium-sized enterprises (SMEs) in fields such as agriculture, manufacturing, commerce and services. For social and historical reasons, these tend to aggregate into sectorial clusters in various parts of respective countries. Today, this kind of economic organization is threatened by globalisation.

One of the keys to sustainability and success is being able to access information. This could be a cheaper supplier, an innovative working method, a new market, potential clients, partners, sponsors, and so on. Current Internet search tools are inadequate because they not only are they difficult to use, the search results are often of little use with their pages and pages of hits.

Suppose an SME needs to find out about a topic - a product, a supplier, a fashion trend, a standard, etc. Suppose, for example, a search is made for ‘fabric dyeing processes’ for the purpose of finding out about the disposal of the dyeing waste material. A query to www.google.com for ‘fabric dyeing’ listed 540 hits at the time of writing, which related not only manufacturers of fabric dyeing equipment, but also the history of dyeing, the dyeing technology, and so on. Eventually a useful contact may be found, and the search can continue for relevant laws and standards concerning waste disposal. But is it *law* or the *interpretation* of the law? What if the laws are of a different country where the practices and terminologies are different?

Users need an easy-to-use interface to the search system, one that is usable by non-expert users and with poor network connections. The main requirement is to get structured results obtained from an interpretation of vague queries followed by some filtering techniques based on designer rules and the acquired experiences. For instance, starting from a request simply constituted by the keyword “punch” the engine should answer with one or more documents containing information in an easy-to-accessible format such as sellers, prices, manufacturers, technical literature on its use, importer and so on. Of particular interest for products and manufactures is to know if there are goods at low price or if there are auctions, or other negotiation mechanisms, for making the purchase.

The SEWASIE Idea

SEWASIE (SEmantic Webs and AgentS in Integrated Economies**)** will design and implement an advanced search engine that provides access via a machine-processable semantics of data, which can form the basis of structured web-based communication. Tools and methods will be developed to create and maintain multilingual ontologies, with an inference layer grounded in W3C standards (XML, XML Schema, RDF(S)), that are the basis for the advanced search mechanisms; these will provide the terminology for the structured communication exchanges.

Search results will be personalised and visualised according to users’ preferences. The system will be an open and distributed architecture based on intelligent agents (brokers, mediators and wrappers), and will accommodate scalability and flexibility issues such as: the ability to fit in changing and growing environments; to interoperate with other systems while offering one central point of access to the user, etc.

Special Query Agents will support users when querying heterogeneous web information sources. The query is sent to a query agent that processes and answers the query moving through the SEWASIE information nodes in order to retrieve the information requested by the user. Information nodes are independent components that semantically enrich existing data sources by linking the data to ontologies and other metadata. The systems will also be capable of real-life business evaluation of the results, striving to develop a system and tools which not only solve the problem, but do so in a usable, marketable way.

Specific objectives

SEWASIE has the following specific objectives:

To develop an agent-based, secure, scalable and distributed system architecture for semantic search (ontology based) and for structured web-based communication (for electronic negotiation).

To develop a general framework responsible for the implementation of the semantic enrichment processes leading to semantically-enriched virtual data stores that constitute the information nodes accessible by the users. The created ontology must have a multilingual interface, based on a logical layer and coded using widespread W3C standards.

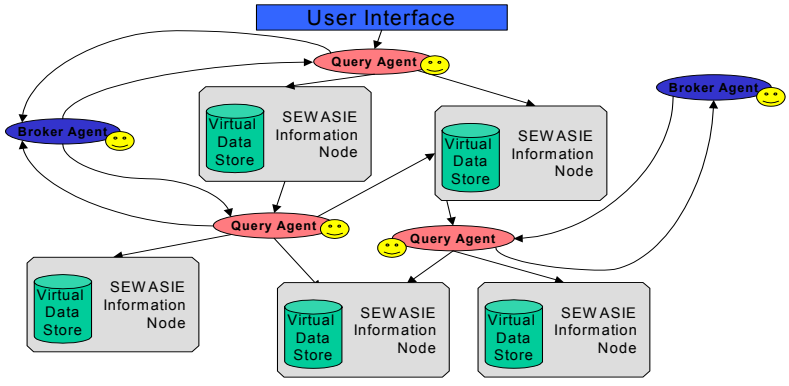
To develop a general framework for query management and information reconciliation taking into account the semantically enriched data stores. First, commonalities among queries have to be detected, then the relevant virtual data stores responsible for answering parts of the queries determined and the queries accordingly split. Finally, the sub-answers have to be combined in order to provide the user with an overall answer to the original query.

To develop an information-brokering component that includes methods for collecting, contextualising and visualising semantically-rich data. To obtain these result, intelligent information filtering and knowledge guidance services have to be developed on the basis of semantic web technologies. Structured data has to be linked to semi- or unstructured data via ontologies. The collected data has to be visualised to show related documents and search result contexts for the purpose of financial control.

To develop structured communication processes that enable the use of ontologies. The communication tool enables structured negotiation support for human negotiators engaging in business-to-business electronic commerce and employing intelligent software agents for some routine communication task.

To develop end-user interfaces for both the semantic design and the query management. The first is a tool supporting the design, the management, and the storage of the semantic information associated to virtual data stores together with a conceptual modelling methodology associated to the devised data model. The latter is a tool for end-user query management and intelligent navigation exploiting the semantic information associated to virtual data stores and to the global virtual view.

Image



The SEWASIE Virtual Network

Results

- Web site project: www.sewasie.org
- **participation/organisation of conferences and workshops**:

Luxembourg, 15 May 2002, Knowledge Technologies Workshop organised by INFSO/D5.
Andreas Becks, FhG-FIT (Sankt Augustin, Germany) presents:
'Research Directions for Integrated Expertise Management'.

Luxembourg, 16 May 2002, Knowledge Technologies Workshop organised by INFSO/D5.
Semantic Web Projects Day:
Sonia Bergamaschi, Universita' di Modena e Reggio Emilia (Italy) presents:
'SEWASIE Project'.

Bologna, 15 July 2002, International Workshop on Agents and Peer-to-Peer Computing (AP2PC 2002).
Sonia Bergamaschi, Universita' di Modena e Reggio Emilia (Italy) presents:
'Peer to Peer Paradigm for a Semantic Search Engine'.

Project Facts and Consortium Information

Project No:	**IST-2001-34825**
Start Date:	***01/05/2002***
End Date:	***30/04/2005***
Key Action 3 Area:	**Information Access, Filtering, Analysis and Handling**
Total Cost:	**€ 2,978,281**
EC Contribution:	**€ 1,999,679**
Project Type:	**Shared-cost RTD**
Project Objectives:	**To develop a distributed agent-based architecture of semantic search and communication using community-specific multilingual ontologies.** **To equip ontologies with an inference layer grounded in W3C standards.** **To develop prototypes that meet the needs of SMEs in a EU context** **To obtain practical experience (user requirements, potential added value, risks etc.).** **e-commerce professionals**
Keywords:	**Ontologies** **Semantic web technologies**
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Project Website:	***www.sewasie.org***