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Semantic Web-based Information Management and Knowledge Sharing for Innovative Product Design and Engineering

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Requirements

The fact that several user groups have different conceptualizations and terminologies for a shared domain is often an obstacle for successful collaboration of specialist departments. An example here is the cooperation of designers and engineers in the automobile industry. Although working in the same domain these different user groups have totally different backgrounds and use different terminologies to talk about things like cars, for example, as depicted in Figure 1.

Technology

The WIDE System tries to handle different terminologies using technologies from the domains of Knowledge Engineering and Semantic Web. By making use of metadata, semantic annotation of documents and ontologies, user queries are interpreted and automatically connected to the corresponding information sources. The results for the query stemming from different information sources are then being integrated on a semantic level.

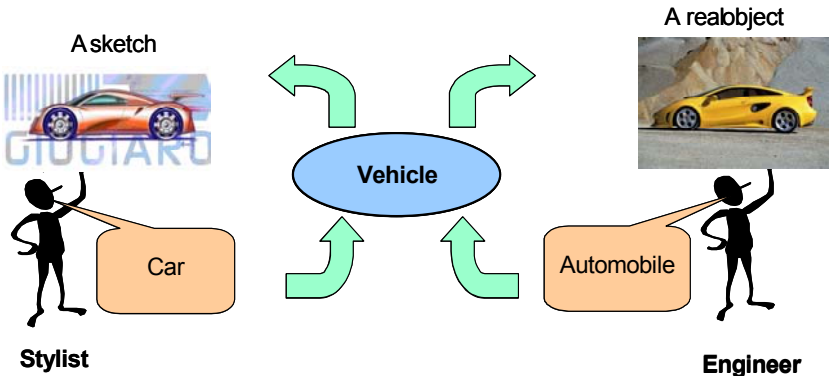

Fig. 1 WIDE Motivation

Both kinds of users usually spend a lot of time for the search of information in data pools originating from the other user's discipline. Here the use of conventional information retrieval technology does not support the semantics of the application task. The WIDE system tries to bridge the gap between different user groups by offering them an easy and effective way to access commonly used information sources without the need to adapt to a special terminology that is not natural for them.

In Fig.2 a sketch of the system architecture together with the main innovation aspects of WIDE is outlined. Through the User Interface subsystem the user introduces queries and navigates through the information space. The Meta Level subsystem semantically processes queries and results using an internal domain ontology, thesauri and dictionaries. The Content Level subsystem handles the storage and retrieval of content as well as annotation meta data and manages external information sources.

Project partners

Fraunhofer Institut Graphische Datenverarbeitung

GIUGIARO

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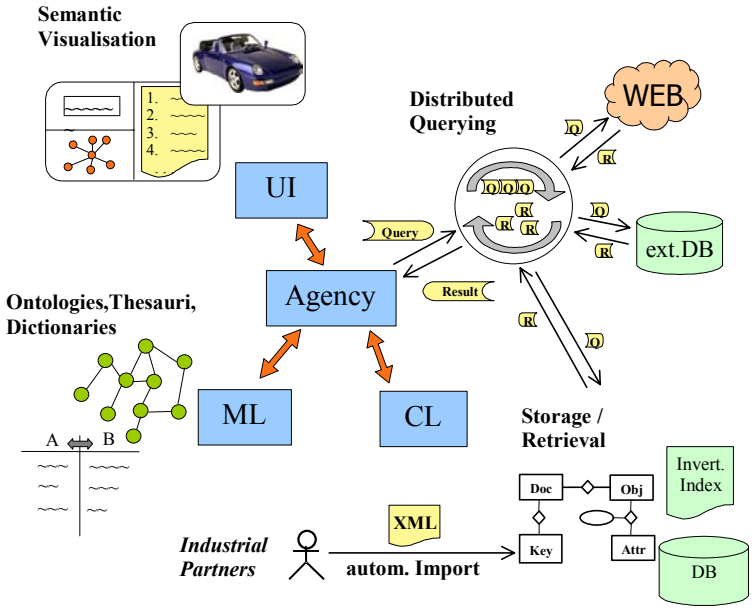

Fig. 2: WIDE Architecture and Innovation Aspects

The Agency controls the communication between the subsystems and distributes queries to the information sources.

Result Presentation

Different user groups prefer different presentations of results. Conventional search engines use hit lists for result presentation. The WIDE-User interface instead groups thematically related hits according to their concepts and links them to a semantic structure for the overall result of the search process.
The result is presented in form of a concept graph which enriches the returned documents of the search process with semantic information as depicted in Fig.3.

This way the interdependencies between the topics involved in the search process are shown. By means of navigation the user can explore the context of the search results and build new queries based on it.
The graph therefore serves for a conceptual navigation in the information space and for support of query refinement. The user is supported graphically - he cannot get “lost in the information space”.

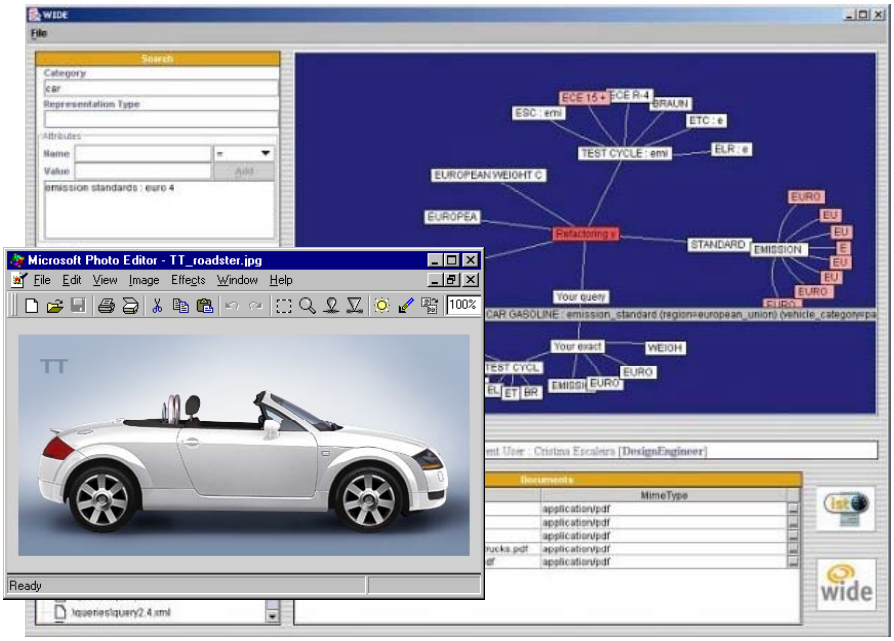

Fig. 3: Visualising semantical results using a graph