Ontobroker in a Nutshell

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The World Wide Web (WWW) provides huge amounts of information in informal and semi-structured representations. This is one of the key factors that enabled its incredible success story. The representation formalisms are simple and retain a high degree of freedom in how to present the information. However, freedom in information representation and simple representation formalisms cause serious bottlenecks in accessing information from the web. We designed and implemented some tools necessary to enable the use of ontologies [2] for enhancing the web. We developed a broker architecture called *Ontobroker* [1] with three core elements: a query interface for formulating queries, an inference engine used to derive answers, and a webcrawler used to collect the required knowledge from the web. The strength of our approach is the tight coupling of informal, semiformal and formal information and knowledge. This supports their maintenance and provides a service that can be used more generally for the purpose of knowledge management and for integrating knowledge-based reasoning and semiformal representation of documents.

The query formalism is oriented toward a frame-based representation of ontologies that defines the notion of instances, classes, attributes and values. The structure of the query language can be exploited to provide a tabular query interface as shown in Figure 1 which asks for the researchers with last name Benjamins and their email addresses. We also need support for selecting classes and attributes from the ontology. To allow the selection of classes, the ontology has to be presented in an appropriate

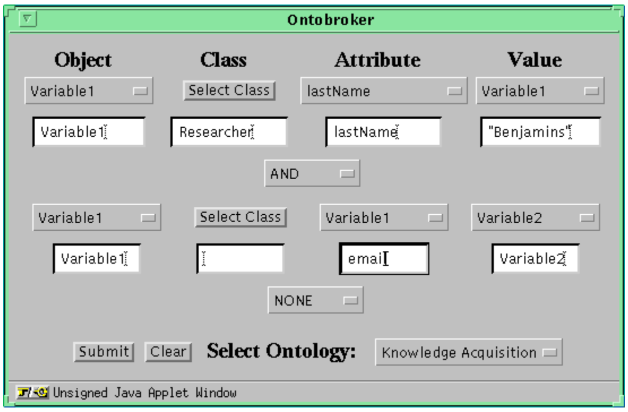

Fig. 1. The tabular query interface of Ontobroker.

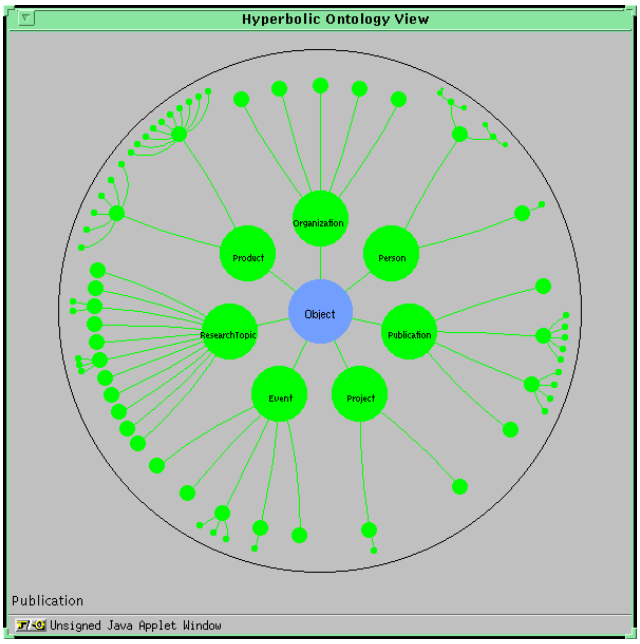

Fig. 2. The hyperbolic ontology view.

manner. This requirement is met by a presentation scheme based on Hyperbolic Geometry: classes in the center are depicted with a large circle, whereas classes at the border of the surrounding circle are only marked with a small circle (see Figure 2). The visualization techniques allows a quick navigation to classes far away from the center as well as a closer examination of classes and their vicinity.

Knowledge contained in the WWW is generally formulated using HTML. Therefore, we developed an extension to the HTML syntax to enable the ontological annotation of web pages. Currently, the W3C is developing the *Resource Description Framework* (RDF). This format will be used to add meta information to documents, i.e. to include semantical information about documents. Therefore, we developed a translator that generates RDF specifications from our annotations. Another possibility for stable web sources is to replace the annotation effort by deriving wrappers which extract this information. Such a wrapper can be used to directly derive the factual knowledge that is used by the inference engine of Ontobroker.

References

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