Building and Using the Semantic Web

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The development of the Semantic Web is still in its early phase when compared to the success story of the World Wide Web during the last decade. On the one hand, this is due to the fact that some of the underlying technologies, like e.g. the web ontology language OWL (cf. http://www.w3.org/2001/sw/WebOnt/), are just being defined and therefore not ready for daily usage. On the other hand, we face the problem of bootstrapping the development of the Semantic Web by building up ontologies and supplying related metadata that are then usable for realizing Semantic Web applications.

Semantic Web Mining [Berendt02] can help in setting up the Semantic Web. A backbone of the Semantic Web are ontologies, which at the present are often handcrafted, maybe by using an ontology development methodology [Sure02a, Sure02b]. This is not a scalable solution for a wide-range application of Semantic Web technologies. The challenge is to learn ontologies in a (semi-)automatic way [Maedche01]. In the same way, the manual annotation of web pages does not scale up. Therefore, methods and tools are required that enable the (semi-)automatic generation of metadata [Handschuh02].

The management of ontologies and related metadata also needs appropriate infrastructure and user support. The Karlsruhe Ontology Framework KAON [Ehrig02] (cf. http://kaon.semanticweb.org) is a novel infrastructure that takes a holistic approach to ontology management and is targeted for business applications. It includes a comprehensive tool suite for ontology management, e.g. ontology evolution, as well as advanced components for building ontology-based applications supporting latest standards [Maedche03].

Various application areas benefit from the Semantic Web. Semantic Web enabled Web Services [Bussler02] provide means for service discovery and composition that exploit the semantic description of these services. The Courseware Watchdog exploits ontologies and associated relational metadata for accessing and browsing distributed learning repositories and thus provides new kinds of functionalities for such learning environments [Schmitz02]. Such environments are closely related to knowledge portals that provide semantic means for integrating and accessing heterogeneous information sources. SEAL [Maedche02, Hotho02] is a comprehensive architecture for knowledge portals offering a broad range of tools for building up and running such portals. The portal of the VISION project (cf. http://www.km-vision.org) is just one example of such a knowledge portal supporting the conceptual browsing and querying of the portal contents. Another illustration of semantic portal concepts is given by the OntoWeb portal (cf. http://www.ontoweb.org), which provides access to all information about the European OntoWeb network [Spyns02].

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