Model driven design of semantic web information systems

K.A.M. van der Sluijs

Semantic Web languages like RDF(S) and OWL provide mechanisms for further evolution of the Web in what is sometimes called Web 3.0. This also gives rise to new types of Web applications, like Semantic Web Information Systems (SWIS). This is a class of data driven Web applications that uses and (re-)combines data from different sources into new applications.

A key challenge to SWIS application is achieving data integration. Data integration comes with several challenges. The thesis describes a framework that allows a semiautomatic approach to match and integrate heterogeneous semantic data sources. It also describes several SWIS applications in several different domains to demonstrate how the techniques can be applied in specific cases.

Besides data integration the thesis explores the use of personalization and collaboration in this new set of SWIS applications. By using the same data integration techniques described earlier, users can automatically benefit from underlying semantic structures in the form of personalization, recommendation and smart navigation. This collaborative aspect also allows applications to utilize the workforce of their web users for providing metadata to the (multimedia) objects in their database.

Finally the thesis describes a Model Driven Web Application Framework called Hera, which which is a framework for designers to create data driven Web applications by only using modeling techniques instead of error-prone and complex programming. By using techniques described earlier in the thesis Hera was redesigned to model web applications over several input (semantic) data source, describing personalization within the navigation model and the flexibility to reuse several presentation model engines to realize the presentation part of the Web applications that are designed. We also consider maintainability of Web applications by providing extendibility via using aspect oriented programming techniques.