

## WEB DATA INTEGRATION AND PRESENTATION

The Web is one of the most popular platforms for accessing information and has a direct impact on our daily lives. As a result of the Web's popularity, information providers added a lot of content to the Web, content that transcends space and time boundaries. The early hand-crafted Web pages have been replaced by complex Web applications that very often have as back-end a database management system. Also, we see an increasing number of (mobile) devices that have Web access (e.g., mobile phones, personal digital assistants, television, etc.) in addition to the traditional computer-based platform.

Web application developers are facing today two main challenges: the integration of Web data and the presentation of Web data. On the one hand, the Web is a universal publishing platform for which there is an increasing need to integrate data that comes from different sources and possibly has heterogeneous representations. On the other hand, the raw data, whether obtained as a result of an integration process or being directly available from a single source, needs to be published on the Web in such a way that it is accessible by different browsing devices and users. Web applications that in this integration and presentation consider the user characteristics in order to provide only user-relevant information help to alleviate the "information overload" problem on the Web.

In this issue we focus on the previously identified two main challenges. The first three papers answer research questions related to the data integration problem or one of its related problems like data translation. The last two papers suggest solutions for the Web data presentation problem with a specific focus on Web presentation adaptation to user characteristics.

The first paper by Papotti and Torlone presents a framework for translating schemes and instances from one Web data model into another Web data model. The proposed translation algorithm is based on the elements of a supermodel, an extensible model that contains the models' primitives. The algorithm uses a series of predefined procedures that transform supermodel metaprimitives. Models, schemas, and instances are represented in XML, and the procedures are stored as XML transformations (in XSLT or XQuery).

The same topic of schema and instance translation comes back in the second paper by Thiran et al. Similar to the supermodel from the previous paper, the authors define the Generic Entity Relationship (GER) model which has primitives to express any schema, whatever its underlying model is. The paper presents schema transformations that operate on the GER constructs. Because schemas are expressed as GER specializations, the presented schema transformations can be applied for a wide range of schema models. The schema transformations were successfully used in exporting legacy databases to XML data.

The third paper by Christoffel et al. presents a distributed agent-oriented approach for the integration of information sources in the field of scientific literature. The authors propose a system in which agents operate in an open information market, thus obeying the laws of supply and demand. The realization of the agents is based on Web services, which supports a cross-platform implementation

and ownership by different organizations. It is worth noting that the authors consider security issues (e.g., authentication, authorization, privacy) in the communication messages between agents or/and customers.

The fourth paper by Lei et al. gives an ontology-based methodology for generating Web presentations for some data. The methodology has three major components: the site view ontology, the presentation ontology, and the customization framework. The site view ontology describes at conceptual level the Web user interface. The presentation ontology supports the specification of layout and style for the previously defined user interface. The customization framework defines rules for showing, hiding, or modifying model components or selecting appropriate layout and style information for the presentation based on a previously specified user profile.

The fifth paper by Musa and de Oliveira presents an architecture that supports the exchange of learner's information between different e-learning applications in order to build a richer learner model than the one found in standalone e-learning applications. The learner model (similar to the user profile from the previous paper) helps adapting the Web presentation to the user's data and cognitive style. The communication between e-learning applications is based on Web services and the learner model uses elements from PAPI and LIP standards increasing thus the interoperability aspects of the proposed architecture.

As presented above, the Web data integration and presentation aspects (including the adaptation of the presentation based on user characteristics) are hot topics for current Web research. The proposed papers tackle some of the problems involved with Web data integration and presentation. With the emergence of the Semantic Web, Web data integration and presentation are faced with new opportunities and challenges to be investigated, e.g., providing the right annotations for Web data that can be used for the integration of Web data or the automatic generation of Web presentations, automatic discovery of Web services performing data integration or data presentation on the Web, reuse of integration or presentation design knowledge, etc.

Web data integration and presentation are two of the many research topics related to Web application development. Other topics that need also to be investigated as well for Web application development are: the dependability aspects of Web applications (the trustworthiness of the services delivered by Web applications), better support for Web application interoperability, component-based development of Web applications, service-oriented architecture of Web applications, etc. By exploring these topics, providing solutions to the encountered problems, and building Web applications that show the viability of the proposed approaches, we can all make the Web of tomorrow better than the Web of today.

**Flavius Frasincar**  
**Martin Gaedke**  
**Geert-Jan Houben**

Guest Editors