

WebRatio, an Innovative Technology for Web Application Development

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1 Introduction

WebRatio [5] is a software tool representative of a particular approach to the development of Web applications, called the “model-driven approach”. It claims that more and more efforts should be spent on the application modeling, and reusable implementations should be automatically or semi-automatically produced from high-level models.

The distinguishing feature of WebRatio is the adoption of formal graphical languages for the specification of data intensive Web applications, and the semi-automatic generation of code from such specifications. Web applications are specified using the Entity-Relationship (ER) model for data requirements, and the Web Modelling Language (WebML) [2,4] for the functional requirements.

The supported ER model is quite conventional, with a few limitations that make the ER schema easier to map onto a standard relational schema; this standard schema is then used by the WebRatio implementation as either the schema of a newly designed database supporting the Web application, or as a reference for mapping to pre-existing data sources.

WebML is a visual language for expressing the hypertextual front-end of a data-intensive Web application, i.e., the interfaces presented to the users for content browsing and management. WebML includes primitives for modelling such aspects as:

1. The structuring of the application into different hypertexts (called site views) targeted to different user groups or access devices.
2. The hierarchical organization of a site view into areas.
3. The pages that constitute the actual application interface, the content units contained in each page, with their relationship to the elements of the data model (entities and relationship).
4. The operations and services that can be activated from the application pages.
5. The links that connect pages, content units, and operations to provide users with suitable interactions on the browsers (e.g., anchors, radio buttons, forms for data entry).
6. Session-level information and personalization aspects.

2 The WebRatio Editing Tool

The WebRatio editing tool focuses on five main aspects:

1. Data design: supports the design of the ER data schemas, with a graphical user interface for drawing and specifying the properties of entities, relationships, attributes, and generalization hierarchies.
2. Hypertext design: assists the design of site views, providing functions for drawing and specifying the properties of areas, pages, units, and links.
3. Data Mapping: permits declaring the set of data sources to which the conceptual data schema has to be mapped, and automatically translates ER diagrams and OCL expressions into relational databases and views.
4. Presentation design: offers functionality for defining the presentation style of the application, allowing the designer to create XSL style sheets and associate them with pages, and organize page layout, by arranging the relative position of content units in the page.
5. Code generation: automatically translates site views into running Web applications built on top of the J2EE, Struts, and .NET platforms.

WebRatio internally uses XML and XSL as the formats for encoding both the specifications and the code generators: XML is used for describing data and hypertext schemas, whereas XSL is used for generating the graphic properties and layout of the page templates, for validity checking, and for automatic project documentation. The extensive use of XML and XSL facilitates custom extensions, which apply both to the WebML language, which can be extended with user-defined units and operations, and to the tool functions, which can be enriched with custom consistency checkers, documentation and code generators, and presentation rules.

3 Related Work

The development of Web sites with a model-driven approach has been addressed by two important research projects, namely Araneus [1] and Strudel [3].

References

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