Hera Presentation Generator

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ABSTRACT

Semantic Web Information Systems (SWIS) are Web Information Systems that use Semantic Web technologies. Hera is a model-driven design methodology for SWIS. In Hera, models are represented in RDFS and model instances in RDF. The Hera Presentation Generator (HPG) is an integrated development environment that supports the presentation generation layer of the Hera methodology. The HPG is based on a pipeline of data transformations driven by different Hera models.

Categories and Subject Descriptors

H.5.4 [**Information Interfaces and Presentation**]: Hypertext/Hypermedia—*Architectures, Navigation*; D.2.2 [**Software Engineering**]: Design tools and techniques—*Computer-aided software engineering (CASE)*; I.2.4 [**Artificial Intelligence**]: Knowledge representation formalisms and methods—*Representation languages*

General Terms

Algorithms, Design, Management

Keywords

Design environment, RDF(S), SWIS, Semantic Web, WIS

1. INTRODUCTION

The Semantic Web offers numerous benefits and opportunities to the Web application designer: application interoperability, inference capabilities, semantic validation of models and their instances etc. Web Information Systems that use Semantic Web technologies are called Semantic Web Information Systems (SWIS). Several model-driven methodologies for designing SWIS already exists: OntoWebber [1], SHDM [2], Hera [3] etc. Most of these methodologies lack an integrated development environment to support the designer in building SWIS. The aim of this paper is to present the Hera Presentation Generator, an integrated development environment that supports the construction of SWIS using Hera.

2. HERA METHODOLOGY

The Hera methodology is based on two main layers: the data collection layer and the presentation generation layer. The data collection layer specifies the retrieval of data coming form different sources. The presentation generation layer describes the presentation of data tailored to the user and its browsing platform. In Hera, models are represented in RDFS and model instances in RDF.

Figure 1 shows the presentation generation layer of the Hera methodology.

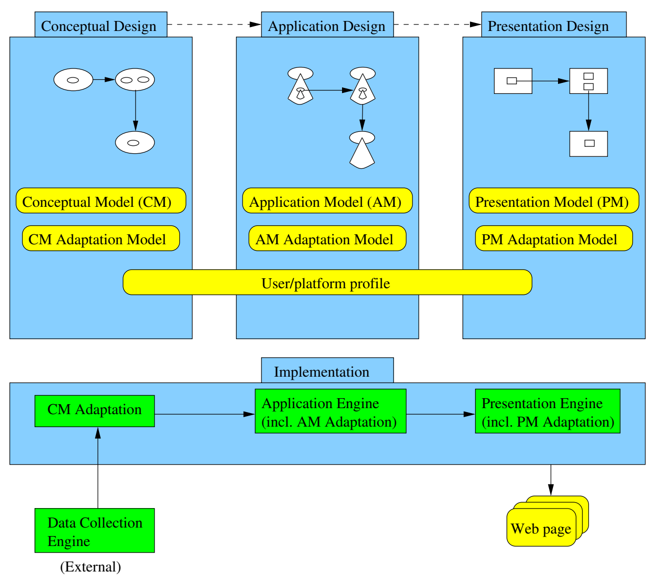

Figure 1: Hera's presentation generation layer.

The conceptual design builds the conceptual model (CM), a uniform view on the data sources. The application design defines the application model (AM), a navigation structure for the application's data. The presentation design constructs the presentation model (PM) containing the look-and-feel aspects (layout/style) of the application.

A characteristic aspect for Hera is the personalization of the Web presentation based on user preferences and browsing platform. The personalization aspect is defined by two models: the user/platform profile (UP) and the adaptation model (AdaM). UP stores the static features (attribute-value pairs) of the user and his browsing platform. The adaptation model defines appearance conditions for elements that appear in the CM, AM, and PM.

This implementation is based on a sequence of XSLT transformations, hence the full name HPG-XSLT.

3. HERA PRESENTATION GENERATOR

The presentation generation layer of the Hera methodology is supported by an integrated development environment called the

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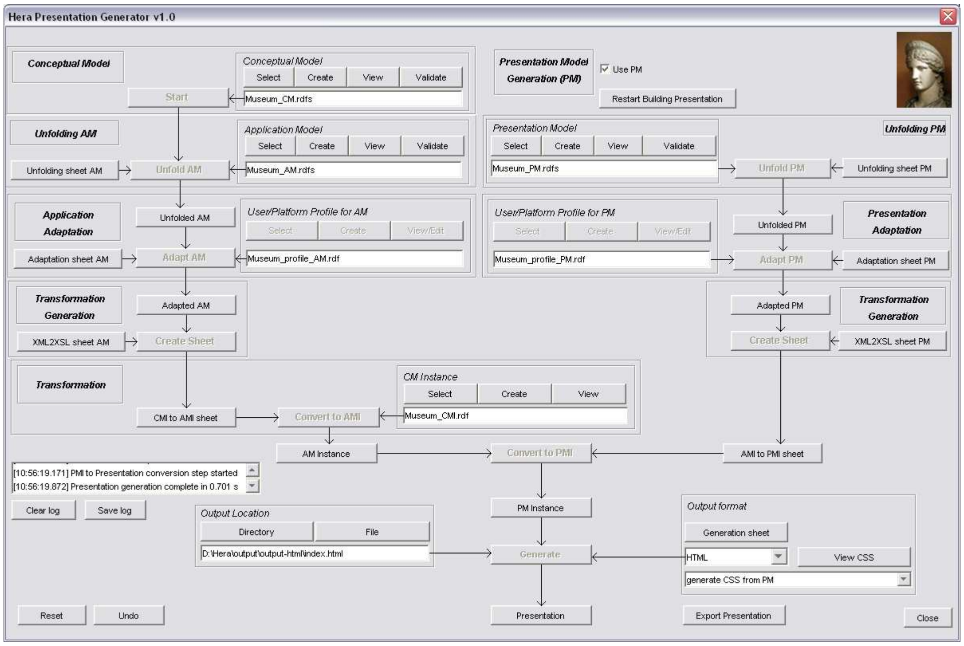

Figure 2: The advanced user interface of HPG.

Hera Presentation Generator (HPG). Figure 2 shows the advanced version of the user interface of HPG.

Each transformation step has associated with it a rectangle labeled with the step's name (e.g., Conceptual Model, Unfolding AM, Application Adaptation, etc.). Buttons may represent data transformations or one of the inputs/outputs for transformations. Additionally there are buttons to select, create, view, and validate different models. Horizontal arrows at the left and right of a button, and vertical arrows at the top of a button refer to the inputs of the transformation. Vertical arrows at the bottom of a button point to the output of the transformation. In order to view/edit the CM, AM, and PM several Visio solutions were implemented. These Visio solutions support the export of the graphical representation of the models to their corresponding RDF/XML serialization. The validation of the models is based on RDF(S) semantics and some Hera-specific rules.

The HPG has implemented the following data selection and transformation steps:

Conceptual Model Selection The designer selects one of the existing CM or creates a new CM.
Application Model Unfolding The designer selects one of the existing AM that correspond to the previously chosen CM or creates a new AM. The RDF/XML serialization of the AM is unfolded to a format that is more convenient for an XSLT transformation.
Application Model Adaptation The designer selects one of the existing UP or creates a new UP, relevant for the AM adaptation. The AM is adapted based on AM appearance conditions and the selected UP.
CMI2AMI Transformation Generation Based on the adapted AM, this transformation generates another transformation that converts a CM instance (CMI) to an AM instance (AMI).
CMI2AMI Transformation The designer selects one of the existing CMI that correspond to the previously chosen CM. Using the formerly generated transformation this CMI is converted to an AMI.
Presentation Model Unfolding The designer selects one of the existing PM that correspond to the previously chosen AM or creates a new PM. The RDF/XML serialization of the PM is unfolded to a format that is more convenient for an XSLT transformation.
Presentation Model Adaptation The designer selects one of the existing UP or creates a new UP, relevant for the PM. The PM is adapted based on PM appearance conditions and the selected UP.
AMI2PMI Transformation Generation Based on the adapted PM, this transformation generates another transformation that converts an AMI to a PM instance (PMI).
AMI2PMI Transformation Using the previously generated transformation the AMI is converted to a PMI.
Code Generation The designer selects the output format (HTML, HTML+TIME, SMIL, or WML) and generates appropriate code.

4. CONCLUSIONS AND FUTURE WORK

The Hera Presentation Generator (HPG) supports the automatic building of (static) WIS from a given set of specifications (models). It supports personalization of the presentation with respect to its navigation structure and layout/style. In future we would like also to add to the HPG the personalization of the presentation with respect to the domain model. Also we would like to build a similar user interface for the HPG generating dynamic WIS.

5. REFERENCES

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