

An explicit model for tailor-made eCommerce web presentations

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Abstract. This paper focuses on how the setting-related factors influence the content selection, the layout creation and the presentation generation for (eCommerce) web-based presentations. It pays special attention to those factors which help the user play rhetorical roles. We have integrated our theory in the Standard Reference Model for Intelligent Multimedia Presentation Systems (SRM-IMMPSs). By doing so, both the user and the designer will benefit. The user will be able to interact and communicate in a more natural way and the designer will be able to predict, limit the number of presentations plus perform more precise usability evaluations.

1 Introduction

In the current competitive business environment, providing meaning and satisfaction to customers is of great importance in order to remain in business. A web site can be of help in many ways: it can be used to attract the customer's attention to (new) information, products and services; it can be used to persuade customers to purchase a certain product directly or to live according to a certain lifestyle; and it can be used to offer reassurance and service to keep the customer satisfied and loyal [5].

In order to automatically generate web-based presentations which help users to fulfill their needs and to become loyal customers, a complex model is needed. This model should not only contain the information about the user, but also about the setting in which the presentation will be presented. Our model, derived from the Standard Reference Model for Intelligent Multimedia Presentation Systems (SRM-IMMPSs) [1], introduces an Optimization Layer which guides the creation of presentations in such a way that it helps users understand how to react to or to interact with the information provided. In other words, this type of presentations help users recognize the *rhetorical role* [3] they are asked to play and helps them to understand the purpose and the content of the presentation. When a user plays a rhetorical role, for example a "teacher" looking for study books on Amazon.com, she presents a version of herself that she deem appropriate for the time (3 months before her course starts), place (web site

that sells books) and situation (finding cheap books that students will like) [8]. The combination of the user, time, place and situation is called a *setting*.

To sum up: information about the setting and rhetoric (which role to play in order to fulfill a need through interaction with the web-based presentation) within our model is necessary because every course of action from the users is not only driven by their needs and goals, but is also dependent on its virtual and social circumstances (which content, layout, interaction level is provided plus which device, platform, network speed is being used).

In this paper we focus on the setting-related factors that influence the content selection, the layout creation and the presentation generation for a web site. We aim at a model that facilitates the process of rhetorical role-playing presentation generation. In section two, we introduce the characteristics of an eCommerce oriented setting and the rhetorical roles users play within the different types of web-based presentations. In section three, we describe the SRM-IMMPSs. In section four, we propose an Optimization Layer and corresponding adjustments within the IMMPSs architecture. Finally, we present discussion and conclusions of the proposed approach.

2 The characteristics of an eCommerce oriented setting

In order to describe an eCommerce oriented setting, we focus on two main characteristics: the web site and the visitors. In the following two subsection we will briefly describe the influence of the web site and the visitors in the process of automatically generating an adaptive tailor-made web presentations.

2.1 The web site

The main purpose of a web site is *to inform*, *to persuade* or *to entertain* its target audience. The purpose of an eCommerce oriented web site is to persuade its target audience in such a way that they will buy, use or adjust to the information, products, service/lifestyle offered.

Each web site type is either based on *utilitarian values* or *hedonic values*. Web sites with utilitarian values are designed to help the visitor perform certain tasks easily and quickly. Their design is all about functionality. They are realized as a feature-based implementation such as search engines, structured lists and overviews/site maps. Web sites with hedonic values are designed to entertain the visitor. Their design is all about pleasure, excitement and they offer a uniquely webby experience with characteristics such as association, image, experience and pleasure.

We consider eCommerce oriented web sites to be mainly of an electronic shop (eshop) type, where the purpose of the web site is to persuade people to order and/or buy information, products, lifestyles, dreams, etc. They can have either utilitarian values, where the visitor uses, for example, a search engine to find the products and click on a button to order that product or hedonic values, where the visitor for example plays a game or reads a story to get a reduction or a free sample.

2.2 The people who visit the web site

When people communicate with each other they *communicate through a series of [rhetorical] roles that they assume appropriate to their rhetorical purposes* [2]. Their rhetorical purpose is to find information written in such a way that it helps them to fulfill their needs. Therefore they will prefer information written in an informative, persuasive or entertaining way. We presume that users also play different roles when they react to or interact with a web site. In order to incorporate rhetorical role playing into the electronic medium, we introduce *Persona Theory* [3]. Persona Theory provides guidelines how to create roles that define the content, the tone and the ways to communicate with the web site and its audience. This is achieved by introducing Personas. *Personas* are behavioristic style templates. Each Persona shows how to achieve its goal and perform its tasks within a certain setting, in this case, a web site with a certain purpose and a certain way of interacting with the visitor.

There are two types of Personas. On the one hand the *Author Persona*, who is the voice (of the designer/company) that speaks through the web site. On the other hand, the *User Persona*, who is a voice that explains the role the actual user is asked to play when entering the web site. User Personas can be grouped into *do-ers*, *readers* and *viewers* [10], based on their given needs and goals. (We use the term *do-ers*, rather than Zeldman's *users* in order to avoid confusion with the general interpretation of the word *user*). *Do-ers* are people who use tools to accomplish a task. They want to find a product (so they can buy it) or find/compare/verify information. They want to carry out their task as fast as possible and with as little effort as possible. *Viewers* are people who seek entertainment. They want to be surprised, seduced or guided because the journey is often more important than the end result. They will take their time and enjoy the web site's 'flashy' appearance. *Readers* are people who turn to a web site as they might turn to a book or an article. They want to read in order to find in-depth information or to find relaxation/excitement. *Do-ers* are more attracted to eshops with utilitarian values. *Viewers* like to be entertained or want to experience a certain life style on eshop with hedonic values. *Readers* will prefer an eshop which looks like a story, where for example the visitor can buy products following the example of a celebrity or one of the characters within this story.

Following this reasoning, we can conclude that there should be a link between the purpose of the web site and the type of audience when developing Personas in order to help users to fulfill their needs and become loyal customers. In the following sections, we first shortly describe SRM-IMMPSs, then we present the Optimization Layer which makes it possible to generate setting and rhetorical role-playing dependent presentations.

3 The SRM for IMMPSs

A common approach for presentation generation is realized with the help of retrieval, creation and generation systems. An example of this is the Standard

Reference Model for Intelligent Multimedia Presentation System (SRM-IMMPS) [1], which deals with the dynamic creation and generation of multimedia presentations. It is a broadly applicable model that describes the generating of presentations including web-based presentations. Therefore our model is based on SRM-IMMPS. In the next section we will introduce an Optimization Layer, which lies between the Generation Process and the Knowledge Server (see fig 1). First we will show the IMMPS architecture and shortly describe the different expert modules within the Knowledge Server.

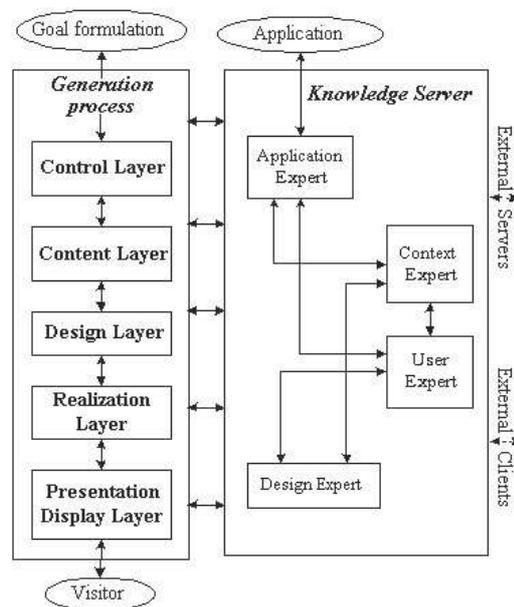


Fig. 1. The Standard Reference Architecture for IMMPSs

Figure 1 shows the IMMPS reference architecture. Its conceptual design reflects a modularization of the generation process into five layers: *Control Layer*, *Content Layer*, *Design Layer*, *Realization Layer* and *Presentation Display Layer*. To gain knowledge, the layers can exploit explicitly encoded knowledge provided by a separate Knowledge Server. The Knowledge Server is composed of four knowledge sources: *Application Expert*, *Context Expert*, *User Expert* and *Design Expert*. The experts are represented as shared resources rather than as local or private resources.

The *User Expert* maintains the knowledge of the IMMPS's user model. It may include representations of the goals and plans; physical or mental abilities; attitudes and preferences; knowledge and beliefs of the user or group of users. The *Application Expert* provides the IMMPS with application specific knowl-

edge. The data can be retrieved from different sources, such as web sites, databases etc. Within this component the data for the presentation of the web site is stored. It is also assumed to carry out tasks, such as interfacing with the application system(s), data format conversion, provision of data and data characterization.

The *Context Expert* serves as a container for knowledge concerning the context. The context refers to the device used, the platform, the network speed and all factors that can influence the final presentation without being part of the user characteristics. Its task is to construct a generation context (a representation of what has been generated so far and what adaptivity rules have been used) and a presentation context (a representation of what has been presented to the user so far and how she interacts with this presentation).

The *Design Expert* contains the design rules on how to build a presentation. It complements the other experts in the sense that it provides a container for all other knowledge which is relevant for decision making in an IMMPS. The design constraints and rules are organized per device model and media/modality model.

4 Introducing an Optimization Layer for eCommerce

In order to be able to automatically generate adaptive, tailor-made presentations, a setting-driven and rhetorical role-playing approach is needed. Therefore an *User Model Expert* with Target Audience and Visitor Profile knowledge, a *Context Model Expert* with Context and Usage Profile knowledge, a *Discourse Expert*, a *Design Expert* and an *Application Expert* within the Knowledge Server are necessary to provide all the information about the setting. In order to come up with the best presentation for a specific user within a certain setting, the data from the experts needs to be retrieved by an Optimization Layer. This layer filters the data in such a way that the *Motivation, Ability and Opportunity factors* have the highest possible values. Afterwards, it sends the processed data to the Generation Process so that a rhetorical role-playing and setting oriented presentation can be generated (see fig. 2).

4.1 Updates on the Knowledge Server

The *User Expert* is changed into *User Model Expert* and contains a *Target Audience Expert* and a *Visitor Profile*. The Target Audience Expert represent the target audience's motivation, ability and opportunity [6], [4]. The *Visitor Profile* contains knowledge about a particular visitor and additional information to the Target Audience Expert, for example user preferences. Our User Model Expert contains not only information about the presumed user model, but also information directly retrieved from the actual visitor. By generating presentations specifically meant for a certain audience, we hope to get a more precise User Model Expert. The SRM-IMMPS has either one of these information sources and targets as much visitors as possible.

The *Context Expert* is changed into *Context Model Expert* and contains a *Context Expert* for general information and an *Usage Profile* for specific information about the way and product the user uses to view the presentation. The

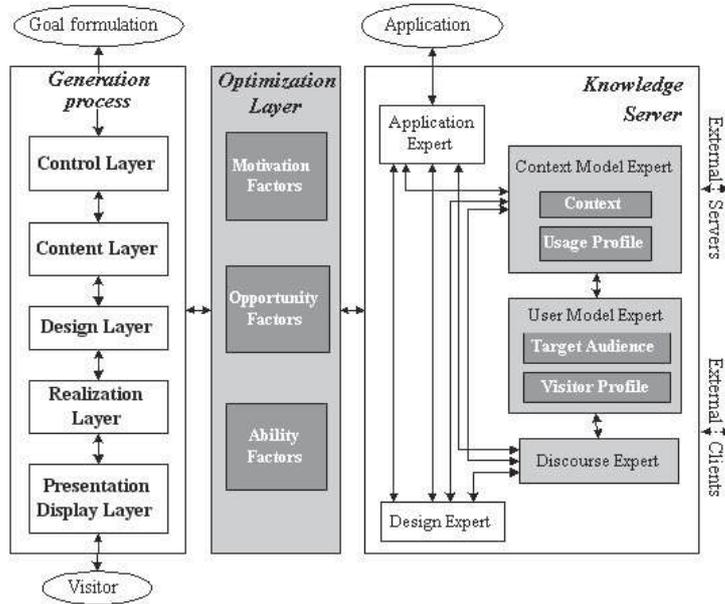


Fig. 2. An Optimization Layer within the SRM for IMMPS

added value of the Context Model Expert compared to SRM-IMMPS's Context Expert is that it gives a more precise model on initially processed, integrated information.

A *Discourse Expert* [9] is added. This Expert guides the generation of the presentation structure using discourse models such as Rhetoric Structure Theory [7], a pedagogical model or a marketing oriented model. It is based on the purpose of the web site and gives a recognizable 'flavor' to the presentation, which shows how users should play their roles. This 'flavor' can be the color of the brand or a certain way of writing that distinguishes one web site from another within the same application area.

The *Application Expert* and the *Design Expert* remain the same. They are both used in the process of retrieving and creating the content for the presentation.

4.2 The Optimization Layer

In figure 2 we present the Optimization Layer which consists of three modules: *Motivation*, *Ability* and *Opportunity*. These modules are necessary for processing the data from the Knowledge Server in such a way that a presentation can be generated based on a rhetorical role-playing and setting-driven approach.

The Motivation module is responsible for the filtering of information about the target audience characteristics, such as the need, goal, cultural values in

combination with the purpose of the web site. It guides the generation of a presentation relevant to the target audience. It motivates the visitor to explore the web site and fulfill her need. It contains information of personal relevance. It keeps track of the values consistency (culturally held beliefs), needs and goals. It also assures a low customer risk and controls a moderate inconsistency with attitudes of the user. In order to gain this knowledge, the Motivation module collaborates with the Target Audience, Application and Discourse Expert modules.

The Ability module processes the information about the user characteristics, such as cognitive style, (dis)abilities, level of experience and knowledge. Its goal is to ensure that the generation process results in a presentation suited for a user with (dis)abilities, such as level of knowledge, level of experience, type of cognitive style, motor-handicapped/poor-sighted, etc. In order to gain this knowledge, the Ability module collaborates with the Target Audience and the Design Expert modules.

The Opportunity module processes the characteristics of the environment and characteristics on the presentation of the web site, such structure, structure of content. Its goal is ensure that the generation process results in a presentation that is adapted to the environment. The layout of the web site presentation is improved and can be viewed by using that certain device, platform, network speed, etc. In order to gain this knowledge, the Opportunity module collaborates with the Context, the Application and the Design Expert modules.

5 Discussion and conclusions

This paper introduces issues that originate from Persona Theory and Situated Action framework. Rhetorical role-playing and a setting-driven approach can be helpful on the side of the enterprize and the customer within an eCommerce setting. Based on this we offer an explicit model for a tailor-made web site presentation in eCommerce web site setting. Following the advances on SRM-IMMPS research with respect to dynamic creation and generation of content presentations, we build upon the SRM by adding an additional Optimization Layer. This way, we aim at generating meaningful and satisfactory presentations, for visitors who recognize the role they need to play in order to find what they are looking for.

The power of the Optimization Layer is twofold. On the one hand, the Optimization Layer processes the data from the Knowledge Server experts and sends it to the Generation Process in order to guide the generation of the most appropriate presentation (setting, rhetorical role-playing adaptive) for the current visitor. This makes it easier to perform precise usability evaluations. On the other hand, the number of different presentations from the same web site is not infinite. This will not only decrease the time for automatic generation, but it will also make it easier to trace the number of scenarios within a certain setting. This way a further user adaptation based on the Visitor Profile is facilitated. A possible disadvantage of the approach is the fact that the web site presentation

is no longer suitable for visitors who are not part of the target audience, but who are potential customers. It could also be the case that the information exchanged among the Knowledge Experts conflicts.

To summarize: altering the SRM from a Situated Action and Persona Theory perspective, provides means for satisfaction-level evaluation of the presentation within the process of web design. This is an additional step to fulfilling various customer needs, within, but not restricted to, eCommerce settings.

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