The Role of Human Factors in Web Personalization Environments

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INTRODUCTION

The explosive growth in the size and use of the World Wide Web as a communication medium as well as the new developments in ICT allowed service providers to meet these challenges, developing new ways of interactions through a variety of channels enabling users to become accustomed to new means of service consumption in an "anytime, anywhere and anyhow" manner. However, the nature of most information structures is static and complicated, and users often lose sight of the goal of their inquiry, look for stimulating rather than informative material, or even use the navigational features unwisely. Hence, researchers and practitioners studied adaptivity and personalization to address the comprehension and orientation difficulties presented in such systems, to alleviate such navigational difficulties and satisfy the heterogeneous needs of the users, allowing at the same time Web applications of this nature to survive.

There are many approaches to address these issues of personalization but usually, each one is focused upon a specific area, that is, whether this is profile creation, machine learning and pattern matching, data and Web mining or personalized navigation.

Some noteworthy, mostly commercial, applications in the area of Web personalization that collect information with various techniques and further adapts the services provided, are among others the Broadvision's One-To-One, Microsoft's Firefly Passport, the Macromedia's LikeMinds Preference Server, the Apple's WebObjects, and so forth. Other, more research-oriented systems, include ARCHIMIDES (Bogonikolos et al., 1999), Proteus (Anderson et al., 2001), WBI (Magglio & Barret, 2001), BASAR (Thomas & Fischer,

1997), and mPERSONA (Panayiotou & Samaras, 2004). Significant implementations have also been developed in the area of adaptive hypermedia, with regards to the provision of adapted educational content to students using various adaptive hypermedia techniques. Such systems are, among others, INSPIRE (Papanikolaou, Grigoriadou, Kornilakis, & Magoulas, 2003), ELM-ART (Weber & Specht, 1997), AHA! (De Bra & Calvi, 1998), Interbook (Brusilovsky, Eklund, & Schwartz, 1998), and so forth.

BACKGROUND

Once considering adaptation and personalization categories and technologies we refer to Adaptive Hypermedia and Web Personalization, respectively, due to the fact that they both make use of a user profile to achieve their goal, and consequently they can together offer the most optimized adapted content result to the user.

A Constructive Comparison of Adaptive Hypermedia and Web Personalization

In view of the aforementioned statement, it would be essential to highlight their similarities and differences and furthermore, to identify their convergence point which is their objective to develop techniques to adapt what is presented to the user, based on the specific user needs identified in the extracted user profiles.

Generally, Adaptive Hypermedia refers to the manipulation of the link or content structure of an application to

achieve adaptation and makes use of an explicit user model (Brusilovsky, 2001; Eklund & Sinclair, 2000). Adaptive Hypermedia is a relatively old and well established area of research counting three generations (Brusilovsky & Peylo, 2003). Educational hypermedia and online information systems are the most popular, accounting for about two thirds of the research efforts in adaptive hypermedia. Adaptation effects vary from one system to another. These effects are grouped into three major adaptation technologies: adaptive content selection (Brusilovsky & Nejdl, 2004), adaptive presentation (or content-level adaptation) and adaptive navigation support (or link-level adaptation) (Brusilovsky, 2001; Eklund & Sinclair, 2000).

On the other hand, Web personalization refers to the whole process of collecting, classifying and analyzing Web data, and determining based on these the actions that should be performed so that the user is presented with personalized information. Personalization levels have been classified into: Link Personalization, Content Personalization, Context Personalization, and Authorized Personalization (Lankhorst, Kranenburg, & Peddemors, 2002; Rossi, Schwade, & Guimaraes, 2001). The technologies that are employed in order

to implement the processing phases mentioned above as well as the Web personalization categories are distinguished into Content-based Filtering, Rule-based Filtering, Collaborative Filtering, Web Usage Mining, Demographic-based Filtering, Agent Technologies, and Cluster Models (Pazzani, 2005; Mobasher, Dai, Luo, Nakagawa, & Wiltshire, 2002).

As inferred from its name, Web personalization refers to Web applications solely, and is a relatively new area of research. One could also argue that the areas of application of these two research areas are different, as Adaptive Hypermedia has found popular use in educational hypermedia and online information systems (Brusilovsky, 2001), whereas Web personalization has found popular use in e-business services delivery. From this, it could be implied that Web personalization has a more extended scope than Adaptive Hypermedia.

The most evident technical similarities of them are that they both make use of a user model to achieve their goal and they have in common two of the adaptation / personalization techniques: the adaptive-navigation support and the adaptive presentation. Last but not least, it is noteworthy to mention that they both make use of techniques from

Figure 1. User Perceptual Preference Characteristics – Three-Dimensional Approach
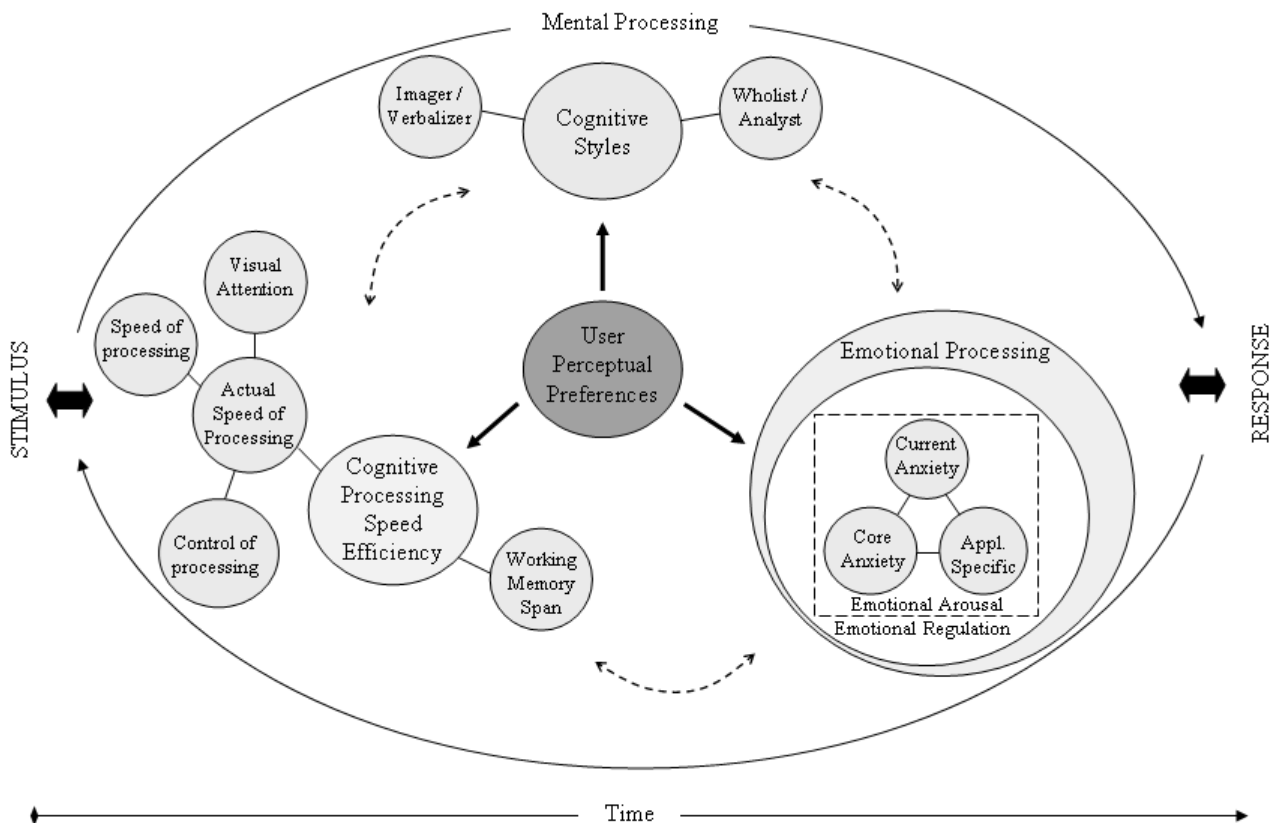
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