Chapter 8.3
Adaptation and Personalization of Web–Based Multimedia Content

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ABSTRACT

A traditional multimedia system presents the same static content and suggests the same next page to all users, even though they might have widely differing knowledge of the subject. Such a system suffers from an inability to be all things to all people, especially when the user population is relatively diverse. The rapid growth of mobile and wireless communication allowed service providers to develop new ways of interactions, enabling users to become accustomed to new means of multimedia-based service consumption in an anytime, anywhere, and anyhow manner. This chapter investigates the new multi-channel constraints and opportunities emerged by these technologies, as well as the new user-demanding requirements that arise. It further examines the relationship between the adaptation and personalization research considerations, and proposes a three-layer architecture for adaptation and personalization of Web-based multimedia content based on the "new" user profile, with visual, emotional, and cognitive processing parameters incorporated.

INTRODUCTION

Since 1994, the Internet has emerged as a fundamental information and communication medium that has generated extensive enthusiasm. The Internet has been adopted by the mass market more quickly than any other technology over the past century, and is currently providing an electronic connection between progressive entities and millions of users whose age, education, occupation, interest, and income demographics are excellent for sales or multimedia-based service provision.

The explosive growth in the size and use of the World Wide Web, as well as the complicated nature of most Web structures, may lead in orientation difficulties, as users often lose sight of the goal of their inquiry, look for stimulating rather than informative material, or even use the navigational features unwisely. To alleviate such navigational difficulties, researchers have put huge amounts of effort to identify the peculiarities of each user group, and design methodologies and systems that could deliver an adapted and personalized Web-content. To this date, there has not been a concrete definition of personalization. However, the many solutions offering personalization features meet an abstract common goal: to provide users with what they want or need without expecting them to ask for it explicitly (Mulvenna, Anand, & Buchner, 2000). A complete definition of personalization should include parameters and contexts such as user intellectuality, mental capabilities, socio-psychological factors, emotional states, and attention- grabbing strategies, since these could affect the apt collection of users' customization requirements, offering in return the best adaptive environments to the user preferences and demands.

With the emergence of wireless and mobile technologies, new communication platforms and devices, apart from PC-based Internet access, are now emerging, making the delivery of content available through a variety of media. Inevitably, this increases user requirements which are now focused upon an "*anytime, anywhere, and anyhow*" basis. Nowadays, researchers and practitioners not only have to deal with the challenges of adapting to the heterogeneous user needs and user environment issues such as current location and time (Panayiotou & Samaras, 2004), but they also have to face numerous considerations with respect to multi-channel delivery of the applications concerning multimedia, services, entertainment, commerce, and so forth. To this end, personalization techniques exploit Artificial Intelligence, agent-based, and real-time paradigms to give presentation and navigation solutions to the growing user demands and preferences.

This chapter places emphasis on the adaptation of the Web-based multimedia content delivery, starting with an extensive reference to the mobility and wireless emergence that sub-serves the rapid development of the multi-channel multimedia content delivery, and the peculiarities of the user profiling that significantly vary from the desktop to the mobile user. Furthermore, it approaches the existing adaptation (adaptive hypermedia) and personalization (Web personalization) techniques and paradigms that could work together in a coherent and cohesive way, since they are sharing the same goal, to provide the most apt result to the user. Lastly, having analyzed the aforementioned concepts, it defines a three-layer adaptation and personalization Web-based multimedia content architecture that is based on the introduction of a "new" user profile that incorporates user characteristics such as user perceptual preferences, on top of the "traditional" ones, and the semantic multimedia content that includes, amongst others, the perceptual provider characteristics.

MOBILITY EMERGENCE

The rapid development of the wireless and mobile advancements and infrastructures has evidently given "birth" to Mobile Internet. It is considered fundamental to place emphasis on its imperative existence, since statistics show that in the future the related channels will take over as the most sustainable mediums of Web-based (multimedia) content provision. Mobile Internet could be considered as a new kind of front-end access to Web-based content with specific capabilities of delivering on-demand real-time information. Nowadays, many sectors (governmental, private, educational, etc.) start to offer multimedia-based services and information via a variety of service delivery channels apart from the Web (Germanakos, Samaras, & Christodoulou, 2005). Two of

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