Chapter 4.14
Personalization Issues for Science Museum Web Sites and E-Learning

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ABSTRACT

E-learning has the potential to be a very personalized experience and can be tailored to the individual involved. So far, science museums have yet to tap into this potential to any great extent, partly due to the relative newness of the technology involved and partly due to the expense. This chapter covers some of the speculative efforts that may improve the situation for the future, including the SAGRES project and the Ingenious Web site, among other examples. It is hoped that this will be helpful to science museums and centers that are considering the addition of personalization features to their own Web site. Currently, Web site personalization should be used with caution, but larger organizations should be considering the potential if they have not already started to do so.

BACKGROUND

In the past few years, the number of people visiting museums' Web sites has gone up rapidly. As a consequence, museums have to face the significant challenge of creating virtual environments that are progressively more adapted towards the different needs, interests and expectations of their heterogeneous users. Increasingly, museums and science centers are using their Web sites to augment their learning facilities in potentially innovative ways

(Tan et al., 2003). In particular, museums need to provide for differing online requirements such as teaching, e-learning and research (Hamma, 2004). One of the solutions available to help is the introduction of personalization techniques (Dolog & Sintek, 2004) that, by providing differentiated access to information and services according to the user's profile, make facilities and applications more relevant and useful for individual users, thus improving the overall visitor's experience. Science museums, by their very technological nature, ought to be at the vanguard of applying new techniques like personalization.

Developed in the early 1990s in an attempt to try to respond to the different needs and characteristics of an ever-growing number of Internet users, personalized or adaptive Web systems have since been exploited in different sectors such as commerce, tourism, education, finance, culture and health. What distinguishes these systems from the traditional static Web is the creation of a user model that represents the characteristics of the user, utilizing them in the creation of content and presentations adapted to different individuals (Brusilovsky & Maybury, 2002). By so doing, personalization becomes a useful tool in the selection and filtering of information for the user, facilitating navigation and increasing the speed of access as well as the likelihood that the user's search is successful.

The techniques available to collect information about users, as well as the methods used to process such information to create user profiles and to provide adapted information, are varied. A brief description of the different approaches will be presented here before moving on to illustrate different application examples within the science museum world.

PERSONALIZATION TECHNIQUES

A first important distinction concerning the amount of control the user has on the adaptation process can be made between customization and personalization. *Customization* or *adaptability* occurs when "the user can configure an interface and create a profile manually, adding and removing elements in the profile" (Bonnet, 2002). The control of the look and/or content of the site are explicit and user-driven; that is, the user is involved actively in the process and has direct control. In *personalization* or *adaptivity*, on the other hand, the user is seen as being passive, or at least somewhat less in control (Bonnet, 2002). Modifications concerning the content or even the structure of a Web site are performed automatically by the system based on information concerning the user stored in the so-called *user profile*. Such information about the user is provided either *explicitly*, by the user themselves, using online registration forms, questionnaires and reviewing (static profiles) or *implicitly* by recording the navigational behavior and/or preferences of each user through dynamic profiling Web technologies such as *cookies*[1] and *Web server log files*[2] (Eirinaki & Vazirgiannis, 2003).

Once the data concerning the users is collected either implicitly or explicitly, or even in both ways, as is often the case, appropriate information that matches the users' need is determined and delivered. This process usually follows one or more of the following techniques: content-based filtering, collaborative filtering, rule-based filtering and Web usage mining.

Content-based systems track user behavior and preferences, recommending items that are similar to those that users liked in the past (Eirinaki & Vazirgiannis, 2003). *Collaborative filtering* compares a user's tastes with those of others in order to develop a picture of like-minded people. The choice of material is then based on the assumption that this particular user will value information that like-minded people also enjoyed (Bonnet, 2002). The user's tastes are either inferred from their previous actions or else measured directly by asking the user to rate products. Another common technique is *rule-based filtering*, which allows