Chapter 2.3
Adaptation and Personalization of User Interface and Content

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ABSTRACT

Adaptive services based on context-awareness are considered to be a precious benefit of mobile applications. Effective adaptations however, have to be based on critical context criteria. For example, presence and availability mechanisms enable the system to decide when the user is in a certain locale and whether the user is available to engage in certain actions. What is even more challenging is a personalization of the user interface to the interests and preferences of the individual user and the characteristics of the used end device. Multimedia personalization is concerned with the building of an adaptive multimedia system that can customize the representation of multimedia content to the needs of a user. Mobile multimedia personalization especially, is related with the particular features of mobile devices' usage. In order to fully support customization processes, a personalization perspective is essential to classify the multimedia interface elements and to analyze their influence on the effectiveness of mobile applications.

INTRODUCTION

Limited resources of mobile computing infrastructure (cellular networks and end user devices) set strict requirements to the transmission and presentation of multimedia. These constraints elevate the importance of additional mechanisms, capable of handling economically and efficiently the multimedia content. Flexible techniques are needed to model multimedia data adaptively for multiple heterogeneous networks and devices with varying capabilities. "Context" conditions (the implicit information about the environment, situation and surrounding of a particular communication) are of great importance.

Adaptive services based on context-awareness are indeed a precious benefit of mobile applications: in order to improve their provided service, mobile applications can actually take advantage of the context to adjust their behaviors. An effective adaptation has to be based on certain context criteria: presence and availability mechanisms enable the system to decide when the user is in a certain locale and whether the user is available

to engage in certain actions. Hence, mobile applications aim to adapt the multimedia content to the different end user devices.

However, typically each and every person receives the same information under the same context conditions. What is even more challenging is a personalization of the user interface (UI) to the interests and preferences of the individual user and the characteristics of the user end device. The goal of mobile applications is to increasingly make their service offerings more personalized toward their users. Personalization has the ability to adapt (customize) resources (products, information, or services) to better fit the needs of each user. Personalization in mobile applications enables advanced customized services such as alerts, targeted advertising, games, and improved, push-based mobile messaging. In particular, multimedia personalization is concerned with the building of an adaptive multimedia system that can customize the representation of multimedia content to the needs of a user.

Multimedia personalization enlarges the application's complexity since every individual's options have to be considered and implemented. It results in a massive amount of variant possibilities: target groups, output formats, mobile end devices, languages, locations, etc. Thus, manual selection and composition of multimedia content is not practical. A "personalization engine" is needed to dynamically create the context-dependent personalized multimedia content. General solution approaches concerning the personalization engine, include personalization by transformation (using XML-based transformations to produce personalized multimedia documents), adaptive multimedia documents (using SMIL-like presentation defined alternatives), personalization by constraints (optimization problem—constraint solving), personalization by algebraic operators (algebra to select media elements and merge them into a coherent multimedia presentation), or broader software engineering approaches.

Mobile multimedia (M3) personalization es-

pecially, is related with the particular features of mobile devices' usage. Because of their mobility and omnipresence, mobile devices have two characteristics worth noticing. First, users have limited attention as they operate their mobile devices (this is because they usually are concerned at the same time in other tasks, (e.g., car driving)). Second, users tend to treat their mobile devices in a quite personal way, seeking for personal services and personalized content. The preferences of users are therefore noticeably affected. In many cases, they favor content and services which do not require transmitting large quantities of information. Thus, low-intensity content (e.g., ring tones, weather reports, and screen icons) proved to be very popular. This is not only because of the low availability of mobile devices' resources which complicates the processing of large volumes of information. Users demand further individually customized content on the mobile Internet because its personalization level is higher than that of the fixed Internet.

Detailed issues concerning M3 personalization can be described, analyzing UI design issues. Existing mobile applications offer a reasonably easy, browser-based interface to help user access available information or services. In order to support adaptation and personalization mechanisms they should be also as far as possible concentrated on the individual prerequisites of the human in contact with it. In this chapter, after the presentation of background topics we discuss critical issues of the mobile setting (characteristics of mobile applications and mobility dimensions in user interactions) that influence adaptation and personalization technologies. Then, as an application case, we focus on m-commerce applications and customer interfaces. All current research studies tend to acknowledge that the design rules of wired Internet applications are only partially useful. They should not be directly adopted in mobile computing area, because of the considerably different user requirements and device constraints. On the other hand, experi-

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