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Chapter 11

MM4U: A Framework for Creating Personalized Multimedia Content

Ansgar Scherp, OFFIS Research Institute, Germany

Susanne Boll, University of Oldenburg, Germany

ABSTRACT

In the Internet age and with the advent of digital multimedia information, we succumb to the possibilities that the enchanting multimedia information seems to offer, but end up almost drowning in the multimedia information: Too much information at the same time, so much information that is not suitable for the current situation of the user, too much time needed to find information that is really helpful. The multimedia material is there, but the issues of how the multimedia content is found, selected, assembled, and delivered such that it is most suitable for the user's interest and background, the user's preferred device, network connection, location, and many other settings, is far from being solved. In this chapter, we are focusing on the aspect of how to assemble and deliver personalized multimedia content to the users. We present the requirements and solutions of multimedia content modeling and multimedia content authoring as we find it today. Looking at the specific demands of creating personalized multimedia content, we come to the conclusion that a dynamic authoring process is needed in which just in time the individual multimedia content is created for a specific user or user group. We designed and implemented an extensible software framework, MM4U (short for "MultiMedia for you"), which provides generic functionality for typical tasks of a

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dynamic multimedia content personalization process. With such a framework at hand, an application developer can concentrate on creating personalized content in the specific domain and at the same time is relieved from the basic task of selecting, assembling, and delivering personalized multimedia content. We present the design of the MM4U framework in detail with an emphasis for the personalized multimedia composition and illustrate the framework's usage in the context of our prototypical applications.

INTRODUCTION

Multimedia content today can be considered as the composition of different media elements, such as images and text, audio, and video, into an interactive multimedia presentation like a guided tour through our hometown Oldenburg. Features of such a presentation are typically the temporal arrangement of the media elements in the course of the presentation, the layout of the presentation, and its interaction features. *Personalization* of multimedia content means that the multimedia content is targeted at a specific person and reflects this person's individual context, specific background, interest, and knowledge, as well as the heterogeneous infrastructure of end devices to which the content is delivered and on which it is presented. The creation of personalized multimedia content means that for each intended context a custom presentation needs to be created. Hence, multimedia content personalization is the shift from one-size-fits-all to a very individual and personal one-to-one provision of multimedia content to the users. This means in the end that the multimedia content needs to be prepared for each individual user. However, if there are many different users that find themselves in very different contexts, it soon becomes obvious that a manual creation of different content for all the different user contexts is not feasible, let alone economical (see André & Rist, 1996). Instead, a *dynamic*, automated process of selecting and assembling personalized multimedia content depending on the user context seems to be reasonable.

The creation of multimedia content is typically subsumed under the notion of multimedia authoring. However, such authoring today is seen as the static creation of multimedia content. Authoring tools with graphical user interfaces (GUI) allow us to manually create content that is targeted at a specific user group. If the content created is at all "personalizable," then only within a very limited scope. First research approaches in the field of dynamic creation of personalized multimedia content are promising; however, they are often limited to certain aspects of the content personalization to the individual user. Especially when the content personalization task is more complex, these systems need to employ additional programming. As we observe that programming is needed in many cases anyway, we continue this observation consequently and propose MM4U (short for "MultiMedia for you"), a component-based object-oriented software framework to support the software development process of multimedia content personalization applications. MM4U relieves application developers from general tasks in the context of multimedia content personalization and lets them concentrate on the application domain-specific tasks. The framework's components provide generic functionality for typical tasks of the multimedia content personalization process. The design of the framework is based on a comprehensive analysis of the related approaches in the field of user profile modeling, media data modeling, multimedia composition, and multimedia

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