

Preface

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The term *cultural heritage* evokes images of historical sites and buildings, works of art, and less tangible objects like music and films. This collective heritage needs to be looked after and preserved for future generations, but it is also an inheritance to be understood and appreciated by the widest possible audience. It represents an ideal environment for investigating the *personalization* of information, i.e. accurate and specific selection of content to satisfy and accommodate individual user needs and knowledge, to engage directly with their interests and passions. Personalization of cultural heritage as a discipline is an exciting combination of humanities and science: it encompasses aspects of computer and information science, leisure and social activities, human-computer interaction.

Personalization of cultural heritage information as an area of research is now 10 years old. Early investigations in 1998 explored online and physical access to museum content or individual support for tourists: e.g., ILEX explored the dynamic generation of labels for virtual visitors of a museum website (Oberlander et al. 1998); HyperAudio focused on the dynamic creation of presentations for visitors exploring a physical museum (Not et al. 1997, 1998); AVANTI (Fink et al. 1998) selected and suggested services and places of interest targeted to the tourist's individual needs. ILEX and HyperAudio were grounded on natural language generation techniques and provided sophisticated adaptation of content on the basis of a rather simple user model. AVANTI used adaptive hypertext techniques to support the dynamic composition of

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personalized Web pages that included travel and accommodation information and services as well as descriptions of places of interest. In all three systems, the dynamic generation of content was rather complex and required the development of specialized editing tools (Isard et al. 2003; Petrelli and Not 2005; Fink et al. 1998).

The above examples show how personalization of cultural heritage can support different contexts of use: traditional PC use, mobile interaction inside a building, or nomadic interaction across a city. The variety of contexts stimulated research on user models that overcame the more traditional ‘knowledge and interest’ setting. The HIPS project, for example, explored several aspects of adapting content to context: in the Hippie prototype cognitive and social aspects (Opperman and Specht 2000) were proposed as an addition to the model of the visitor’s knowledge and interest (Opperman and Specht 1999); another HIPS prototype modelled few rooms in the Palazzo Pubblico in Siena (Italy) and captured the visitor’s physical pattern of movements to automatically personalize presentations (Bianchi and Zancanaro 1999), thus making the environment reactive and the technology disappear (Marti et al. 1999).

This research on personalization evolved with advances in mobile computing, exploring different devices, places, and interactions.¹ For instance, a Tablet PC was used in GUIDE (Cheverst et al. 2000) to support cultural city tours; a PDA was used in CRUMPET (Schmidt-Belz and Poslad 2003) to provide information and services for tourists. INTRIGUE (Ardissono et al. 2003) employed mobile phones to support the planning of group visits of a small region on several days, while wearables were utilized to show video clips on goggles while visiting an indoor exhibition (Sparacino 2002). Finally, in the *ec(h)o* project, an interactive cube supported tangible interaction in a museum (Hatala and Wakkary 2005).

Devices, places and interactions all contribute to a rich model of the context of use, a fundamental component of every adaptive cultural heritage system. Specifically, different devices provide different capabilities and constraints in terms of computational power and presentation; place is equally important, as being outdoor or indoor affects user position identification and connectivity; furthermore, the interaction offered to the user affects the way the user model is acquired (e.g., via questionnaire) and dynamically modified (e.g., by tracking the visitor’s path in a physical space). PEACH explored many of these issues by making use of plasma screens to introduce the visit and PDAs to support it: a virtual-agent moved from the screen to the visitors’ PDA and mediated a video-based adapted presentation (Stock et al. 2007).

To conclude this overview on 10 years of personalization of cultural heritage, we should note the recent growing attention among museum and cultural heritage professionals. Indeed the importance of adopting a personal style of visit dates back to 1985 (Finn 1985) and the theoretical foundation for differences in visitors’ behaviour was first discussed in 1992 (Falk and Dierking 1992). However, only recently personalization technology has been fully acknowledged as an effective medium to improve the museum experience (Falk and Sheppard 2006). So far, professionals have observed the technical evolution of the area, but they have not yet granted unconditional support.

¹ In particular, PDA technology pushed the development of mobile museum guides; see (Raptis et al. 2005).

This is mainly due to the complexity of the technology involved (Filippini-Fantoni 2003) and to the feeling that it is still in an experimental phase (Wakkary et al. 2007).

As attention to visitors and their participation continues to grow, more cultural heritage projects are involving the general public. Two recent efforts explore the bookmarking of interesting exhibits for re-access after the visit (Filippini-Fantoni and Bowen 2007) and the online annotation of objects in a museum to feed the online catalogue metadata (Trant et al. 2007). Both cases seem to appeal more to a limited number of visitors and enthusiasts willing to spend time and energy on something they consider useful and worthy. Personalization of cultural heritage exploration seems to fit well this new context of social collaboration and long-term interaction.

The papers included in this special issue encompass aspects of personalization of cultural heritage applications that consolidate past research and outline future trends.

The first paper, by Zimmerman et al., extends the above experiences with different modes of delivering content in a museum. The LISTEN system enriches the physical environment via interactive soundscapes tailored to the user's movements. The technology disappears and the personalization is smoothly integrated with the visit to create an evocative immersive experience. Empirical tests, carried out within an exhibition at the Kunstmuseum Bonn, showed that the provision of personalized sound and audio presentations greatly improves the user's experience.

Damiano et al. investigate aspects of mediation between the individual interest of the visitor and learning goals planned by the museum curators. The paper describes Carletto, a location-aware anthropomorphic guide presenting information about a historical site. The authors propose dramatized presentations as a way to mediate between the visitor's information needs and the presentation goals of the curator of the collection. The results of an evaluation with museum visitors suggest a set of personalization requirements useful for the design of new generation museum guides.

The importance of communicating core features of a personalization system to its actual user is investigated in the third paper. Cramer et al. analyze the way users perceive personalization in recommender systems in the cultural heritage domain. They describe the results of an empirical evaluation aimed at assessing the impact of transparency on the acceptance of user-adaptive systems. They show that explaining the user why a recommendation is made increases the acceptance of the suggestions, but it does not necessarily influence the trust in the system. On the basis of these findings the authors propose guidelines for the design of recommender systems in the cultural heritage domain.

The last paper by Carmagnola et al, in line with the more recent trends in cultural heritage organizations, uses social tagging and Web2.0 technology to generate adaptive recommendations in cultural heritage applications. The authors first describe the PAPER framework for the development of multi-device, adaptive recommender systems based on virtual communities. Then they present the iCITY recommender guide, an instantiation of the framework, which provides information about the cultural resources and events promoting the cultural heritage in the city of Torino, Italy. A preliminary evaluation of iCITY shows that users appreciate the social and community features offered by the system.

The articles in this special issue illustrate some of the challenges personalization in cultural heritage faces, but they also show the value of improving presentation and

navigation with advanced adaptation methods. We hope that readers find value in these articles.

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Authors' vitae

Liliana Ardissono is an Associate Professor at the Dipartimento di Informatica of the Università degli Studi di Torino (Italy), where she obtained her University Degree and her PhD in Computer Science. Her research interests include User Modeling, Adaptive Hypermedia and Service Oriented Computing. She is the author of more than 70 papers published in international journals and conferences. Moreover, she is Secretary of the Board of Directors of User Modeling Inc. and she is a member of the Editorial Board of *User Modeling and User-Adapted Interaction—The Journal of Personalization Research*. She was a co-editor of various publications, including the *UMUAI Special Issue on “User Modeling and Personalization for Television”* (2004) and the book *“Personalized Digital Television: targeting programs to individual users”* (Kluwer Academic Publishers, 2004). She was Program Chair of the 10th International Conference on User Modeling (UM 2005), Edinburgh. She also cooperates in various national and international research projects, including, QUADRANTIS (PRIN grant in 2006) and WS-DIAMOND (6th Framework Programme of the European Union).

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