

PATHS: Personalised Access To cultural Heritage Spaces

Eneko Agirre, Oier Lopez de Lacalle
University of the Basque Country
{e.agirre,oier.lopezdelacalle}@ehu.es
Paul Clough, Mark Stevenson
University of Sheffield
p.d.clough@sheffield.ac.uk M.Stevenson@dcs.shef.ac.uk

Abstract. This paper describes a European project called PATHS (Personalized Access To cultural Heritage Spaces) that aims to support information exploration and discovery through digital cultural heritage collections. Significant amounts of cultural heritage material are now available through online digital library portals, which can also be overwhelming for many users who are provided with little or no guidance on how to find and interpret this information. The PATHS project will create a system that acts as an interactive personalised tour guide through existing digital library collections. The system will offer suggestions about items to look at and assist in their interpretation.

1 Introduction

Content and users are setting an exciting agenda for innovation in digital libraries. Growing quantities of digital content and information are becoming available and are being produced in increasingly sophisticated forms. In today's society both individuals and organisations are confronted with growing quantities of content that needs to be made accessible and usable. This requires new services to enable people to create, explore and share content, and personalise their experiences of digital libraries. The success of the European Digital Library initiative depends in part on the ability to unlock its users' abilities to access, manipulate, use and share cultural heritage resources.

Significant amounts of cultural heritage material are now available through online digital library portals. However, this vast amount of cultural heritage material can also be overwhelming for many users who are provided with little or no guidance on how to find and interpret this information. Potentially useful and relevant content is hidden from the users who are typically offered simple keyword-based searching functionality as the entry point into a cultural heritage collection. The situation is very different within traditional mechanisms for viewing cultural heritage (e.g. museums) where items are organized thematically and users guided through the collection. Users of cultural heritage portals have diverse information needs and exhibit highly individualistic information seeking behaviours (e.g. information encountering and foraging) which are not well supported in standard search interfaces. Recent trends in information access services have recognized the necessity of providing support for more exploratory and

serendipitous search behaviours if services are to be effective in helping users with discovering and assimilating knowledge [3, 5, 4].

The PATHS project suggests the metaphor of paths through a collection as a powerful and flexible model for navigation that can enhance the users experience of cultural heritage collections and support them in their learning and information seeking activities. As a result will provide users with innovative ways to access and utilise the contents of digital libraries that enrich their experiences of these resources. The system will make user-specific recommendations about items of potential interest as individuals navigate through the collection. The user will be offered links to information both within and outside the collection that provide contextual and background information, individually tailored to each user and their context. Users can construct their own paths (independent paths) which can be saved for future reference, edited or shared with other users. These paths will be more than a simple list of items in a collection that the user has visited; they will also contain information about the links between the items, details of others items connected to them and connections to information both within and outside the collection that provides context. Groups of users can work collectively to create paths (collaborative paths), adding new routes of discovery and annotations that can build upon the contributions made by others. Users can also follow pre-defined paths (guided paths) created by domain experts, such as scholars or teachers. Guided paths provide an easily accessible entry point to the collection that can be either followed in their entirety or left at any point to create an independent path. Guided paths can be based around any theme, for example artist and media (paintings by Picasso), historic periods (the Cold War), places (Venice), famous people (Muhammed Ali), emotions (happiness), events (the World Cup) or any other topic (e.g. Europe, food).

PATHS will work directly with leading cultural heritage initiatives to advance understanding of user requirements and the research objectives of the project:

- **Alinari 24 ORE SpA.** The Alinari Archives hold a collection of 5,500,000 photographs which is growing at a rate of about 30,000 images each year.
- **Europeana** (<http://www.europeana.eu/>) is the prototype website of the European digital library. Europeana is incorporating millions of digitised items from Europe's archives, museums, libraries and audio visual collections and providing access through a single portal.

2 Objectives

The PATHS project will take a user-centred approach to development by bringing users into the research cycle from the beginning of the project, gathering their input at all stages in the development on how it can help to meet their needs and feedback on the functionality as prototypes are field-tested. The PATHS project consists of several separate, but connected, packages of work, including the following:

- **Gathering user requirements** and creating functional specifications from a broad range of users including those belonging to different groups, e.g. students, family historians and photographers and of different types, e.g. learning styles and needs from Cultural Heritage collections. These requirements will be used to develop

a functional specification for the systems developed during the project. These requirements will build upon those identified in previous work for cultural heritage information access systems [6, 2].

- **Processing cultural heritage content** and enriching it through identifying connections between items within a collection and complementing connections with existing relations and providing links to material both within and external to the collection that provides background information (e.g. to Wikipedia).
- **Designing effective user interfaces** through which users will interact with the PATHS system. These interfaces will provide users with personalised navigation through Cultural Heritage collections that is enriched with the additional information added through processing the digital content. The user interface will allow users to follow pathways created by other users and to share their own. This will build on previous work on personalisation in museums and digital libraries [7, 1].
- **Designing evaluation methodologies** and conducting of field trials to assess the performance (effectiveness, efficiency and satisfaction) of the systems implemented in PATHS in realistic scenarios. Evaluation will culminate in field trials in end-user scenarios. Particular focus will be on evaluating users search sessions and the value of paths generated by the user. Also, focusing on the evaluation of browsing techniques will form part of this research.

The vision is to build a system that:

- Exploits existing knowledge of users to optimise the effectiveness of interacting with digital heritage resources.
- Enables the testing and refinement of such knowledge.
- Enables new knowledge to be discovered.

This system will provide personalized access to resources by adapting suggested routes to the personalized requirements of individual users and groups. It will seek to:

- Respond to users in a cognitively ergonomic way i.e. by matching navigation to a learners preferred style and minimising any mismatch and consequent additional cognitive processing load. In this way, the learner will find exactly what s/he wants with the least effort. Navigation entails travelling the shortest path between starting point and desired end point.
- Challenge and stretch the user by via controlled and constructive mismatching. In this way, learners may develop increasing autonomy and versatility i.e. the ability autonomously to thrive in information environments not necessarily matched to their own preferred style. PATHS will also explore the extent to which users may be encouraged and helped to engage in cognitive processing in which they are less strong. For example, the extreme divergent thinker may usefully be encouraged (in certain learning circumstances) not to underplay complementary convergent processing. Cognitive research suggests that s/he may, without such complementary processing, exhibit over-generalisation and lack of grasp of detail. Conversely, the strong convergent thinker may be encouraged to explore and think more divergently (creatively) to avoid fragmented learning and failing to see the wood for the trees. PATHS will explore the potential of suggesting sub-optimal, but constructive paths to users.

3 Conclusions

The PATHS project aims to investigate and implement pathways in a naturalistic setting for a range of users and groups that regularly make use of cultural heritage information. A large-scale operational system will be developed for navigating on-line cultural heritage collections in a more effective manner than current searching functionalities. Pathways will be used to guide and assist individuals and user communities with information discovery and exploration within cultural heritage information spaces for learning and information seeking activities. This will support multiple information seeking behaviours and enhance the users' information access experience of digital library resources.

PATHS will focus on using content from Europeana. The breadth and depth of material provides a challenging data source, together with Europeana's status as a centralised portal for European cultural heritage material. Experimenting with user-adaptivity in this domain will benefit ongoing work on providing semantic enrichment to Europeana content and showcase the kinds of technologies which would make Europeana more accessible to a wider range of users and communities. However, PATHS will also show the generalisability of technologies developed in the project in developing prototype systems for content from Alinari. Contributions made by PATHS will be expected to benefit scholars and citizens alike in providing personalised information access.

4 Acknowledgements

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n 270082. We acknowledge the contribution of all project partners involved in PATHS (see: <http://www.paths-project.eu>).

References

1. Bonis, B., Stamos, J., Vosinakis, S., Andreou, I., Panayiotopoulou, T.: A platform for virtual museums with personalized content. *Multimedia tools and applications*, 42(2), 139-159 (2009)
2. Clough, P., Ireson, N., Marlow, J.: Extending domain-specific resources to enable semantic access to cultural heritage data. *Journal of Digital Information* 10(6) (2009)
3. Eaglestone, B., Ford, N., G. Brown, Moore, A.: Information systems and creativity: an empirical study. *Journal of Documentation* 63(4), 443-464 (2007)
4. Ford, N.: Information retrieval and creativity: towards support for the original thinker. *Journal of Documentation* 55(5), 528-542 (1999)
5. Foster, A., Ford, N.: Serendipity and information seeking: an empirical study. *Journal of Documentation* 59(3), 321-340 (2003)
6. Minelli, S., Marlow, J., Clough, P., Recuero, J.C., Gonzalo, J., Oomen, J., Loschiavo, D.: Gathering requirements for multilingual search of audiovisual material in cultural heritage. In: *Proceedings of Workshop on User Centricity - state of the art (16th IST Mobile and Wireless Communications Summit)*. Budapest, Hungary (2007)
7. Schmitz, P., Black, M.: The delphi toolkit: enabling semantic search for museum collections. In: *Proceedings of the International Conference for Culture and Heritage Online 2008*. Montreal, Quebec, Canada (2008)