

Project title: Cultural Heritage Knowledge Exchange Platform

Project description

In today's society several trends and changes are shaping the individuals and organisations find, use and share cultural heritage information and knowledge. Existing digital content libraries enable access to huge amount of cultural heritage information opening enormous opportunities for users but rising difficulties to find suitable data as well. At the same time, cultural heritage exponents - museums, exhibitors and historic sites have remained conservative and do not use the potential of digital libraries and web technologies to attract walk-in visitors. **The goal of the SMARTMUSEUM project is to develop a universal IT solution for museums, which enables personalised approach to digital content of artworks.** Technologies of the solution contain RFID/NFC based user monitoring, adaptive user profiling and multimedia content presentation. SMARTMUSEUM solution will help users to find easily desired cultural heritage information in a personalised format.

Summary of activities

During the first year of SMARTMUSEUM project the needs and interests regarding on-site digital content access were evaluated by walk-in visitors and museum professionals. Interviews performed by project partners clearly showed that participative, multimedia enabled access to cultural digital content is equally awaited by users of all countries. Based on high demand of full-featured audio-video experience the corresponding architecture of SMARTMUSEUM solution was developed and suitable Mobile Internet Devices were selected and tested. Practical design of web based software and user interfaces for museum multimedia guide and personal mobile phones started as well. The scientific focus of the first year project activities was on user formal profile description, statistical profiling software development and adaption of content annotation technologies. The most important result of first year activities is a common ontology for content, context and user preference presentation. During the next year the implementation of all components – user mobile device application, server software and digital content preparation will continue. Currently the project results have not reached public usage level.

Important work area

- **market prospects, user requirements and resulting “product” profile**

In today's society several changes and trends are shaping the way individuals and organizations find, use and share information. One of the main trends people are confronted with is an ever growing load and diversity of information including digital cultural heritage content and the lack of ability to find specific content based on their interest.



Despite of availability of digital cultural heritage content, the majority of museums do not use it to attract walk-in visitors or improve the on-site experience to be given.

SMARTMUSEUM project aims to broaden the variety of possibilities to distribute and access digital cultural heritage content on-site both indoors (museums) and outdoors (architectural, historical artifacts etc.) according to user profile and preferences. The use of human attention and location monitoring technologies, existing digital cultural heritage content, recommendation information gathered by social networks (wikipedias, blogs etc.), allow incorporating knowledge and suggestions of large groups of users into the learning experience.

Due the universal scalable SMARTMUSEUM solution museums do not have to develop their own unique and costly digital content access systems and may adapt a convenient user feedback interface. The system could be used by travel agencies for personalized tourism as well. From the visitor perspective SMARTMUSEUM solution will be launched as a free service.

- **technology outlook and innovative features**

The SMARTMUSEUM technology portfolio starts with RFID/NFC and GPS based user location and interest monitoring hardware, contains short range wireless networking for physical interest based user grouping and ends up with global web services for profiling and content discovery. The flexible user profile format contains cultural preferences, ones special needs, previous experiences, visit context information - all expressed using standardized metadata keyword sets of Getty Vocabularies and GUMO framework. A novel artifact recommendation system under development is combining traditional data mining technologies of user clustering with explicit interests and ontology driven approach. Even more, the recommendation system to be realized will take into account the context of previous and present visits of the particular user resulting in different recommendations depending on the goals of visits.

- **The demonstrator and results of field tests**

During the first year SMARTMUSEUM project no integrated field tests were done. However, several individual technology evaluation tests were performed. Firstly The performance of selected mobile user devices was tested including NFC communication as essential part of the final demonstrator. Second topic of evaluation was focused on different methods of statistical profile generation succeeded for test set of million objects. Early testing was focused on the features of final demonstrator – a showcase proving that profile assisted visits of walk-in tourists simplify their navigation within exhibition halls, receiving previous knowledge related multimedia information and conclusively getting stronger long lasting impression.



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User involvement, Promotion and Awareness

The SMARTMUSEUM technical solution is targeted towards European museums and digital content providers. **SMARTMUSEUM will provide a tool to allow museum visitors to have personalized access to the digitalized cultural heritage related to museum artifacts**, increasing thus interaction between visitors and cultural heritage objects in a future smart museum environment, taking full benefit of digitized cultural information.

The users of the SMARTMUSEUM system will be directly involved in the process. The SMARTMUSEUM consortium includes two **museums as end users** where public testing will be organized to get user feedback on system functionalities and ease of use.

As part of public dissemination, the SMARTMUSEUM consortium has launched its **website**, www.smartmuseum.eu, providing an overview of the project objectives and research focus. **Networking and cooperation with other ICT projects** was started at ICT 2008 Event in Lyon.. Further cooperation is foreseen with an FP6 project [CASPAR](#), which is dealing with novel solutions for digital preservation.

Dissemination via conference and workshop proceedings and publications in international journals has this far been carried out by KTH, TKK and IMSS. Altogether **10 articles** have been prepared and have either been published already or have been submitted for evaluation and reviewing. The consortium has submitted a joint scientific paper to the EVA Conference in Florence in April 2009.

Future Work or Exploitation Prospects

The second year of project will include continuation of development activities of user device HCI, SMARTMUSEUM profiling software and demo set content preparation. In the middle of year 2009 integration of individual components and artifact tagging will start at the partner museums. The testing of the whole solution is planned to the end of the year to be in parallel with dissemination activities. Since the usability of SMARTMUSEUM solution depends on quantity of participating institutions the main target groups for result exploitation are museums and digital content holders. The focus of dissemination is on exhibitions and museum conferences already started on the national level. It is expected that the solution will acquire critical amount of users for effective services in 2-3 years.

Future work regarding SMARTMUSEUM dissemination and exploitation will be guided by the *Exploitation plan* which objects at the following targets:

- Fully functional solutions will be developed at end user sites in Malta and Italy by the end of 2009
- Demonstration of the system is expected to be functional by June-July 2009
- Two workshops for end users and stakeholders will be held after the first demonstrators are implemented and tested.