smartmuseum

TITLE OF PAPER:
SMARTMUSEUM: Towards Intelligent Cultural Heritage Knowledge Exchange Platforms on Semantic Web

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ABSTRACT:
Cultural Heritage is referred to the legacy of physical artifacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations. Cultural Heritage is a domain that has been taking advantage of Semantic technologies to its own benefit for a while.
Ontologies have been utilized to model the knowledge about works of art, culture, travel and tourism. They have been allowing preservation of such information by extending the digitization of CH with metadata, creating interoperable data formats and schemas that can be shared and utilized in different domains such as digital libraries or across the internet. Emerging technology standards like RDF, RDFS and OWL and domain specific vocabularies such as VRA, Getty (ULAN, TGN and AAT), Museumdat and the CIDOC-CRM ontology specification are examples of these advancements creating webs of cultural legacies. At the top of these meaningful knowledge hives, intelligent applications and platforms can be built which can utilize these meaningful hives and allow machines and humans to interact with rich set of metadata repositories, creating notion of intelligent cultural heritage knowledge exchange platform.

We are presenting SMARTMUSEUM, a novel intelligent platform that allows personalized access to Cultural Heritage knowledge, which utilizes Semantic Web standards for Cultural Heritage knowledge creation, documentation and dissemination. We describe how Semantics enable the documentation of knowledge at Museum side, and how Semantics enable documentation of profiled knowledge of users, at users side, as well as how Semantics allows intelligent information retrieval across the platform from Museum side to Users side. We realize such intelligence by implementing state-of-art technologies such as adaptive user profiling and personalized recommendation generation, which are exchanged through mobile museum guides also accessible through World Wide Web.

The work for realization and implementation of such platform is enabled by EU FP7 SMARTMUSEUM project where industrial, academic and museum partners join their efforts to realize the goal of developing a universal IT solution for museums, which enables personalised approach to digital content of artworks. In this project partners from Sweden (KTH), Finland (TKK), Estonia (ELIKO) contribute to embedding Semantics into the platform by: enrichment of artworks, semantic representation for user profiles and realization of semantic services enabling recommendation and personalized information retrieval, partners from Bulgaria (Webgate), France (INRIA) contribute to development and mobile interaction with platform by: implementing interfaces on Symbian and Windows Mobile devices, enabling ubiquitous sensor fusion through RFID and GPS tagging and positioning, while museums in Florence, Italy (Institute and Museum of History of Science) and Malta (Heritage Malta), provide physical and virtual experiment environment for realization of software platform. To present audience with the progress of the ongoing work at the project, a public demonstration will be held during SEMAPRO2009 in Malta.

PRESENTER'S BIO :
Nima Dokoohaki is a researcher and a PhD student at Royal Institute of Technology (KTH), Stockholm, Sweden. Nima holds a bachelors degree in Software Engineering and a masters degree in Software Engineering in Distributed Systems. He is currently focused on researching Semantic user profiling and recommender systems under EU FP7 SMARTMUSEUM project.

His general research interests include Web Intelligence and Semantic Technologies. Nima has been in close cooperation with International Academy, Research and Industry Association (IARIA) for past two years.
He won a best-paper award for his paper at SEMAPRO2007, in Tahiti. In addition to academic activities, Nima has been in close cooperation with industry as well. He has been an observer, evangelist and practitioner of Service Oriented Architecture (SOA), Web Services and e-Business standards for past 5 years. He is a former member of OASIS (Organization for the Advancement of Structured Information Standards), a not-for-profit consortium that drives the development, convergence and adoption of open Web Services standards. During 2008 ,in the role of an SOA architect, he practiced adoption of SOA and Web services standards at Enterprise level, at a Swedish telecom operator, in Stockholm, Sweden.

SUMMARY OF THE APPLICATION /ONE PAGE/ :

SMARTMUSEUM: Cultural Heritage Knowledge Exchange Platform
www.smartmuseum.eu

In today's society several trends and changes are shaping the individuals and organisations find, use and share of 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 an universal IT solution for museums, which enables personalised approach to digital content of artworks.** Technologies of the solution contain RFID and web log based user interest monitoring, adaptive user profiling and mobile device multimedia content presentation. SMARTMUSEUM solution will help users to find easily desired cultural heritage information in a personalised format.

First official public demonstration will held during SEMAPRO conference in Malta, October 2009.

Technology outlook and innovative features
The scientific focuses of project are user formal profile description, hybrid profiling combining semantics and statistics, adaption of content annotation technologies. The most important result of the project in this area is a common ontology for content, context and user preference presentation. The developed user profile consists of cultural preferences, personal abilities and skills, previous experiences including context information - all expressed using standardized metadata of Getty Vocabularies and GUMO framework.

The SMARTMUSEUM technology portfolio includes RFID/NFC and GPS based user location and interest monitoring hardware, short range wireless networking for physical interest based user clustering and global web services for profiling and content discovery. The real user needs and interests regarding on-site digital content access were deeply evaluated by walk-in visitors and museum professionals in Malta and Florence. Based on high demand of full-featured audio-video experience the SMARTMUSEUM supports full multimedia and text-to-speech functionality for Windows Mobile PDAs and Symbian smartphones.

User involvement, promotion and awareness
The SMARTMUSEUM technical solution is targeted towards European museums and digital content providers e.g. Europeana network. Due the universal scalable solution the museums joining the network do not have to develop their own solutions for content annotation, multimedia guiding and may adapt a convenient user preference feedback interface. The system could be used by travel agencies for personalized tourism services as well. 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. From the visitors' perspective SMARMUSEUM solution will be launched as a free service.