A Mobile Asset Sharing System for Digital Cultural Heritage

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Abstract
This poster paper presents ongoing work in the design, construction, and evaluation of a digital asset management system for digital cultural heritage resources. This work has taken the form of a series of interlinked exploratory prototypes that have then guided continued development. The first stage was the design and building of a community-based digital repository for sharing media relating to heritage sites of cultural and scholarly interest. Currently the asset management infrastructure is being used on a pilot basis to store and deliver information for a cultural heritage site in Ireland. The system facilitates mobile access and upload of digital content from scholars on site, and community sharing. Structured content organisation of geographical markers, 3D model support, video playback and metadata annotation are areas of ongoing work.
Keywords: digital cultural heritage, asset management system, mobile applications, sharing.

Introduction

Digital cultural heritage is becoming increasingly important as people use digital technologies to document and explore their history and environment. Digital Cultural Heritage can be defined broadly as the use of Information and Communication Technology for Cultural Heritage purposes (Cameron and Kenderdine, 2007). In this project a deliberate effort is being made also to build an active community of users (Borgman, 2004).

The cultural heritage site, Spike Island, lies off the south coast of Ireland (Martin, 2008), the site of a mediaeval church, it has at various times been farmed, used as a military fort, convict depot, and prison. This is an area of cultural and scholarly interest with tourist potential. Coastal and marine scientists are keen to use the uninhabited island as a research location. Pre-existing digital materials (documents, maps, photographs) and newly collected content are stored on behalf of the anticipated user community of scholars and scientists. New content generated from this community, including photographs, building models, and textual descriptions have associated metadata descriptors such as timestamp and geo-tag. 3D models of the major structures on-site have been developed. It is envisaged that the Spike Island site will be developed over an extended period.

Design of Asset Sharing System

A key element of the project was the development of a community-based digital repository for sharing assets. This is tailored to the types of content and use cases on the Spike Island project.

A project specific taxonomy and project specific custom fields have been developed for the asset database. This was implemented in the third party module Content Construction Kit (CCK) which enables custom fields and associated widgets in Drupal. This is fully integrated with other modules such as Views.
Point of Interest (POI) information and associated metadata are stored in addition to the objects themselves. The asset management system is part of the “invisible infrastructure” (Paisley, 1980) behind the project that employs scalable standard technologies.

The Web-enabled asset management system (AMS) is built in an Apache 2.0 Webserver, Drupal 6 content management system, PHP 5 and Java 6 on the server-side, Javascript and JQuery on the client-side, and with a MySQL backend. The AMS supports various content media types (documents, images, video and audio), and functions including previewing, search, internationalization (i18n), and access control. The Java Lucene API is used for search and retrieval.

All media viewing – whether remote (on-site) or desktop – is by means of dedicated content delivery and playback modules. Free, open standards (HTML5, Open Standard Player) are used here. Technologies such as Flash that may not be supported on some platforms are thus avoided. There is a desktop-only Asset Management Browser (AMB), but the focus has mostly been on mobile access. The AMB uses Java WebStart (JWS) and the XML-based Java Network Launching Protocol (JNLP) to display 3D models. JWS and JNLP are supported by all the major Web browsers. Applications are launched as executable Java Archives (JARs). Mobile communication with the application server consists of HTTP messages and the JSON format.

**Mobile Applications**

Two mobile applications (one for the Android and one for iPhone iOS platform) have been developed to investigate potential uses of mobile devices on-site for both site exploration and real-time access of the digital repository by scholars. These provide features such as on-site object positioning and identification, recording and text, image and video upload. Both of these employ location-based information (GPS) and digital mapping software (Google Maps API). In related efforts prototype mobile augmented reality and video streaming are being investigated (O’Riordan and Murphy, 2011). These applications use the Wikitude API for geolocation and the AndAR toolkit for 3D model rendering. 3D support on the mobile platforms is with OpenGL ES.

These efforts are to facilitate a two-way flow of information on- and off-site, allowing scholars and scientists to both access information and upload new content and annotations. Current network access is only through 3G mobile telephony, WiFi access will be necessary to fulfil this function in the future.

**Evaluation**

A small scale usability test (Liu, 2010) has provided feedback on the core features of the AMS. Ten people where registered to test the core features such as browsing, search, tagging and playback. Feedback was overall positive. Issues that arose included that many of the users did not have a Java browser plugin installed. It remains to carry out usability studies on the mobile apps. This will then feed into the next stage of the project which will develop the annotation features for working scholars, among others.

**References**


