The Atlas of Maritime Buddhism Technical Infrastructure for Collaborative Development

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Abstract

The Atlas of Maritime Buddhism project being led by Prof. Lancaster, Director of the Electronic Cultural Atlas Initiative (ECAI), is a complex project with team members from multiple institutions, disciplines, and regions. A large volume of already existing materials is being collected and more will be produced. The material has a wide variety of data types and sources. Providing data storage and access control, supporting reuse of existing data, and enabling development of integrated, multiple media products will be challenging.

However, we have an opportunity to develop this project using a new generation of data portals, research support and collaboration tools, analysis methods, and presentation tools. The project team members are sharing information systems and tools as well as data. A number of these tools and collaborations are presented in this paper.
ECAI is helping to coordinate the development of a support infrastructure for information on the history of Maritime Buddhism. Team members are encouraged to suggest tools to add to the infrastructure. Building this infrastructure, not just collecting the data for a single function, opens up the possibility of developing a myriad of views and visualizations of the materials. Using shared-tools, members of the team can produce their own views of the materials, focusing on research topics or new insights. The group as a whole can develop and distribute museum and educational products for global distribution.

Introduction

For over the past fifteen years, ECAI has supported development of collaborative research in an array of related fields including: religious atlases, cultural heritage, spatio-temporal visualizations, gazetteer development, digital library tools, and ePublications (Fig. 1). Over this period many new technologies have been introduced and some have been displaced. One of the conclusions from this experience is that any infrastructure or set of tools must be able to easily adapt to change. It must also be easy for team members to contribute data and extract data as needed. Many of the team members of the Atlas of Maritime Buddhism project have substantial and even outstanding technical capabilities and systems, which they use for their particular content area or research field. To support this project, tools that allow team members to contribute access to specific data for development of a team data library is essential.

A platform for collaborating through data annotation will support team authoring of reference resources such as gazetteers, timelines, bibliographic materials, and data sources that can be used by all team members. Existence of a centralized data server will assist in data collection and identification, especially for those who do not have a large-scale data storage system. Contribution of analysis and visualization tools by team members can be linked to this infrastructure to provide a platform for research and for development of the museum displays and publication products planned for the Atlas.

Infrastructure and Tools under Development

The Comprehensive Knowledge Archive Network

I-Chun Fan and his team at Academia Sinica in Taiwan and ECAI have been discussing an infrastructure to provide support for a Consortium of Cultural Atlases. To support this effort Hsiung-Ming Liao and Yao-Hsien Yeh, at Academia Sinica, are implementing a shared data platform. They have implemented CKAN (ckan.org), the open-source data portal platform developed by the Open Knowledge Foundation. CKAN has a wide user base including several major data.gov platforms including the UK, USA, Australia, and Japan. CKAN is a powerful data management system for publishing, sharing, finding and using data. It has fine-grained access control and an integrated data API. And important for ECAI and the Maritime Buddhism project is the strong support for spatial data built into CKAN.
The Academia Sinica team is in the process of customizing CKAN for the ECAI Clearinghouse and Cultural Atlas projects. The portal will provide important services for the scholarly community (Fig. 2). It will give a central, standardized location for a large number of cultural information sources that are currently at security risk. And, by integrating the resources into a larger system gives them greater visibility and resilience.

A collaboration space in the CKAN portal is being set up for the Maritime Buddhism project. The CKAN system is an ideal system for hosting a wide variety of materials with a range of data types and metadata and has strong support for spatial data. The server can store project materials under development and can continue to host them when completed as an efficient access library and archive (Fig 3.). It will support reuse of data and development of multi-media materials for multiple products.

**Editors’ Notes**

Professors Michael Buckland and Ryan Shaw initially developed a system called Editors’ Notes (http://editorsnotes.org ) to enable groups of documentary editors to collaborate on their notes, reduce duplication of research and make more of their hard work available to others (Fig. 4). The Website states: “Editors’ Notes is an open-source, web-based tool for recording, organizing, preserving, and opening access to research notes, built with the needs of documentary editing projects, archives, and library special collections in mind.”
The Editors’ Notes project is now expanding its scope to support collaborative research projects. An account in Editors’ Notes has been set up for the Atlas of Maritime Buddhism. An initial project using Editors’ Notes will focus on supporting collaborative development of a reference gazetteer of place names related to the history of Maritime Buddhism. During the fall semester, 2014, Editors’ Notes is incorporated by Lewis Lancaster for his planned course assignments. His students will be assigned to research specific locations, important in the dispersal of Buddhism through Southeast Asia, and to collect published material. This data will become annotation for the dynamic Maritime Buddhism reference gazetteer.

**Maritime Buddhism Gazetteer**

In the processing developing our ECAI Cultural Atlases one of first things we find that we usually need is a reference gazetteer. We are collecting information on the primary places of interest and document: place names over time, location in latitude and longitude, start and end dates of each instance, feature type (such as port or stupa), notes on accuracy and certainty of location and time information, and bibliographic information on sources.

I have recently developed an initial draft Atlas of Maritime Buddhism Gazetteer in collaboration with Prof. David Blundell, National Chengchi University, Taiwan. The gazetteer includes a set of points representing historical sites and regions (Fig. 6). Locations are being researched online with annotation of source information and often using multiple sources to verify locations. It has been developed using GIS (open source QGIS) and Google Earth. Points are registered by latitude and longitude of sites some of which can still be found in Google Earth satellite imagery. Where there is sufficient data, regions or kingdoms are being geo-rectified with polygons being created and will be available for team use. A centroid of the region is used in the Google Fusion implementation to provide a simple set of data points. Historical maps will be geo-registered and under discussion are possibilities for automated geo-registration and location harvesting from the cartography (Fig 5).

![Figure 5. Detail of Physical Chart of the Indian Ocean by A. K. Johnson, David Rumsey Map Collection.](image)
Figure 6. Atlas of Maritime Buddhism initial Gazetteer draft in QGIS, Jeanette Zerneke, 2014.

The gazetteer will be used as a reference data source within the Maritime Buddhism implementation in Editors Notes such that researchers and note writers will be prompted with the agreed upon spelling and it will link to current information about the place automatically. So, for instance, if the agreed upon location of the place changes, it won’t have to be changed in a myriad of places in the annotations. As we get further along, the gazetteer will be hosted for public access in the Maritime Buddhism project’s CKAN portal and can be linked to using web services.

**Atlas of Maritime Buddhism, Maritime Museum Exhibits and Multi-media**

For many years Lewis Lancaster has been working with Sarah Kenderdine, University of New South Wales, Australia, on designs for development of 3D and interactive, immersive environments for his Blue Dots research work on the Buddhist Canon. Now they are working together on designs for the Atlas of Maritime Buddhism museum displays being planned for the Maritime Museum in Hong Kong in 2016 and other venues. Since Sarah Kenderdine will be presenting this work earlier in the Workshop I will only mention it here. Sarah Kenderdine has a very impressive oeuvre of works that include the highly successful and relevant exhibition: “Pure Land: Inside the Mogao Grottoes at Dunhuang, a seminal research project that envisions the future of digital preservation, cultural heritage interpretation and an embodied museography” (http://alive.scm.cityu.edu.hk/projects/alive/pure-land-ii-2012) (Fig. 7).


The paper by Blundell and Zerneke, “Electronic Cultural Atlas Initiative—Early Austronesian Historical Voyaging in Monsoon Asia: Heritage and Knowledge for Museum Displays Utilizing Texts, Archaeology, Digital Interactive Components and GIS Approaches,” International Journal for Humanities and Arts Computing, January 2014, we explored some of the potential for developing a range of animated, interactive installations, and augmented realities for the Austronesian and Maritime Buddhism atlases. 3D and immersive installations are providing exciting new ways to deliver historical information in integrated environments. These mobile Apps with augmented reality demonstrate presently available technologies such as GPS and enhanced functions on smart phones for providing
a new layer of experience linked to physical artifacts. Museums have started to leverage the capabilities of mobile computing to provide online wireless resources with rich contextual information.

**Conclusion**

To increase the capability and efficiency of the highly talented Atlas of Maritime Buddhism project team members, ECAI is helping to coordinate the development of a support infrastructure. Some of the components already being built are described in this paper. In addition, team members are encouraged to suggest tools to add to the infrastructure. Building this infrastructure, not just collecting the data for a single function, opens up the possibility of developing a myriad of views and visualizations of the materials.

Individual members of the team can produce and publish their own views of the materials, focusing on research topics or new insights. The group can develop museum and educational products for global distribution. By both enabling reuse of data and providing shared access to tools the project will provide valuable support to its members. Finally, ECAI will continue to encourage collaborative development of customized tools for data analysis, visualization, and electronic publication. Together these efforts will foster an environment where the team and its members will be able to produce more than the members could have done on their own. This is the substantial reward for collecting, organizing, and sharing our important work.