The Mesoamerican Corpus of Formative Period Art and Writing

Author: Cameron J. Berkley
Co-PIs: Dr. Dennis E. Slice, Dr. Michael Carrasco, Dr. Joshua Englehardt
Department of Scientific Computing, Florida State University

Abstract

The Mesoamerican Corpus of Formative Period Art and Writing is a digital resource that will expand currently-available data to facilitate and robustly support research on the emergence of writing in the New World. The goal of the project is to reveal the artistic and scribal traditions of the Olmec culture, Mesoamerica's first civilization and the originator of an ancestral sign system from which all later Mesoamerican writing developed. The Corpus assembles a database of Formative period (ca. 1500-400 BCE) Mesoamerican iconography and writing in a digital catalog accessible via intuitive and interactive web and mobile applications. This suite of digital research tools, including an innovative visual-input search tool, are targeted to a broad range of users, from academic researchers to K-12 teachers and students. These tools allow users to compare, analyze, and visualize relationships among a broad corpus of visual data, archaeological materials, and conceptual information. We envision the educational reach of The Mesoamerican Corpus of Formative Period Art and Writing surpassing the presentation of essays and static visual data to allow for the dynamic search, visualization, and investigation of a corpus of material currently only partially available in scattered sources with restricted access, such as small, regional Mexican museums.

Introduction

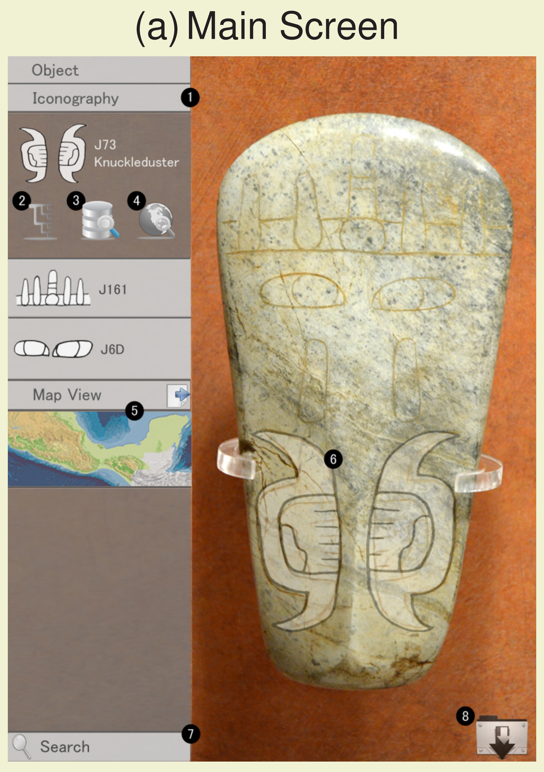
This project aims to surpass the presentation of essays and static visual data on Mesoamerican Formative Period art and writing to allow for the dynamic search, visualization, and investigation of a wide range of visual, archaeological, and conceptual information. These new digital technologies will move beyond a "website" or searchable database of materials to produce a set of resources and applications that do not exist purely as a presentational medium, but rather allow for the active manipulation of data that leads to new ways of thinking about that material.

Web and Mobile Applications

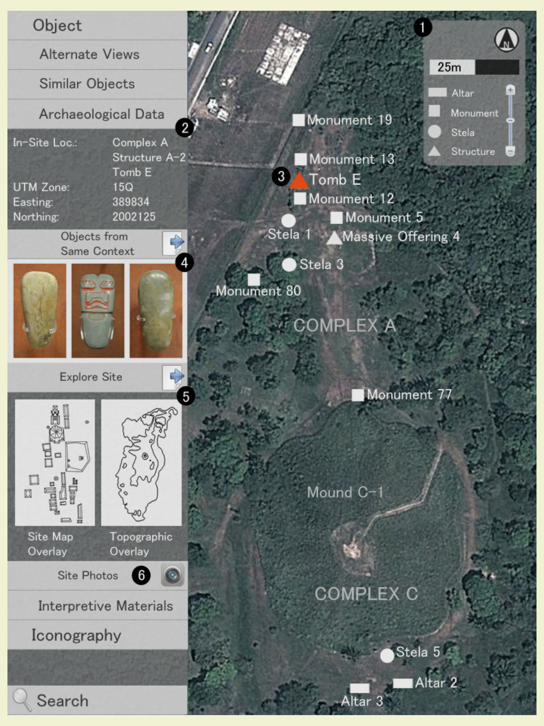
Web and mobile applications are under development tol make the corpus and associated research tools available to researchers in the lab or in the field. From the home screen (Fig. 1a), users will have three primary points of entry: Objects, Iconography and Writing, and Sites. Selecting Objects will call up a list of specific objects in the catalog with thumbnail photos of each object. Selecting one of the photos will take the user to the Object View screen (Fig. 1b) which displays a high-resolution image of the object, information about the object, and additional options. Selecting Iconography and Writing (Fig. 1c) calls up a list of iconographic motifs and script elements found on objects in the database. Selecting an individual motif, users may either access a list of objects on which the motif appears or bring up a map view that displays all sites at which the selected motif has been found. Selecting Sites (Fig. 1d) calls up a scalable, interactive map that displays all sites at which objects in the database have been found.

(a) Main Screen

(b) Object View



(c) Iconography View



(d) Site View

Fig. 1

Web and Database Back End

The back end is divided into two major components: the web server and the database server. The database server is powered by MongoDB (MongoDB 2015, Fig. 2b) and stores the corpus of information in a document-oriented, NoSQL fashion. Unlike traditional relational databases, data are not stored in columns and rows, but rather "documents" which consist of key-value pairs. The web server, powered by Node.js (Node.js 2015, Fig. 2a), serves to both handle HTTP requests and as an intermediary between the front end and the database.

(a) Server-Side Platform (Web, Data)

(b) NoSQL Database

Fig. 2

The web server serves the visual and interactive components (HTML, CSS, and Javascript) separately from the data itself, which is accessed through a REST (representational state transfer) interface which calls on the database. In this way, both the web and mobile clients may access the data in the same way, despite having different implementations. This also allows for the possibility of third parties to implement their own interface to access the corpus database without the need to modify the back end.

Web and Mobile Front End

Both the web and mobile clients (the front end) employ HTML, CSS, and Javascript to structure, style, and provide interactivity to the user interface. The Bootstrap (Bootstrap 2015, Fig. 3a) front-end framework is used extensively for page templates, forms, buttons, navigation, and other interface components. Through the use of javascript, the front end is able to request data from the REST server and insert it into the page interactively as the user navigates. The maps in the Object and Site views make use of OpenLayers (OpenLayers 2015, Fig. 3b) to display sattelite and geographic data from Google Maps, as well as the locations and layouts of objects and sites pulled from the corpus database.

(a) Bootstrap

(b) OpenLayers

(c) Phonegap

Fig. 3

The PhoneGap (PhoneGap 2015, Fig. 3c) mobile development framework was chosen for the mobile front end, as it allows much of the HTML, CSS, and Javascript from the web application to be reused in a "hybrid" mobile app, rather than implementing a purely-native application for each platform (Android, iOS, etc.) in their respective native languages. Unlike a web application accessed via mobile, the PhoneGap application will allow for a native feel as well as access to native features such as the camera, storage, and location services.

Visual-Input Search and Future Work

Given the inherent visual nature of the material, searches that are based on the input of images-such as a researcher's own drawing of a motif-will permit investigators to explore the corpus in ways impossible with keyword searches. This goal will be achieved by surveying new technologies based on advances in visual recognition software, (Belognie et al. 2002; Roman-Rangel et al. 2009; Batuwita et al. 2011; Frauel et al. 2006), and by extending and developing original digital tools for visua- input searches and the presentation of comparison data. Ultimately, a researcher will be able to photograph a motif on an artifact not found in the corpus, and find all artifacts within the database that share this motif. During this Level II Start-Up Grant, much work has been completed in developing prototypes of the back end and the web front end. With an Implementation Grant from the National Endowment for the Humanities, the full functionality of the final application will be actualized.

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 cjb10m@my.fsu.edu