

Browsing Historical Pompeian watercolours through a Google Earth-based meta interface: Luigi Bazzani's Exhibition

A. Coralini¹, A. Guidazzoli², M.C. Liguori², A. Baglivo² and M. Spigarolo²

¹ Department of History and Human Cultures, University of Bologna, Italy

² CINECA Interuniversity Consortium, Casalecchio di Reno, Bologna, Italy

Abstract

A Google-Earth-based meta interface provides the traditional text-based access to cultural repo DB with an easy and quick way for gaining insight into the full available data. Developed at Cineca for the Department of History and Human Cultures - Bologna University – the interface is proving its flexibility with this case of re-use as a support to an upcoming exhibition about watercolours realized at Pompeii at the turn of XIX century.

Categories and Subject Descriptors: H.5.2 [User Interfaces]: Graphical user interfaces, I.3.8 [Applications], J.2 [Physical Sciences and Engineering]: Archaeology, J.5 [Arts and Humanities]: Fine arts

1. Introduction

In 1998, after the call issued by the Archaeological Superintendency of Pompeii to national and international research institutions to valorise the archaeological sites of the Vesuvian area, saw light the “Vesuviana” framework, directed since then by professor Daniela Scagliarini Corlàita, with the Archaeological Department (currently Department of History and Human Cultures) of Bologna University. The pilot project “Pompei-Insula del Centenario (IX 8)”, aimed at fully documenting a large neglected *insula*, has since become a lively lab involving more than 300 collaborators and researchers pertaining to several disciplines. In order to best communicate the results, in 2000 started a collaboration with Cineca ViSIT Lab (<http://www.cineca.it/en/page/visit-technologies-and-applications>) that implemented a series of virtual applications such as, as a first output, the reconstruction of the “Casa del Centenario” used also, in 2004, as a backdrop for the scenes shot in a Virtual Set for the documentary “High Tech Pompeii”. In 2005 “Vesuviana” extended its attention to *Herculaneum*, and the collaboration with Cineca focused on the organisation and fruition of the wealth of non-homogeneous data, gathered in different databases, linked directly to virtual reconstructions (with the “Casa dello Scheletro” as case-study) [Cor09].

At present, while the archaeological researches continue, Cineca is coming along with new ICT applications, always aimed at communicating to a public wider than that of the researchers alone the results of on-site work: for example, as we will see in this paper, for the upcoming exhibition about a conspicuous set of more than one hundred watercolours realized at Pompeii by Luigi Bazzani at the turn of XIX century. Among the “Pompeianist” painters, Bazzani

stands out for his unique adhesion to the objective fact: for their incredible realism his watercolours seem to compete with photography. This characteristic makes them a valuable source of information for archaeologists and scholars, since many interiors, that at the time of Bazzani were still in good condition, are now irretrievably gone.

The topographical feature of Bazzani’s watercolours made them particularly suitable as a case of re-use for the prototypal geographical interface developed within the PARSJAD project (Archaeological Department of Bologna University and IBACN - Emilia-Romagna Regional Directorate for Cultural Heritage) by customizing a layer of Google Earth [CGL*12]. The occasion has been offered by the set up of the exhibition “Pompeii in the XIX century in the paintings of Luigi Bazzani” organized by the Archaeological Department of Bologna University in partnership with Fondazione del Monte of Bologna and Ravenna. Alongside the temporary exhibition, in Bologna and Naples, a permanent one will grant on the Web open and continuous access.

2. The PARSJAD prototype and its meta-interface

Before delving into the technical features of the application developed for the exhibition about Bazzani, it is necessary to explain the PARSJAD prototype, that is, the meta-interface for the geographical browsing of heterogeneous cultural data developed within the European project PARSJAD for the Archaeological Department of Bologna University and IBACN - Emilia-Romagna Regional Directorate for Cultural Heritage.

The PARSJAD prototype, aiming at valorising the Samira catalogue by IBACN, that collects Cultural Heritage data pertaining to the Emilia-Romagna region (bbcc.ibr.re-gione.emilia-romagna.it/samira/v2fe/index.do), provides two ways for querying and displaying data: the first one is based on Google Earth and takes advantage from the inherently geographical connotation, and hence their spatial organization, of cultural data in order to provide immediate and intuitive knowledge about the contents of repositories [SK06]. The interface is generalized: it is independent from any specific software for the management of the related databases and does not perform queries on the entire complexity of the data, but refers to the source repositories for the navigation and any further analysis. The second way for querying and displaying data (currently under development) will, instead, access data through the navigation of models (philologically accurate 3D reconstructions), made accessible through a different viewer based on X3D technology. This second interface will be better connected to the navigation of the DB in its entirety.

As aforesaid, the prototype implements, as its main source of data, the access to Samira, the DB repository developed by IBACN. However, its architecture has been designed to be cross-platform and independent from specific data access technologies. To this end, the architecture of PARSJAD has been developed in three tiers [Eck95], with a central layer that acts as a connection (overlay layer) between the data format used by the interface in itself (for example, the positioning of info on territory) and the format in which data are made available by the DB repositories. The 3-tier pattern represents a specificity of the present solution when compared with other ones [SSF10].

2.1 Presentation tier

The presentation tier is the level of the interface in itself. For this layer the PARSJAD prototype uses XML, KML and Google APIs to add a new level of data to the standard one implemented by Google Earth [DBB*11]. Among the main technologies available at present for the customisation of a landscape browsable via Web (X3D, Unity 3D, OSG4Web and Google Earth) Google Earth was chosen as the most appropriate for the goals of the project [CGL*12].

2.2 Middle tier (or overlay layer)

The overlay layer is the connecting layer that allows to generalize the interface and abstract it from specific repo DB (communicating with the layer below). This layer receives in their native language data collected from the layer below and transforms them into an intermediate language that can be processed in KML file for the layer above. To this purpose, the following layer consists of an XML Schema grammar implemented *ad hoc* (which we will refer from now on as “PARSJAD Grammar”) and an XSLT document for the validation and automatic generation of KML files.

2.3 Data tier

The data level is made of geographically distributed data coming from the repo DB server. In this layer, the informa-

tion is kept neutral and independent from the operations made in the upper layers. It is retrieved from different communication protocols, dependent on individual architectures, and it is passed on to the upper layer to be converted into the intermediate language, on the basis of the “PARSJAD Grammar”.

3. Implementing the prototype

The prototype implementation was achieved by interpolating a KML file structuring the parts that define the new level of data (placemarks, balloons, low poly models in DAE format, Photo Overlay, any pre-programmed tour, etc.). With the information coming from the DB repositories connected to the interface, a KML Network Link, containing a PHP script run by the Middle Tier, is automatically produced. This KML is interpreted by Google Earth and shows the end-user the graphical content of the stored information. Regardless of the way in which requests are performed to different databases, through the “Parsjad Grammar” and an XSLT document, information is automatically translated into an XML file (client side) mirroring the XML Schema used by Parsjad. Hence, such information reaches the highest level (presentation) already customized in KML format by the intermediate layer, where the XML will further translate data into KML format, used by Google Earth plug-in to display data upon the landscape.

The key point in the automatic customization of the new data level is, therefore, the XSLT document that allows the automatic creation of the KML file starting from the harvesting of data in native language. The KML file:

- Processes the information coming from the DB repositories;
- Inserts placemarks using the georeferencing coordinates associated with data;
- Places a logo associated with the placemark (which changes depending on the pertaining repo DB);
- Creates a balloon associated with the placemark and customizes its information (including the navigation links to the portal of origin);
- If available, places on the territory an image, chosen among the most significant ones coming from the bounded DB repos, as a photo overlay;
- If available, places on the territory a low poly DAE model coming from the bounded DB repos.

4. A case of re-use: from the PARSJAD prototype to the interface for Bazzani’s Exhibition

The adaptation of the PARSJAD prototype to the needs of the application for the exhibition about Luigi Bazzani can be seen as the first case study to test its versatility, made possible by the adoption of a three-tier architecture, that enables actions on any of the levels implemented without affecting the others. In particular, the application dedicated to Bazzani made it necessary to customize the intermediate level by changing the XML Schema grammar in

order to include additional data regarding the specific project. This, as a direct consequence, resulted in the change of the XSL style sheet that, as in PARSJAD, takes care of creating the KML related to the data dynamically harvested from the repo DB and, then, displayed on the landscape. The KML file passed to the presentation tier contains the description of the balloon, the placemark, the photo overlay and the DAE models to be placed on the ground. The application for the exhibition, unlike the one developed for the PARSJAD project, is a web application that does not require reading from a repository, but the insertion, modification and deletion of data through the use of a mask, provided with an authentication mechanism, expressly implemented.

From the point of view of the end user, the prototype opens up with a view framing the archaeological area of Pompeii, the Vesuvius in the background and the coast on the left (Fig. 1). The archaeological sites of interest are pointed to by a placemark. Each is marked by an icon made of a cartouche with the signing of Luigi Bazzani. Whenever available, next to the placemark is displayed the more representative watercolour of the site: this image is contained in a "Photo Overlay", one of the tools provided by Google Earth to analyse images in detail (Fig. 2). By double-clicking the image the user enters into "photo mode", where it is possible to zoom the watercolour (Fig. 3). At the top right of the screen appears a mini-map of the photo overlay. It is possible to analyse the image both by moving the rectangle in the minimap and through the photo overlay. Since the architecture of this application derives from the one adopted for PARSJAD, in addition to the photo overlay it is possible to have low poly COL-LADA models [GRR*08] or, alternatively, hi-poly models in X3DOM (this part of the project is under development). By clicking on the placemark a balloon opens: it contains the name of the site (in our case they are almost exclusively Pompeian buildings and some public spaces pertaining to ancient Pompeii), the year in which the excavations started, a brief description and a link to a descriptive card (if present) (Fig. 4).

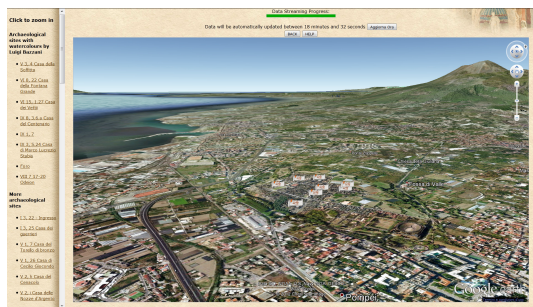


Figure 1: The opening view of the application.

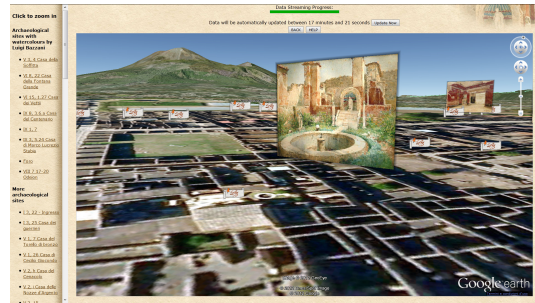


Figure 2: Placemarks and Photo Overlay.

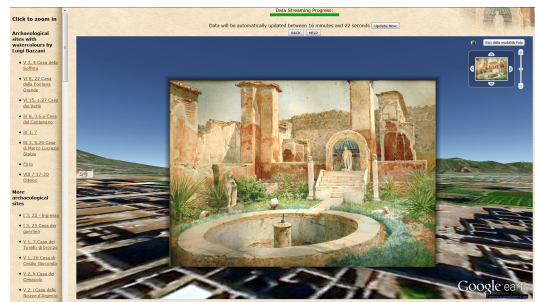


Figure 3: Entering the "photo mode".

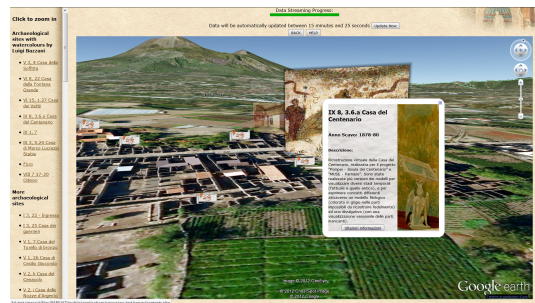


Figure 4: A balloon opens up by clicking the placemark.

By clicking on the link a new browser tab, containing the layout of the site, opens up (Fig. 5). Through the layout of the Pompeian building the end-user can obtain information about each room. For each room there are one or more views: for each view you can make a comparison among a vintage photo, the watercolour by Luigi Bazzani and a nowadays photo taken from the same perspective chosen by the painter for the realization of his watercolour; finally, it is also available a detailed description for each view (Fig. 6). Rooms with information are highlighted on mouse over.

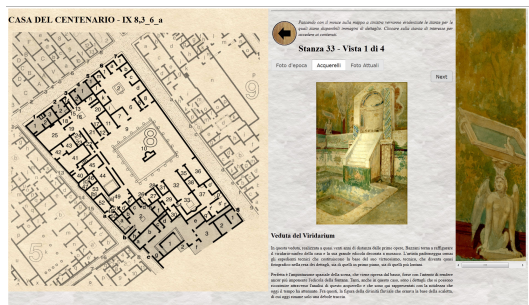


Figure 5: The browser tab, containing the layout of the site and information about it.



Figure 6: Through the tab it is possible to make comparisons among images of the same site related to different time periods.

At present, a test site is visible at the following URL:

<http://3d-test.cineca.it/files/PARSJAD/public/applications/vesuviana-test2/>

The official Web site will open to public at the end of April 2013, immediately after the closing of the exhibition.

5. Conclusions and further developments

The exhibition about Luigi Bazzani and his Pompeian watercolours has been a nice opportunity to test the adaptability of the PARSJAD prototype. In the near future the second development step foresees the realization of an interface more connected to source DB repositories. Starting from low poly DAE models set upon the Google Earth customized interface, and thanks to a different viewer based on X3D technology, the end user will be able to browse 3D philologically accurate reconstructions and access, through them, to in-depth information tailored for researchers or the general public. This second phase will be developed both within the PARSJAD project, testing at present with the Roman villa in Russi, Northern Italy, and within the “Vesuviana” framework, accessing DB repositories pertaining the project about archaeological sites in Herculaneum.

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