

Creative Re-use of Data: a GIS Tool to Trace the Provenance of Cypriot Cultural Heritage



Valentina
Vassallo,
Sorin
Hermon
Cyprus

Introduction

This paper presents the experience of the Science and Technologies for Archaeological Research Center (STARC) of the Cyprus Institute in the online publication of cultural heritage content in European Digital Libraries projects, and their re-use for different purposes. Apart from the research's aims related to this activity, the re-use of the data takes into consideration the educational aspect, as well as the importance of the content for tourism and leisure. This is done through digitization and publication within the Digital Libraries projects and providing Europeana¹ with metadata information of Cypriot cultural collections. In particular, this paper focuses on the case study of the collection from the Byzantine Museum of the Archbishop Makarios III Foundation in Nicosia (Cyprus). For this collection a GIS application that fosters digital inclusion in the field of education, tourism, and edutainment has been planned and is currently under development.

The Byzantine Museum of the Archbishop Makarios III Foundation hosts numerous artefacts, dating from the 6th - 20th centuries A.D. Some of these artefacts are icons looted from the Turkish-occupied areas of the island and recently repatriated². The collection consists also of frescoes, mosaics, and religious artefacts (Eliades, 2008). The Foundation was born in the '70s by the will of Makarios III, the Archbishop of Cyprus and first President of the Cypriot Republic. The reaction of the Church to the continuous looting of the island's cultural heritage and the need for protection of religious monuments and their cultural objects led to the adoption of a regulation for the collection, protection, and preservation of the monuments of Christian Art. For this reason, the Byzantine Museum

houses the richest and most representative collection of Byzantine icons from Cyprus and a considerable number of mural fragments from the most important monasteries of the island, religious objects, vestments, manuscripts, and so forth (Eliades, 2010).

Usability and accessibility

The digital accessibility of the cultural collections opens a new important way of access to them and it guarantees a new availability, preservation, and creative re-use. Furthermore, it allows an enhancement of quality content, richness in terms of metadata information, potential re-use, and at the same time uniqueness; it enables improved search and retrieval. The accessibility of the Cypriot cultural collections, and in the specific case of the Byzantine Museum collection, is possible through different levels of knowledge and access, diverse levels of specialization and information³:

1. the Museum digital catalogue;
2. the STARC repository;
3. the European Digital Libraries projects;
4. the Europeana portal.

The digital catalogue of the Byzantine Museum is an online catalogue, both in Greek and English⁴. It is compiled manually with the insertion of the information from the paper catalogue of the Museum. It hosts the basic information of the artefacts and describes the title, the chronology, the information about the author or the artistic school, the material or the technique with which it was made, the dimensions of the artwork and its conservation status (Fig 1).



The digital accessibility of the cultural collections opens a new important way of access to them and it guarantees a new availability, preservation, and creative re-use. Furthermore, it allows an enhancement of quality content, richness in terms of metadata information, potential re-use

The digital catalogue of the Byzantine Museum

	Έργο: Χριστός Παντοκράτορας
	Χρονολογία: 13ος αιώνας
	Καλλιτεχνία/Σχολή: -
	Προέλευση: Από το ναό Αγίου Ευφραστάτου Λύσης, κλήθηκε από Τούρκους αρχαιοκατήλους και μεταφέρθηκε παράνομα στο εξωτερικό, όπου πωλήθηκε το 1983 στο Ίδρυμα Μακί στο Χαούσταν του Τέξας. Μετά από συμφωνία με την Εκκλησία της Κύπρου η τοιχογραφία επαναστατήθηκε τον Μάρτιο του 2012.
	Τεχνική: Τοιχογραφία τρούλλου
	Διαστάσεις: Διάμετρος: εσωτερικά: 264,5 εκ., εξωτερ.: 270 εκ., ύψος: εσωτερικά: 117,5 εκ., εξωτερ.: 123 εκ.
	Κατάσταση Διατήρησης: Αρκετά καλή

The metadata of the Byzantine Museum collection is in turn aggregated in the Repository developed by the STARC of the Cyprus Institute⁵, together with other important Cypriot collections, in order to be further aggregated through European Digital Libraries projects. Specifically, the collection of the Byzantine Museum passes through the Linked Heritage⁶ and AthenaPlus⁷ projects into Europeana⁸. From here, with a backward path and links to the different digital archives involved, it is possible to pass through all the procedure and arrive to the museum digital catalogue again⁹ (Vassallo, Piccinino, 2012). These passages allow more visibility and access to the original data, and at the same time make it possible to enhance the user experience with the data.

The description of the Byzantine Museum digital collection has been done through the elaboration of a customized LIDO¹⁰ metadata schema, which creates the opportunity to fully

describe the contents to be published and to guarantee their easy retrieval and browsing in the STARC Repository aggregator¹¹ (Fig. 2) (Vassallo et al., 2013a).

The user interface of the STARC repository.

The description of the items from the digital catalogue of the Museum have been formalized and enriched, in order to provide other information that could be also of importance in the retrieval and further re-use of data about museum artefacts. With respect to the original description of the museum, the customized LIDO metadata schema provide more information, among others the ID of the artwork, the object work type, the rights of the artefact and of the digital object, the place(s) of the digital conservation, the artist/school, the object description, etc. Something converges in these descriptions that is missing in the original data structure, and that helps to provide more information about the objects: about when and by whom the object was bought, which collection it belonged to, who was the donor of the artwork to the cultural centre, the provenance, etc.

Thanks to this further information, in particular for the Byzantine Museum collection a “route of the artwork” has been included, giving specific information related to the life history of the artefacts, such as the place of manufacture, the provenance of the artist, possible changes of conservation place, etc. (Vassallo et al., 2013a).

This kind of data and information made it possible to undertake parallel research in the re-use of the Cultural Heritage digitized content, in order also to improve the accessibility and usability of the museum’s content.

For this reason, within the STARC Repository, where the metadata of the artefacts are stored, a WebGIS tool will be integrated. The users will enjoy a further experience through the re-use of these data, and the tool will give them the possibility to interact with the digital information (besides its semantic query ca-

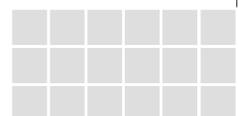
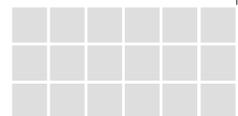
pabilities and visualization choices) and enhance their knowledge on the topics presented, both for scientific and popular use.

The GIS tool

The GIS tool, currently under development, stores information regarding the artefacts and their spatio-temporal paths. The GIS environment is structured in thematic layers in order to enable the user to become familiar with the spatial and temporal environment of the artefacts. The layer tree is composed of DEMs, historical aerial photos, street maps and layers, which represent the monuments or places where the artefacts originate and travelled to. Additionally, the artefacts themselves are represented as clickable points. Each artefact is associated with a URL pointing the user to the STARC Repository, where the complete metadata regarding each item are stored.

One of the main purposes of this GIS tool is to enable the user to understand the movement of artefacts in spatial and temporal terms. Hence in the layer tree this movement is represented by arrows indicating the original position of the artefact and its movement through time. Time is represented by different arrow colours, representing different decades. It is essential to underline the fact that the spatial and temporal movement is not retrievable for all the artefacts; however a pattern of spatial and temporal movement/smuggling of Cypriot antiquities can be identified within such a methodological framework.

Within this environment, the user can navigate through the history of the artefacts and visualize their spatio-temporal movement in and out of Cyprus. The user can further visualize information regarding the artefacts through the structured metadata documentation of





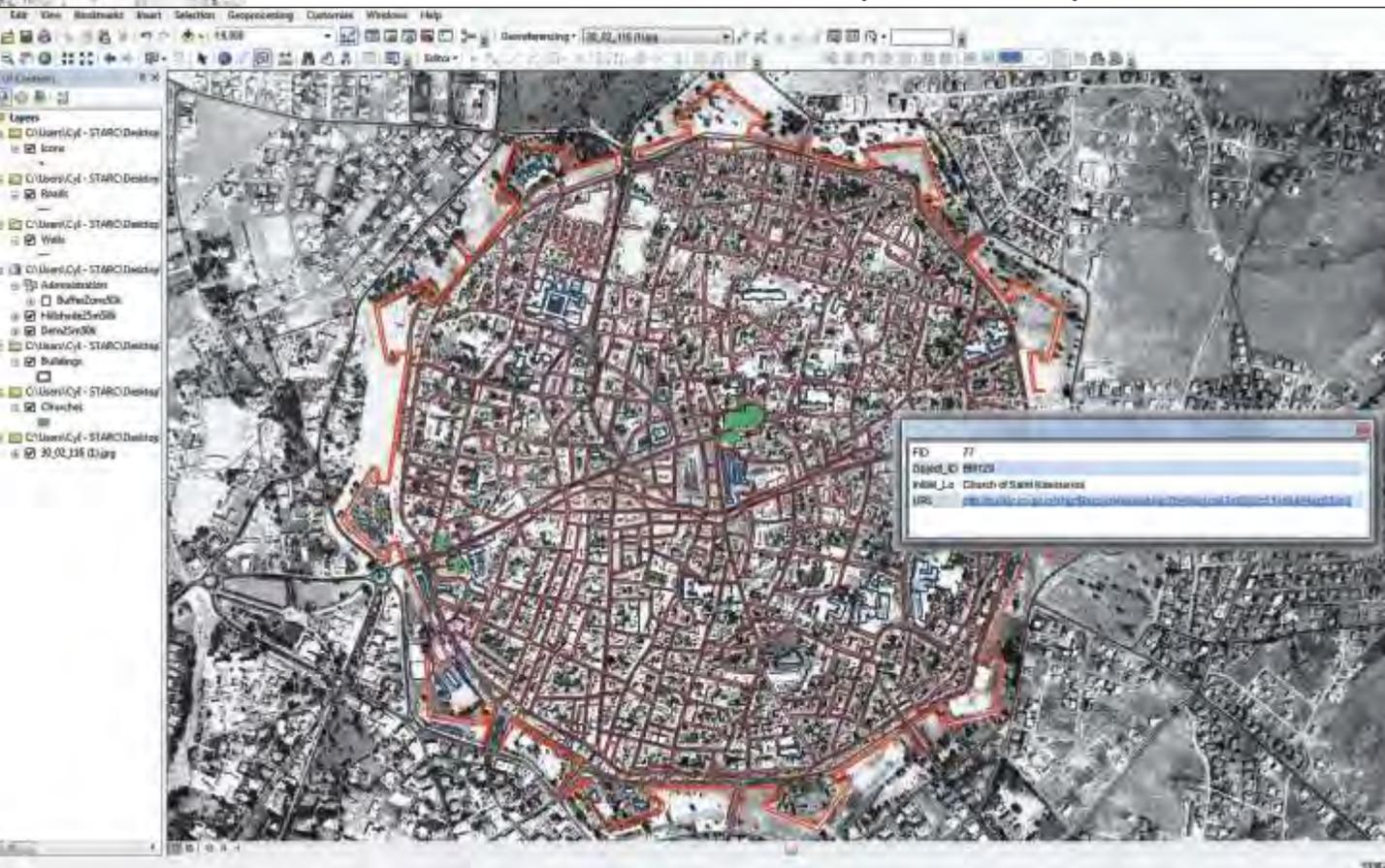
each digital object, stored in the STARC Repository, also to serve as a source for information provided to Europeana.

The GIS project illustrates and helps the user to visualize the history of the Cypriot cultural heritage. The user is able to switch from the GIS tool to the STARC Repository. Currently, each vector point in the GIS project represents an artefact and is linked with the STARC Repository URL. The user is able to select the artefact (e.g. a Byzantine icon), click on the URL, and visualize the metadata of the object (Fig 3).

Through the STARC Repository, the user can also access (with further links) the website of the Archbishop Makarios III Foundation, where the original data about the artworks are digitally catalogued.

The idea behind the structure of the GIS tool is to start from micro and then expand to macro geographical scale. For the specific case study of the Byzantine Museum, the first step was to identify the case study for the micro scale, which is the city of Nicosia.

In the micro scale GIS, the icons are mapped where they were located initially and then



The connection between the GIS and the artefacts' metadata.

moved within the city walls. The concept is to visualize spatially and temporally the movement of the icons within the walled Nicosia. (Fig. 4).

implement all the geographic locations where the artefacts arrived, and extend the tool beyond the city walls of Nicosia to all the areas of Cyprus and abroad where the initial, in-

The spatio-temporal visualization.



The macro scale GIS will cover all the areas in Cyprus and abroad, where the icons were initially located or where they travel to. The enrichment of this GIS tool with more data is one of the future goals of the project.

intermediate, and final destinations of the icons are identified.

The aim is again to visualize the spatio-temporal movement of the icons in and out of Cyprus and retrieve some statistical data regarding the places where the icons were located after their illegal export from the island and some statistics on the places where the icons were looted and smuggled from (Vasallo et al., 2013b).

Other features are planned to be carried out (e.g. implementation of a GPS positioning system to integrate the archival information with more precise geographical information; incorporation of textual, photographic material and 3D models, etc.).

This research project will improve the re-use of the data and the enhancement of our knowledge about the Cypriot cultural heritage, creating the possibility to adapt such a tool to different cultural datasets and provide them with further information. Within this context, one goal is to provide accredited users with access, in order to allow them to revise, edit, and add new information in the GIS tool. The

Conclusions

The research work is in progress and is currently focussed on the micro level. The plan is to extend the GIS tool to a macro scale and



goal is to share the information online, and enhance the exchange of experience in content resource management between scholars, researchers, and professionals. The aim is to make it a collaborative platform, adding new entries and editing existing ones, and sharing them with the community. Furthermore, an

additional development of the project is to include in the museum a workstation that allows its exploitation by the citizenry in order to learn from the digitized items and to create personalized patterns of visiting, tourism, and education.

Bibliography

Eliades Ioannis (ed.), *Guide to the Byzantine Museum and Art Gallery of the Archbishop Makarios III Foundation*, Nicosia 2008.

Eliades Ioannis, *Illicit Traffic of Cultural Heritage as a Result of Flight and Expulsion in Cyprus*. In: *Flight, Expulsion and Ethnic Cleansing. A challenge for the work of Museums and Exhibitions Worldwide. Ninth International Symposium of the International Association of Museums of History (IAMHI), September 16 to 18, 2010*, Berlin: Deutsches Historisches Museum, 2012, pp. 130-137.

Han Myung-Ja, *Metadata with levels of description: new challenges to cataloguers and metadata librarians*. "Proceedings of the IFLA 2012 Helsinki Conference". <http://conference.ifla.org/past-wlic/2012/80-han-en.pdf>. Accessed on 3 August 2015.

Vassallo Valentina, Athanasiou Eleni, Hermon Sorin, Eliades Ioannis, *Publishing Cultural Heritage content for Digital Libraries: the case of the collections of the Byzantine Museum and Art Gallery of the Archbishop Makarios III Foundation*. Digital Heritage International Congress (Digital Heritage) 2013, (Eds. A. C. Addison, L. De Luca, G. Guidi, S. Pescarin), IEEE, 2013a, Vol. 2, pp. 479-484.

Vassallo Valentina, Kyriacou Niki, Hermon Sorin, Eliades Ioannis, *Tracing provenance of lost and found Cypriot Byzantine icons*. Digital Heritage International Congress (Digital Heritage), (Eds. A. C. Addison, L. De Luca, G. Guidi, S. Pescarin), IEEE, 2013b, Vol. 1, pp. 667-670.

Vassallo Valentina, Piccinino Marzia, *Aggregating Content for Europeana: A Workflow to Support Content Providers*. "Lecture Notes in Computer Science", 2012, Vol. 7489: "Theory and Practice of Digital Libraries" Ed. Edie Rasmussen, Fernando Loizides, pp.445-454, Springer.

1. www.europeana.eu

2. In some cases the artifacts were saved by refugees. In other cases, after having been smuggled and sold on the illegal market, they were repatriated from several countries in Europe and Africa as well as the USA, Japan, and Australia, after an extensive program launched by the Church.

3. The granularity of the information enhances the level of access, the high quality of the data and the reusability of the content described (Han, 2012).

4. <http://makariosfoundation.org.cy/bmc.html>

5. <http://public.cyi.ac.cy/starRepo/>

6. www.linkedheritage.org/

7. www.athenaplus.eu/index.php?en/1/home

8. The Byzantine Museum website does not allow one to export automatically the data; that was the reason why the collection had to be aggregated, instead of contributing directly to Europeana.

9. Thanks to link connections, Europeana is able to send the user to the original data. In the case of the Makarios III Foundation collections, the Cyprus Institute acts as an intermediate since it works as a national aggregator.

10. <http://networkicom.museum/cidoc/working-groups/data-harvesting-and-interchange/what-is-lido/>.

11. STARC is involved in various research projects that aim at establishing a knowledge communication framework that guarantees a comprehensive description and documentation of Cypriot cultural heritage, as well as their digital long-term preservation, publication, access, use and finally reuse of the content. The research activity involves different kinds of content, such as museum collections, images, 3Ds, and texts, coming from different cultural institutions