

Augmented Reality prototype for the development of the historical-archaeological heritage in Italy

The mobile application StribAR: a project of Public Archaeology in Tuscany

Francesca PRESTIPINO, Florence, Italy

Ambra ULIVIERI, University of Florence, Florence, Italy

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Introduction

The idea of developing an application for mobile devices has been developed in a thesis project for master degree in the field of Public Archaeology in Italy; in this thesis, the complexity that many different audiences have in approaching archaeology has been emphasized, especially that it is often hard to find some archaeological data due to their academic nature.

By studying projects that aimed at the promotion of cultural heritage both in Italy and worldwide, the conclusion was that digital technologies can give users, experts or non-experts in archaeology, the opportunity to independently live an immersive experience.

Augmented Reality (AR) and Virtual Reality (VR) are the digital technologies taken into account: through Augmented Reality objects are enriched with additional information, using a digital manipulation carried out by a computer or a mobile device; Virtual Reality immerses the user in a virtual environment, reconstructing imaginary ambiances or conditions that no longer exist.

In light of all the information acquired, the purpose of the thesis was to create an app that exploited AR. The application was designed and customized for the medieval-funerary archaeological site of Stribugliano (Grosseto) (Fig. 1), object of study by the chair of medieval archaeology of the University of Florence, under the supervision of Prof. Michele Nucciotti, professor of Medieval Archaeology and History of Settlements.

The archaeological information included in the app come from the study of archaeological data acquired by excavations which begun in 2012 and still in progress. These excavations revealed the presence of a medieval cemetery (XI - XIV century) and the related skeletal remains and the remains of a parish church, which can be dated at the same period, known until now marginally in some medieval documents that identify it as the "Pieve di San Giovanni de Ballatorio".

In the app you can browse through texts, audios, photos, videos, informational popups and AR visualization; in the app the visiting path can be chosen by the user and it can be adapted to the accessibility needs of different groups of users.

The objective of the app is to involve a broad audience in the archaeological discipline, avoiding any unnecessary specialized lingo and showing to the public that archaeology can be an entertaining experience.

A project of Public Archaeology to communicate historical-archaeological heritage in Tuscany

The archaeological site is located within an accommodation facility frequented by international tourists. Also the surrounding area attracts a varied tourism that is distributed throughout the year. A negative factor that has been highlighted in the thesis paperwork is that, in most of the cases, it is not a cultural tourism. Although the territory of Grosseto is rich in cultural heritage, they remain "in the shadow" because of the lack of interest in cultural promotion of medium and small entities. It is desirable that this first project will act as an engine to start a process of exploitation of the historical archaeological heritage of the Tuscan territory and that it can be extended to the Italian territory.

Public Archaeology in Italy is intended as a response aimed at facing a renewal of the archaeological discipline, able to offer a measurable contribution to the benefit of society and its development.

The path that led to the elaboration of a Public Archaeology proposal took place in some well-defined moments, one of the most significant was the First National Congress of Public Archaeology in Italy edited by Prof. Michele Nucciotti and Dr. Chiara Bonacchi in Florence on 29th and 30th October 2012, to discuss the

'study and strengthening of the role that archaeology, as a historical discipline, and the interpretation and management of the archaeological heritage perform or can perform for the benefit of society and its development' (Nucciotti, Bonacchi, www.archeopubblica2012.it, 2012).

With this same inspiration two professors of Medieval Archaeology of the University of Florence, Prof. Guido Vannini (assistant supervisor of the thesis) and Prof. Michele Nucciotti (supervisor of the thesis) currently make research both in the Tuscan and international territory (in Jordan and Armenia), as a response aimed at facing a renewal of archaeological discipline.

The StribAR application fits the above described intents, the project aims at improving and redesigning cultural services, in order to make the visit experience unique, emotional, fast and immediate. In the thesis it was emphasized that the way of communicating and transmitting information through social networks is evolving in the same direction. The social networks allow to divulge the research and the work of researchers, opening a channel between researchers and the public.

Over the last decades in Italy the research activity is moving toward the study of different audiences to find out more and more attractive communication strategies.

In this regard, the Chair of Medieval Archaeology of the University of Florence has conducted multiple visitor studies and surveys on archaeological audiences in various areas of Tuscany (in the province of Grosseto and in the historic centre of Florence).

Methodology

In June 2018, a survey was conducted at Stribugliano on a sampling of adult residents (+18) with different backgrounds. The specific objective of the research was to analyse the knowledge of the digital technologies of the participants and their point of view on the application; the app would have been developed for an archaeological site of their territory and having them as the first beneficiaries. In the survey conducted by the writer of this article a questionnaire was proposed with open and closed questions. During the investigation it emerged that the knowledge of digital technologies is scarce both in the field of cultural heritage and in other fields, but the audience has shown a positive feedback in opening up to a new reality of enhancement of its territory.

The mobile device app consists of text and audio pages with information related to the area of Stribugliano, to the archaeological site and to excavation campaigns. As to let the users better understand the presented information, clickable highlighted technical terms have been inserted whose explanation appears in a popup. A series of images of the site has been inserted, with the possibility to zoom in on details of the findings currently not visible on-site. Each page of the app has intuitive functionalities that makes it easy to use. The navigation bar allows the scrolling of the various pages, the Home button returns to the initial page. Finally, the navigation menu allows you to move between pages even in a non-sequential order.

In Fig. 2 a page of the app is shown with AR on. The usability is clear and simple, the user pointing the camera of a mobile device on one of the tags placed along the perimeter of the archaeological site will see the findings not present on site, in this case skeletal remains. Clicking on the highlighted points, popups with useful information will appear to enrich your own experience of visit, making you autonomous without any need of an expert live guide.

The toolkit used for the implementation of AR is Vuforia which guarantees effective tag recognition; the app is currently developed for Android 8.x devices and the Android Studio development environment was used. The app has been tested on both physical smartphones and emulated-on-PC smartphones. The AR was tested both in an internal environment (with artificial light) and in the Stribugliano site, by the writer and by a sample of public who showed interest and curiosity for AR and for using a smartphone to receive information otherwise inaccessible to the user.

Future aims and conclusions

In the next future the purpose is to create an independent company, which will deal with small-medium museums that in some Italian small towns are poorly valued and accessible to different targets of public

compared to the existing realities in medium-large cities. Even in worldwide well-known art cities like Rome, Naples and Florence with a vast system of cultural heritage, digital technologies like AR, VR are not currently the main way of divulgation.

The company will face the problem of introducing new interaction tools with innovative technologies (AR, VR) and will elaborate understandable contents for visitors. This will be beneficial for a relevant issue experienced in the small-medium museums: the explanatory contents are prepared often by personnel qualified in other disciplines but not in the field of cultural heritage development.

The start-up will work with public customers like the main public authority that normally maintains and shares the value of Italian cultural heritage, as well as with private customers, like private citizens or foundations who have in their own property some ancient and archaeological (movable or not) relics and who want to add value to their relics.

In conclusion, this project will have as ultimate purpose to make Italian cultural heritage and history enjoyable to a wide public and contribute to new studies in archaeology.



Fig. 1. Archaeological site of Stribugliano (GR) (© University of Florence)



a



b

Fig. 2. a) Augmented Reality page b) Textual content that pops up clicking on red detail highlighted by "i" in order to receive additional information (© Francesca Prestipino, Master's Thesis)

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