2013 International Conference on Virtual and Augmented Reality in Education

Interactive Tourist Guide: Connecting Web 2.0, Augmented Reality and QR Codes

Eulalia Rodríguez Fino[*a], Jorge Martín-Gutiérrez[a], M. Dolores Meneses Fernández[b], Enrique Armas Davara[c]

[a]Dpto. Expresíon Gráfica en Arquitectura e Ingeniería. Universidad de La Laguna. Campus Anchieta, La Laguna, 38202, Spain
[b]Dpto. Ciencias Información . Universidad de La Laguna. Campus Guajara, La Laguna, 38202, Spain
[c]Hanson Freeopen. Creative advertising.Santa Cruz de Tenerife, 38002, Spain

Abstract

This paper introduce the design and implementation of a tourist guide using the combination of three technologies for visiting two of the most important routes in a World Heritage city. The application based on augmented reality will show a video to the user including 3D animations with a route across town displaying all historic buildings. The most emblematic buildings of the city were pictured and modelled and afterwards, a walking tour was designed across the historic site having in mind the interest that culture tourism may have and the impact that this tourism has about World Heritage cities. On the other hand, the tourist map of the city incorporates images of emblematic buildings to visit in any of the two proposed routes. Each image has a QR code which gives access to both textual and multimedia information through a website created for this project. The user will be guided across the tour through the augmented reality application of upon arrival at each building he will be able to access all the information available on the website by scanning the QR code with his smartphone.

Keywords: Tourist Guide, Augmented Reality and QR Codes

1. Introduction

We should be aware that the revitalization and distinction process of a historic ensemble promotes tourist interest. This factor unleashes a feedback process which means bigger attention towards constant improvement

* Corresponding author. Tel.: +34 922 319882; fax: +00 922 31 98 70.
E-mail address: erfino@ull.edu.es

of its configuration for adapting to the new reality [1, 2]. There are several applications and potentials from emerging Information and Communication Technologies (ICTs) available to the main activities related to World Heritage and tourism [3, 4]. In the last few years, use of ICTs have evolved and increased having in mind a higher familiarization of human beings with new technologies as well as their quick and comfortable learning.

These facts give birth to the *Multimedia guided tour of the historic ensemble at san cristobal de la laguna world heritage site*, given that theoretical records outline the rising interest about culture tourism and its impact over World Heritage cities [5]. Its streets, buildings and history turn this town into a suitable place for tourists, previously knowledgeable through ICTs easing the visit of sites detailed in the guide without getting lost across town while receiving detailed information about every building.

2. Guide description

Over the last few years there has been rising interest about culture tourism and its impact over World Heritage cities, which become involved in the creation of attractive sites through culture activities while promoting the artistic and built heritage aiming for higher tourist numbers [6, 7].

The city of San Cristobal de La Laguna becomes a suitable city for tourists, given its history, urban design, street layout and historic buildings.

The strategies aimed at those tourists show that nice memories from the visit must remain in them, strengthening their comeback as well as achieving a nice diffusion across their original environment.

Fig. 1. Historic ensemble map

As a first step after the arrival of the tourist to town, he may visit the Tourist Information Office, where he will gather information about the most emblematic places to visit. He will be also given city maps, including the Historic ensemble one, This map has a QR code inserted, also known as two-dimensional barcode, which is a graphic system for information storage [8].

The main attraction about QR codes is their potential thanks to the latest models of smartphones, which have cameras available that are able to recognize the stored information in the codes thanks to the specific software installed.

This code is linked to a website (http://erfino.webs.ull.es) where each building and walking tour has been stored. The webpage intro named as **LAGUNA QR** includes a video with all multimedia elements described.

In town there are several symbolic buildings catalogued as monumental belonging to the special protection program. Pictures of all buildings were taken and processed through the image recognition software to obtain the correct perspective. In the map handed to the tourist there are two walking tours proposed: red and blue.

Fig. 2. Red rouge buildings

2.1. Red route

The red route or walking tour will take the visitor through ten buildings of interest across the Carrera, San Agustín, Viana and Nava y Grimón streets. This path will begin at the start point or number one belonging to the Carrera street information point.

2.2. Animation of red route buildings

The animation was performed through Macromedia Flash where a virtual camera follows the path along the route until a point of interest where the building's perspective image rises perpendicularly over the map so the tourist will get a3D view feel.
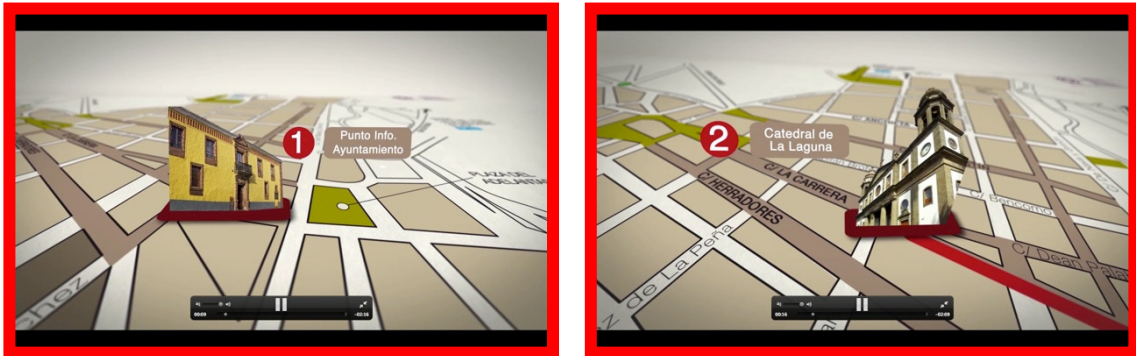

Fig.3 and 4. Buildings numbers 1 and 2 name and display

A label shows the route number and the building's name which will fade afterwards meanwhile the line keeps following the path until the next building. This process will be repeated until finishing the tour at the same start point.
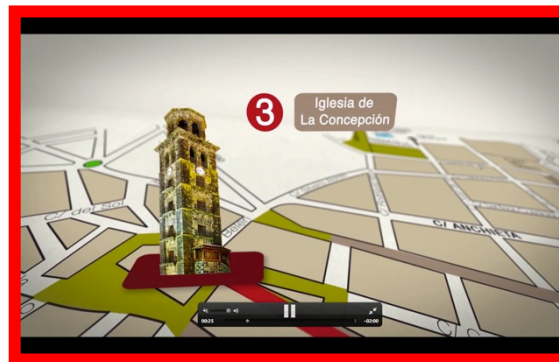
Fig.5. Building number 3 name and display

2.3. Blue route

The blue route proposes the visit of six buildings of interest outside the historic ensemble streets starting at the Santo Domingo Street and following the path alongside the Pablo Iglesias and Marques de Celada streets, Plaza del Cristo and Plaza del Adelantado squares for finishing at the Santo Domingo street, where the blue walking tour ends.

Fig.6. Blue route buildings

Fig.7 and 8. Buildings numbers 11 and 12 name and display

The multimedia element created with both red and blue routes is an 'avi' video format including the entire town's historic ensemble.

Besides, another map has been created following the same trend, where each visible building across the guide route has its own QR code, so it can be recognized by the code reading application, leading the visitor directly towards that building. The tourist also has the chance to obtain direct information right in front of each building without needing to search for it online.

Fig.9. Map of the Historic ensemble's buildings with inserted codes.

3. Conclusion and futher works

What has been exposed allows the visitor to obtain broad and detailed knowledge of the built heritage across town as well as its placement over the historic ensemble prior to his visit.

We regard augmented reality technology as a great potential tool for spreading and enhancing the value of Cultural Heritage, as it does not replace reality but improves its contents. It has established itself as a useful resource for the recovery and knowledge of heritage, because of its ability to add elements to an object's real view, offering different versions of it.

We intend developing an application for describing the routes through smartphones, as well as introducing new functionalities over every point of interest, such as augmented audio, graphic and textual information, as well as interactive games, with all of them related to the town's history and culture.

Acknowledgement

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