Walking, Learning, Enjoying. Mobile Technology on the Trail of Design Masterpieces.

D. Spallazzo [1], M. Ceconello [1] and R. Lenz [2]

[1]INDACO dpt. (Industrial Design, Art, Communication and Fashion), Politecnico di Milano, Italy
[2]Waag Society & 7scenes, Amsterdam, The Netherlands

Abstract

The paper describes Looking for Achille Castiglioni - LfAC - a mobile location-based application designed to lead visitors to the discovery of Achille Castiglioni's projects in downtown Milan. The renowned architect and designer's works are valorised and brought back to life through contextual contents delivered to visitors' smartphones: documents, drawings, photos, models tell the story of architectures, temporary exhibitions, interior and design projects that shaped the history of Italian design. The paper frames LfAC in the context of location based services, describes the process of development, presents the results and discusses the lessons learnt.

Categories and Subject Descriptors (according to ACM CCS): J.5 [Art and Humanities]: Architecture.

1. Introduction

The paper describes LfAC - Looking for Achille Castiglioni - a mobile application which drives users to discover the renowned architect and designer's projects in downtown Milan, linking them to SMAC's (Studio Museo Achille Castiglioni) collection. The application stems from the collaborations between the authors and Studio Museo Achille Castiglioni and it is aimed at valorizing the works necessarily not exposed in the museum - architectures, temporary exhibitions, layouts - and its archive.

With his 60 years long career, Achille Castiglioni is one of the most celebrated Italian designers and architects and SMAC stems from his heirs' willingness to conserve integrally his design agency. In 2006 the museum opened to the public with the mission of conserving, digitizing and showing the collection and the archive: more than 300 industrial products, countless interior design and architecture projects together with countless documents. SMAC is today a small but reputable institution which reached 20.000 visitors in five years: daily tours guide them through the four rooms explaining Castiglioni's work and letting people touch and interact with products.

The document is organized as follows: the first part frames LfAC in the context of location based services related to GLAMs, the second section describes the process of development of LfAC and the last section analyses and discusses the results.

2. Related projects

Mobile devices are changing the way people access information and according to Gartner within two years people will access internet mainly through mobile technology [Gar11]. New tools such as GPS receiver, accelerometer and gyroscope allow richer experiences for smartphones' users paving the way to innovative and attractive applications in cultural heritage field. Others like gesture-based computing [JWS*10] and image recognition are in the forefront and could have successful implementation in the field.

LfAC is a location based service, a kind of mobile application able to locate exactly the user and to deliver contextual contents. These technologies are increasingly being exploited by galleries, libraries, archives and museums – GLAMs – and are expected to be widely adopted in cultural heritage field within two-three years and the same time of adoption is predictable for augmented reality applications [JWS*10].

Oomen [OBV11] proposes a clustering of location based services grouping them into five classes according to their main features: location aware display of content, contributing content by end-users, QR codes, augmented reality applications and location based games. The categorization highlights five different models of interaction between users and cultural heritage and can be helpful to frame LfAC application. Without detailing all the classes is useful to

mention few location based services to explain the strand LfAC is part of. Proposed by Oomen himself, Picture War Monuments belongs to the first cluster and allows users to access contextual information about war monuments spread in the Netherlands and locating them through GPS [OBV11].

Other tools, such as RFID tags and QR code are frequently used to locate users indoor or outdoor, asking them to take photos or to draw the device up to a tag to access further information. In this category falls the eXspot system used at San Francisco Exploratorium to offer visitors the possibility to continue the scientific exploration at home, deepening the information about tagged exhibitions.

Augmented reality browsers like Layar, Junaio, Wikitude overlay third-party information on reality, and are being tested as a means to enhance the visit experience. The Stedelijk Museum of Amsterdam, for instance, proposes with Layar the ARtours project, creating exhibitions in the hybrid space between real and virtual. The Powerhouse Museum of Sidney uses the same browser to show historic photos in the right place where they were taken several years before.

Looking for Achille Castiglioni is a location aware display of contents because it delivers data from museum's collection to users when they walk in the right location. It runs thanks to 7scenes, a mobile storytelling platform which allows to create also location based games. Two examples are The Infiltrant, played in the city of Antwerp and aimed at educating young students about diamonds or The Island which connects players in Amsterdam and New York.

3. Development

As we already stated the main aim of LfAC is to valorize the less known works of Castiglioni - architectures, temporary exhibitions, layouts - taking people directly where they are/were and exploiting digitized archive documents to improve the knowledge about his projects.

The aim stems from two main constraints: first, most part of the archive is not able to be seen and, second, several projects (e.g. architectures and interior design projects) are inevitably not shown in the museum and very often they are no longer visible because dismantled to make room for new layouts or simply because they were temporary exhibitions.

Given the aim and the constraints, a location based service seemed to be the most suitable solution and among the different categories of locative services described above, we chose a location based display of contents.

We decided not to use QR codes for two main reasons: first they require a paper map of the city to be found, excluding in this way those users who have not previously visited the museum and secondly because it would have required the authorization to fix or hang codes to every building.

Although augmented reality browsers could be very useful in reconstructing dismantled exhibitions and buildings we

discarded them because we hadn't 3D models to be used and the still imprecise nature of these application in guiding users towards the points of interest doesn't avoid the necessity of a paper map.

Given these considerations we decided to employ a location based display of contents and among the tools available on the market we chose 7scenes, a mobile storytelling platform designed by the homonymous spin-off of the Dutch no profit Waag Society.

7scenes allows producers to link multimedia data to a point of interest on the map and they will be automatically displayed when the user reaches the target point, locating him through GPS. The platform is very flexible and allows producers to create different mobile experiences: from a free choice of points of interest without a defined path, to a model which takes people on a defined succession of points, till more complex game models like a role-playing experience. Other features that weighed in favour of 7scenes are its capability of tracking visitors' path in the city and giving detailed feedback from users and its ease of use that allows even to not expert developers to create a mobile tour.

3.1. PoIs selection and contents' creation

About 70 projects, developed between 1947 and 1999 and referred to 30 different locations have been identified through a deep analysis of literature and review of the findings with museum's curators and Castiglioni's heirs.

Positioning them on the map we discarded seven locations because not within walking distance from the downtown and we started to work on the remaining, analyzing documents, articles, photos, mockups and all the available material at museum's archive. This phase has been carried out by the authors together with museum's curators to guarantee a fast and exhaustive documents' retrieval and a continuous comparison between sources.

A great amount of documents and data resulted from this phase and analyzing the results we were able to select 15 points of interest, discarding those with few documentation or without significant descriptive material.

For each point of interest we created a brief audio description (about 3-4 minutes long) and processed all images and videos. The audio description have been written following the sources and then refined with reviews by museum's curators and Castiglioni's heirs. The final versions have been then translated from Italian to English and recorded by a professional speaker.

Photos and videos have been digitized to obtain an iconographic description of projects and mounted with audio into 15 videos to be linked to the corresponding PoIs on the map. The choice of video as media is due to a constraint of 7scenes platform which does not still support slideshows.

We then added three audio descriptions to introduce Castiglioni's work in architecture, industrial design and interior design and located in three panoramic points of the downtown which visitors go through toward the points of interest.

The application has been launched on April 11th 2011, during the week of the 50th International Salone del Mobile in Milan, and the described process has been developed in about one month with the efforts of six persons for a total of about 3 person/months work.

4. LfAC: how it works

Looking for Achille Castiglioni is a bilingual mobile location based tour with eighteen PoIs located in downtown Milan and mostly within walking distance from Studio Museo Achille Castiglioni. The tour doesn't provide a defined path to be followed and users are free to decide where to go, looking at the map on their mobile's screen.

The eighteen locations are shown on the map with colored place holders: blue identifies the museum, yellow indicates architecture, purple stands for industrial design and green for interior design. This trick allows visitors to easily identify the locations they are interested in, deciding to follow one of the three thematic routes or to enjoy all the points of interests of a district or just to follow the nearest PoI on the map.

Each location activates a short video with images, photos, sketches and drawings and an audio description of the building/project. Attempting to avoid a typical problem of mobile tours, the alienation from reality to stare at the mobile screen, the audio description has been written looking for a right balance between the so called *eyes up - eyes down*: very often the voice asks users to look at some details directly on the building and other times asks them to look at the mobile screen, for instance to observe an old photo or a project drawing.

The duration of the complete tour is about one hour plus the time needed to move between one PoI to another that obviously changes depending on the chosen path and on visitors.

LfAC is not a self-standing app but one of the scenes available on 7scenes platform: to access LfAC visitors must download and install 7scenes application on their device and then search Looking for Achille Castiglioni (ITA/ENG) among the available scenes and start playing. 7scenes software is free of charge and it runs on iOS4 and Android. The mobile tour can be enjoyed by museum's visitors but also by people who hadn't previously visited SMAC. A flyer is distributed by museum's employees at the end of the guided tour to give users instructions to install 7scenes and run LfAC.

4.1. Tests and use

The application has undergone several testing sessions during

the development to identify minor problems and in order to guarantee a correct functioning. After the launch we also conducted user test to verify the accomplishment of the project's aims.

Figure 1: *some images of LfAC*

The first tests have been lead by the authors together with a small group using an iPhone 4 and two Android devices, a smartphone and a tablet. Even if this session was mainly intended to correct small bugs, some important matters emerged spontaneously. A major difficulty was the duration of the devices' battery: only the Android tablet succeeded in completing the tour while the two smartphones ran quickly out of battery. Other problems can be ascribed to the Android version of 7scenes which is still a beta and has bugs to be fixed, in particular we experienced frequent loss of GPS signal and slow updating of the current position. We have also observed important dissimilarities in the download speed of videos between different phone carriers, due probably to their coverage of city's areas.

Other tests are being carried out with users to have a detailed feedback on contents and on their satisfaction. Teams of volunteers are asked to fill a short evaluation survey after the tour, in order to understand how the application is perceived by visitors. Multiple choice questions aim at defining visitors' profile while a ten questions Likert scale questionnaire tries to understand the perceived benefits in terms of enjoyment and learning. The volunteers who took part to the testing sessions are all aged between 18 and 34 years, with medium/high level of education but with very different levels of familiarity with design and architecture. The table below shows the first result of the questionnaire even if the number of users is not still sufficient to consider data reliable.

	AVG	STD
My knowledge on A. Castiglioni's work has increased	4,75	0,71
Location-based info are a value added	4,75	0,71
Audio and video have been up to my	3,75	1,41

expectations		
The archive images improved my understanding of the topics addressed	4,5	0,71
The duration of the audio and video was correct	3,5	2,12
It was easy to read the map and find points of interest	4	2,12
The tour showed me places in the city I didn't know	5	0,00
After the tour I want to visit Studio Museo Achille Castiglioni	4	1,41
I'm satisfied with the experience made	4,5	0,71
With the tour I learned having fun	4	2,12

Table 1. *Likert scale survey results*

Thanks to 7scenes web platform we can also access the statistics of use and the paths followed by visitors and analyzing these data we can highlight two main points: the application hasn't been very successful and visitors prefer to move among near points of interest, without walking towards the farthest ones.

5. Discussion

The first remark is that smartphones run quickly out of battery. The GPS strongly exploits the battery, restricting the usability of the application: we can find the same concern in other projects like ARthotheque that failed to reach young users because they feared to run out of battery [SWS*11]. Location based services not based on GPS tracking, like QR codes, can overcome this limitation but pose other limitations such as the need of a paper map and intensive use of 3G connection.

Regarding the very low use of the application we can list possible reasons. First is the digital divide: 7scenes platform runs on iOS4 and Android and requires high level smartphones with GPS and internet access, that means not more than 3% of Italian population [Com10]. A second issue which raises the question of possible uptake of these technologies by international visitors are the roaming rates: 75% of SMAC visitors are indeed foreigners. A third reason could be the lack of information: only museum's visitors and few others knows that LfAC is available and 7scenes application is quite well known in the Netherlands and in particular in Amsterdam but it is not so diffused in Italy. Another cause could be the lack of interest in the issues we deal with, a concern partially confirmed by the little willingness of visitors to walk towards farthest PoIs.

This last concern could also rise by the free format of the tour which has the merit to allows users to freely browse through the PoIs but could also be distracting and less exciting: a defined path with compulsory steps could be indeed more engaging, especially if it's structured as a game with tasks and rewards.

As already stated the number of questionnaires collected is not still sufficient to consider the results fully reliable but we can draw some useful suggestions. A first remark is that some visitors perceived the audio and video contributions not completely up to their expectations in terms of quality and duration (AVG. 3,75 and 3,5) partially justifying their poor motivation to walk towards the farthest points.

Visitors are instead quite concordant that LfAC increased their knowledge of the matter and they perceived learning in the real setting (situated learning) [LW91] as a value added. In particular we can highlight that also people who had previously visited SMAC refer quite accordingly an increased knowledge on Castiglioni projects after LfAC tour, directly linked to the contextual nature of the information.

The application is then considered useful in fostering learning about the collection but it also resulted functional to make people discover unknown places in downtown Milan, even if a great part of volunteers was familiar with the centre of the city. Visitors are indeed encouraged to walk, reading the map and observing actively the city.

The next step is the organization of further user tests to collect new questionnaires and consequently more reliable data to be analyzed.

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