

THE ALBANIAN CULTURAL HERITAGE ON THE INTERNET

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Abstract

The paper discusses the production of an interactive map (both for desktop and for mobile) aiming to support the promotion of the cultural heritage, using an authoring system. At present, the tools feature 13 heritage sites across the County of Tirana, which are supported by text and photographs supplied by IMK - Instituti i Monumenteve te Kultures 'Gani Strazimiri' (Institute for Cultural Monuments) within the project 'S.O.S. – Squiperia Open Source', funded by the Apulia Region. We include experience of developing the tools as a possible benefit to other developers in the cultural sector.

Keywords

Authoring System, Interactive Map, Mobile Apps, Cultural Heritage

1. Introduction

The increasing worldwide smartphone penetration¹ and the share value of apps related to travelling - 'Travel' was the eighth most popular app category in the Apps Stores² - show how the impact of mobile is becoming a crucial research issue in the field of travel and tourism.

Smartphones and their applications, due to their ubiquitous nature, are particularly valuable in the on-site stage, providing information at anytime and anywhere.

Questions about destinations mainly concern on the visibility of minor cultural sites, often not easily identifiable: a search for 'ipogeo' (hypogeous - ancient underground construction, mostly used as a tomb) gives thousands of results in Google while only three locations in 'Europeana' map – perhaps in both cases, it turns out to be simply a waste of time. Further, a correct placing of destinations should be tested in order to avoid mistakes, as shown – for example – in TripAdvisor. In this app, a search for attractions in the city of Bari shows a list (Fig. 1) where the first point of interest (POI), located in the city's centre, is 'Trani', another city far from Bari!

¹ Worldwide Smartphone '13-'17 Forecast and Analysis. www.idc.com/getdoc.jsp?containerId=239847.

² Share of IOS apps: 5,17% (www.statista.com/statistics/270291/popular-categories-in-the-app-store, 7/2013); share of Android apps: 4,4% (www.statista.com/statistics/256772/most-popular-app-categories-in-the-google-play-store, 4th quarter 2012).

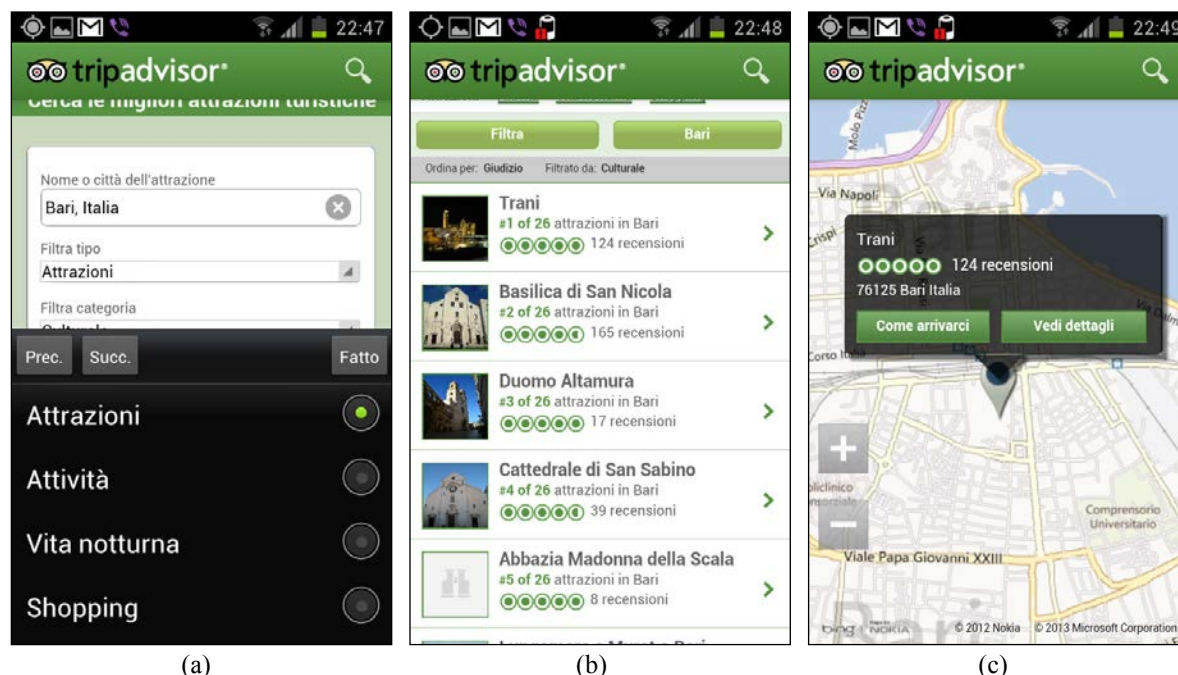


Fig. 1: A search for attractions in the city of Bari (a) show a list (b) with ‘Trani’ as first of 26 attraction of Bari; Trani – which is another city far from Bari – is located in the center of Bari (c)

Even though visitors expressed clear interest in technologies such as interactive mobile guides, ICTs are still underutilized at heritage sites; the aim of our work is therefore to contribute to filling this gap developing a tool to produce interactively an interactive map both for desktop (useful in the pre-travel stage) and for mobile (useful on-site).

2. The project ‘S.O.S. - Squiperia Open Source’

The aim to develop a tool to produce interactively a mobile application, supporting non IT-specialist users in the presentation of assets for promotion purposes is in line with the areas of interest pointed out in the European Research Network on Excellence in Processing Open Cultural Heritage (EPOCH) Research Agenda³.

The task has been included in the cooperation project⁴ ‘S.O.S. - Squiperia Open Source’, promoted by our Institute, aiming at promoting the growth of operational skills among the IMK⁵ staff involved in the Albanian cultural heritage promotion, thus contributing to the

³ EPOCH Research Agenda for the Applications of ICT to Cultural Heritage, Full Report. http://public-repository.epoch-net.org/publications/RES_AGENDA/research_agenda.pdf

⁴ Apulia Region funds.

⁵ IMK - Instituti i Monumenteve te Kultures ‘Gani Strazimiri’, was created in 1965 with the aim to trace, study, restore and protect the values of the immobile cultural heritage in the Republic of Albania; at the same time it has the duty of informing the interested public about the achievements of the field.

development of initiatives in the tourism sector since tourism and culture activities (as well as IMK) are managed by the same Ministry.

Project activities have been generally carried out in a ‘learning-by-doing’ modality, in order to maximize both expertise transfer and skills development.

The collaboration with IMK started with the project⁶ ‘Albania: Conoscere, Comunicare, Condividere’ (‘Albania: Know, Communicate, Share’), to promote Albania as an attractive tourist destination. In effect⁷, *‘Albania is located in a very important section of the Balkan Peninsula, facing ‘ancient Rome’ and en route to Byzantium and the ‘capital of the world’ at that time, Istanbul. As such, many conquerors have passed through the region, leaving traces of their cultures’*.

Initially the team developed a GIS, using the open source tool ‘Quantum GIS’, reporting information about 50 heritage sites; then a plugin for Quantum GIS was developed to generate interactively the file containing the parameters required for the web-publishing of the GIS with Pmapper - another open source tool.

The activity was particularly time-consuming due to the acquisition and geo-referencing of maps as well as to publish the GIS on the Internet, so a procedure to speed-up the whole process was planned.

The procedure is organized in steps: 1) selection of POIs; 2) survey to acquire each image and geographical position using a GPS camera; 3) extracting latitude and longitude contained in the ‘exif’ data of images; 4) input additional data; 5) generate an interactive map.

A software provided by the GPS camera manufacturer⁸ allows the user to develop the 3rd and 4th step: it generates a comma-separated values (csv) file containing ‘exif’ data (latitude, longitude, image name, date) and the additional data inserted by the user (title and content). The csv file is subsequently opened in Open Office⁹ environment to complete the input of information according to the project purposes; for example: number, address, age, external data sheet URL, typology name, marker’s image name both for POI and it’s typology.

Then the user save data in a file using the ‘dbf’ format – which is loaded later by the Authoring System (AS), to perform the ultimate step: the assisted generation of an interactive map available on the internet, both for desktop and for mobile.

⁶ ‘INTERREG III-A FESR/CARDS Italy - Albania 2004/2006 Proximity Program’ funds.

⁷ http://www.icbms-albania.com/download/Albania_heritage_leaflet.pdf

⁸ A free application to read exif data is now available at <http://www.brothersoft.com/exifextractor-ng-download-510811.html>

⁹ To avoid error, some selections are necessary: character = UNICODE (UTF-8); text separator = ‘;’; column type = ‘text’ for the all field with decimal values (the use of dot as decimal separator leads to read a date value).

3. The Authoring System

The Authoring System runs on a web browser ('Firefox' is recommended) – a server must be available on the PC ('AppServ' v.2.6 is recommended). A first version¹⁰ was produced in June 2011; an SQL version was developed in 2012, but it has been discontinued, preferring the previous solution (based on the 'dbf' standard) due to its easiness of use. The implementation of the actual version started in late 2013. The actual version has been organised in 10 tabs: 'File', 'List', 'Types', 'Search', 'Map', 'Callout', 'Settings', 'Info', 'Defaults', 'Credits' – English is the default language both for the AS and the outputs.

The process is as follows. The user loads the dbf file; the AS controls that data comply with the rules stated in the 'Defaults' tab (some fields name and contents are mandatory), loads data populating different tabs, open the tab 'List' and waits for the user's action.

In the 'List' tab the POIs are listed by their numerical item, if any (otherwise, the alphabetic order is adopted); the user is allowed to change only the POI's marker.

In the 'Types' tab (Fig. 2), the POI's typologies are listed in the alphabetical order; the user is allowed to change each typology's name (a box 'Alias' is provided) according to the language chosen, their order (to be used in the legend of the map) and each typology's marker. If the marker's preview shows an image not suitable, the user could upload another icon.

The POI's marker could differ (lightly) from the associated typology's marker giving the possibility to represent additional information. For example, the text '360°' - superimposed on the POI's marker – is able to identify a POI with a virtual tour available.

In the 'Search' tab the user choose the fields to consider for the search. The default field for search is 'Title' (which contains the POI's name), but the user is allowed to substitute it or add other fields for searching in 'OR' mode. It is also possible to change the name to display in the map (a box 'Alias' is provided) according to the language chosen.

¹⁰ <http://jargo.itc.cnr.it/PROGETTI/prototipo/turismo.html>

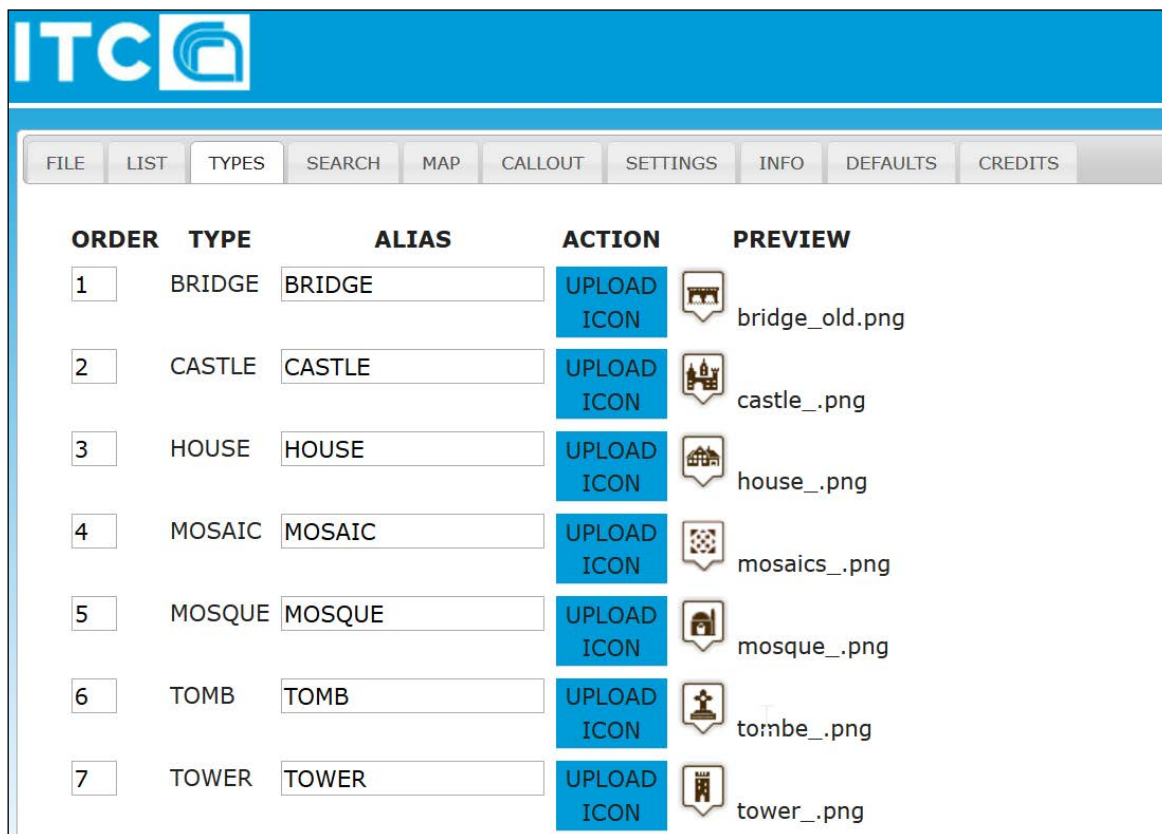


Fig. 2: The 'Types' tab in the Authoring System

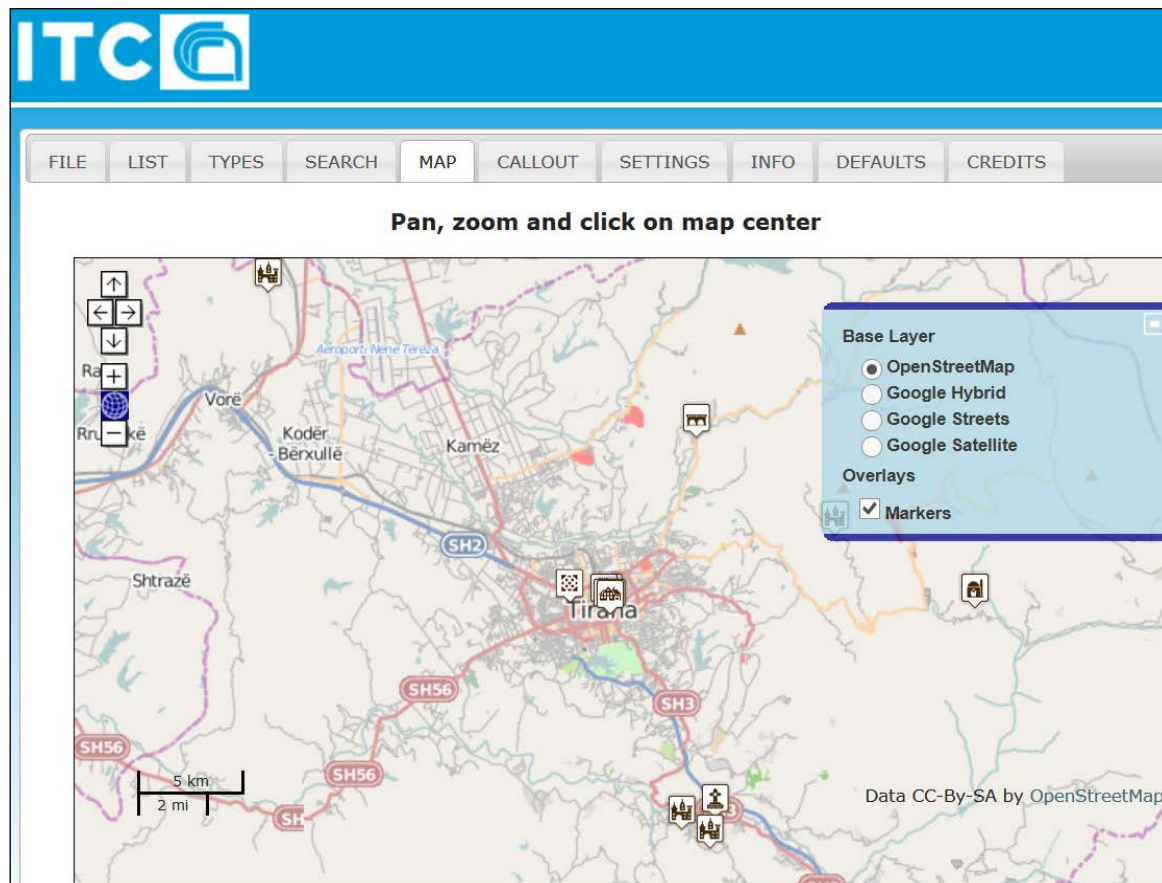


Fig. 3: The 'Map' tab in the Authoring System

In the 'Map' tab (Fig. 3), the AS displays the POIs on an Open Street map, allowing to locate the specific workspace: the user pans, zooms and click on the map centre to define the area to display when the user starts the interactive map; other map typologies are available (Google Hybrid, Streets and Satellite).

In the 'Callout' tab (Fig. 4), it is possible to specify the contents of the callout displayed when clicking on a point of interest on the interactive map, within a predefined layout.

Some contents are predefined (but switchable) - if the user adopted the name of fields as reported in the tab 'Defaults', the items in the callout will display the following data (stored in the database):

- the content of the field 'Title';
- the content of the field selected by the user (usually it is the address of the POI);
- the small image which name is stored in the field 'Thumb'
- the large image which name is stored in the field 'Picture', which will displayed in a pop-up window when the user will click on the small image
- the URL which name is stored in the field 'Webpage', which will be activated in a pop-up window when the user will click on the text in the box (Info as default, switchable)
- the content of the field 'Content' which will be activated after the text in the box (about as default, switchable)
- the content of the field selected by the user
- the content of the field 'Date' (switchable)

The mechanism of field selection is shown – for example - on the bottom of fig.4 ('TEXT 3 FIELD').

In the 'Settings' tab it is possible to set additional parameters for the project (the file name and the window title), the header (Logo, link on the logo, Title and Subtitle, colours), the legend (by type or by name; marker width and height; callout width and height) and the map (clustering distance and threshold; marker width and height).

When the user has completed the input of data, the AS prompts to produce the interactive map for desktop (Fig. 5) as well as for the App described in the following paragraph.

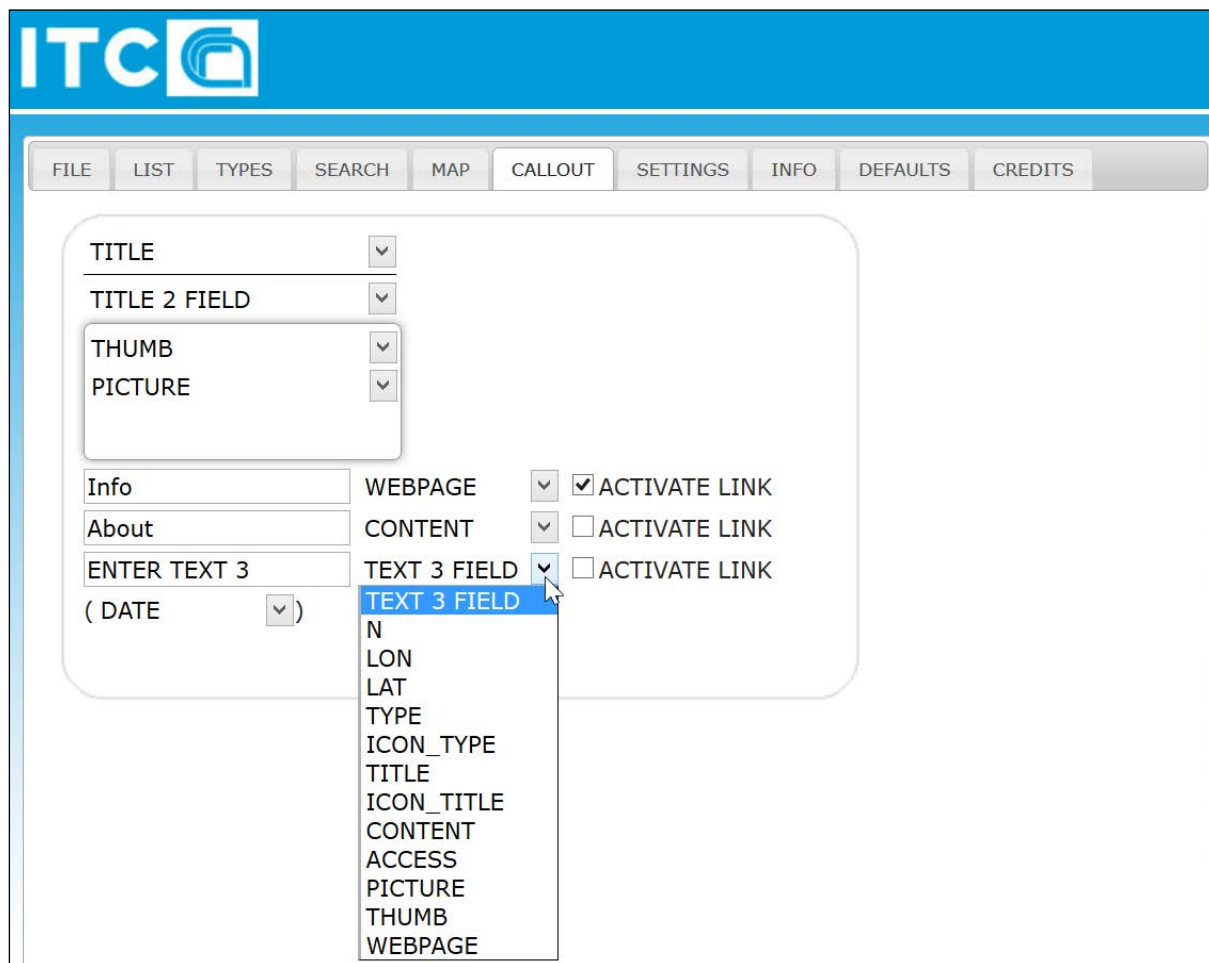


Fig. 4: The 'Callout' tab in the Authoring System

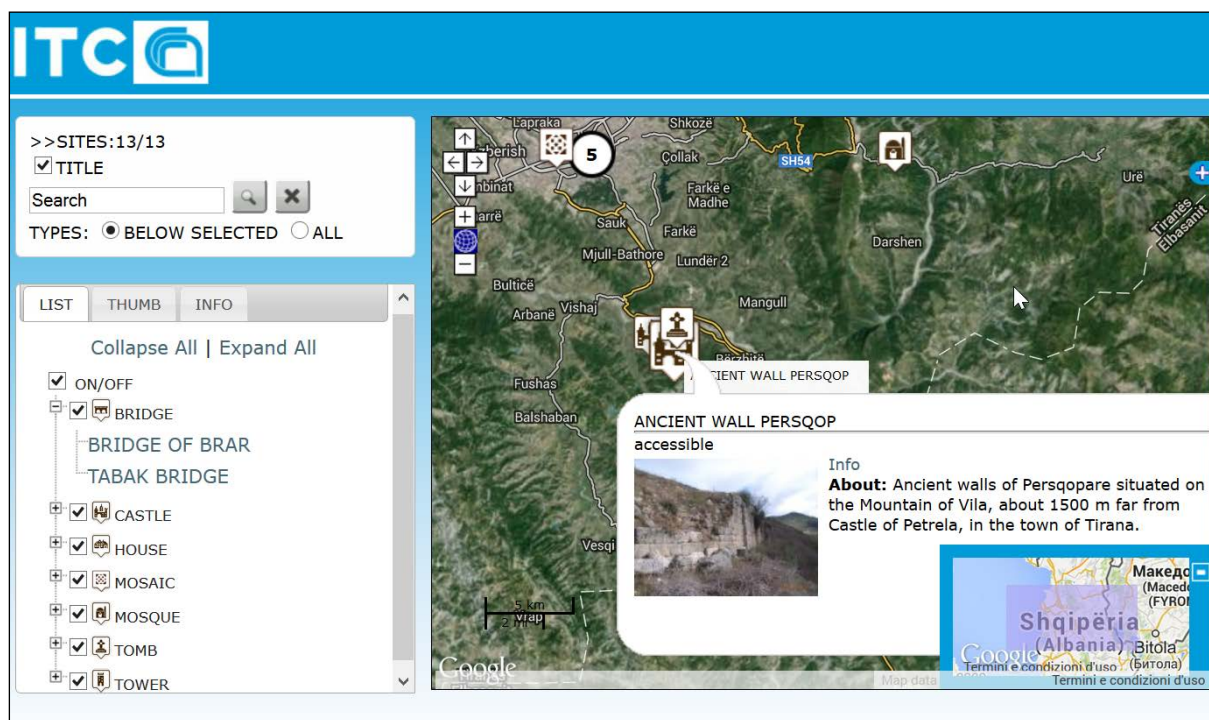


Fig. 5: The interactive map for desktop produced by the Authoring System

4. *The App.*

To implement the App it has been used Android Studio, it is a Google's IDE (Integrated Development Environment) for the Android platform. For testing and validation steps it has been adopted the Android emulator Galaxy Nexus 4.65' and the App has been installed on Android smartphone Galaxy SII plus; so the minimum version of the Android operating system, that can support the app, is 3.0. This minimum requirement allowed the development of innovative features about the map according to the specifications defined in the design phase.

The App, generated by the authoring system, is organized into three sections: 'List of POI', 'Search' and 'Map' (with overview and three display modes – hybrid, streets, and satellite).

All the three sections contain on the top a particular 'heading' that presents the logo, title and subtitle, assigned through the authoring system, and much more.

This section has been developed with a particular Android application element: 'The Action Bar'¹¹ (AB). AB is one of the most important design elements and it was first added in Android 3.0. Using the AB offers users a familiar interface across applications that the system gracefully adapts for different screen configurations. AB is divided into three areas:

- The first is located on the left and contains the logo and title.
- The second is located in the middle and contains an action button 'Map' that opens a view that handles the display of interactive map with zoom extension.
- The third is located on right and contains an action button that runs a several actions of the App and updates according to the current view.

After launching the App, the start page is opened for few seconds (Fig. 6). During these seconds, it happens that the app is updated automatically if the content of POIs, published on a server, has been modified.

After the start page, the App offers the user a scrollable list (Android expandable list) containing all the POI's typologies generated by the authoring system - the 'List of POI' section (Fig. 7). In this section, the user can displays all the typologies, such as Castle, Bridge and so on. Next to the heading of each typology, there is a button with a down arrow to allow the user exploding the list (under the heading of the chosen typology) and viewing, below, the list of POI's selected typology. Through this list, the user can access specific information of the various POIs, proposed and grouped according to the different types.

¹¹ <http://developer.android.com/guide/topics/ui/actionbar.html>

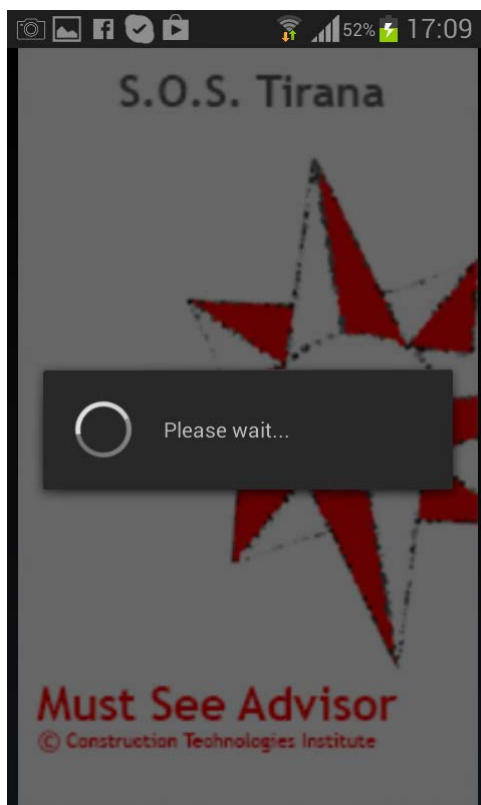
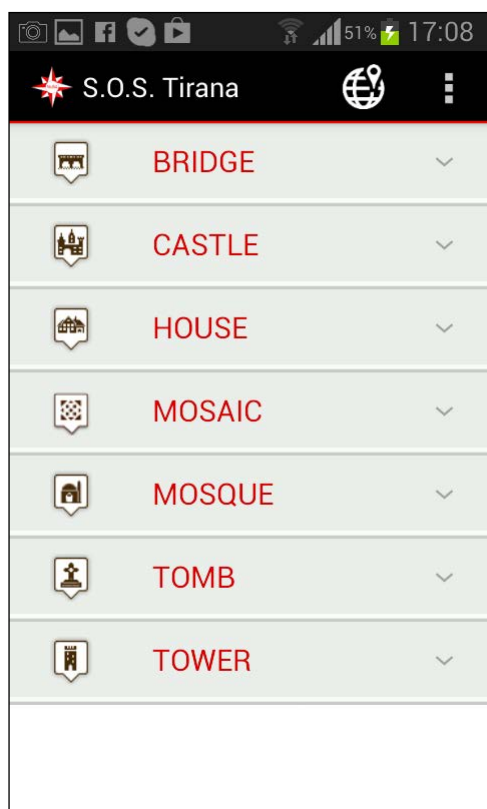
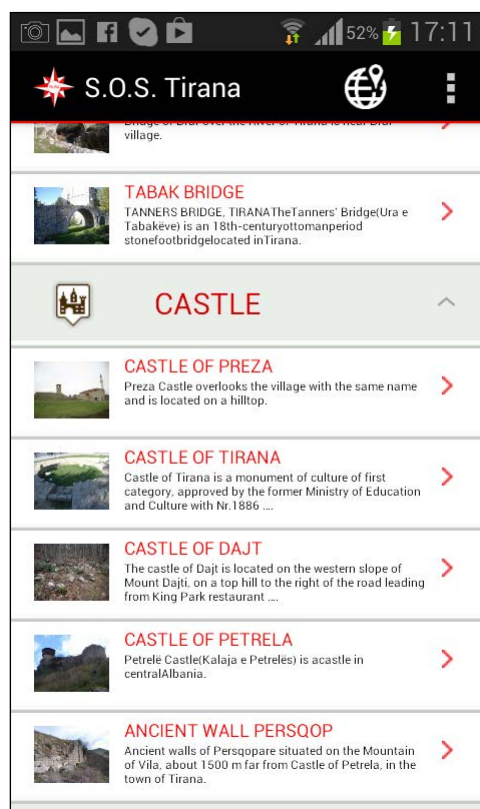


Fig. 6: The start page of the APP



(a)



(b)

Fig. 7: The scrollable list 'List of POIs': (a) the initial list; (b) the list 'exploded' for the type 'Castle'

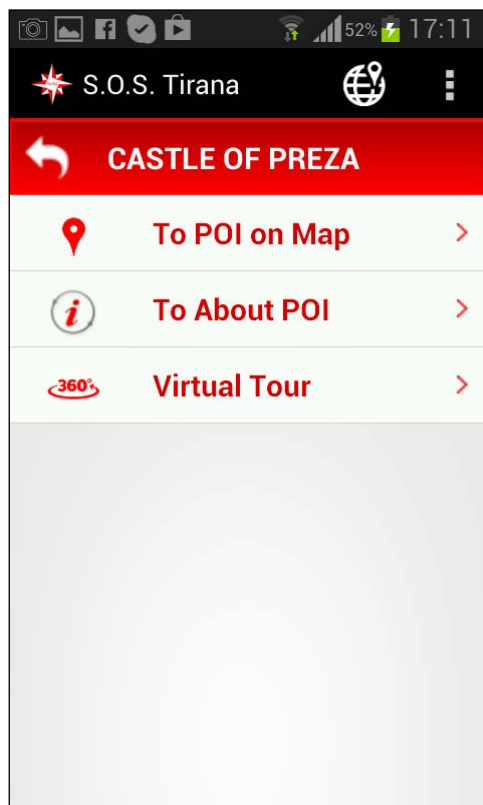
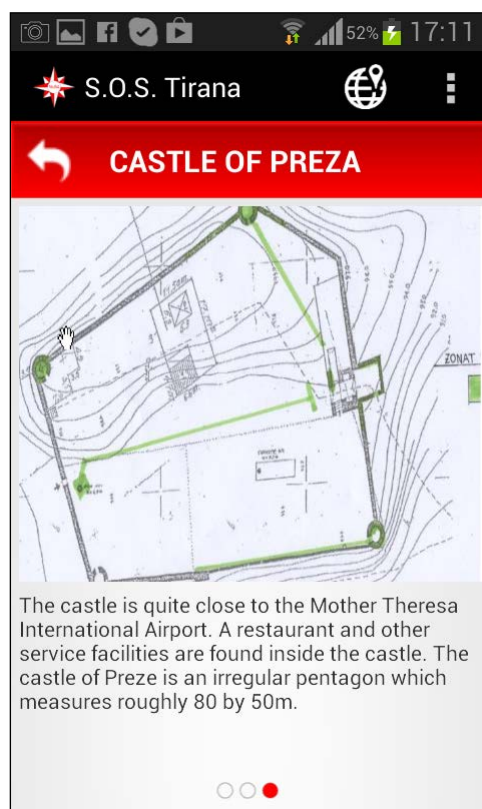


Fig. 8: The scrollable list ‘List of Media’.



(a)



(b)

Fig. 9: The information sheet about the Castle of Preza (Albania). (a) First page; (b) Third page.

Selecting the item relative to a POI within the scrollable list, the user access another scrolling list named 'list of Media' (Fig. 8), where each item allows accessing a particular media content on the selected POI. The use of scrolling lists makes information access much more intuitive and faster; these views, in fact, are optimized for touchscreen mode.

The scrollable list, 'List of Media', allows the user to:

- Display on the device the map centered on the POI ('To POI on Map').
- View the information sheet of the selected POI ('To About POI').
- View the virtual tour of the selected POI, if any ('Virtual tour').

Selecting the item 'About To POI', the App opens a view that contains a detailed information sheet of the selected POI and reported on three pages, which are available by sliding finger across the screen horizontally. The three dots, at the bottom, indicate to the user in which of the three pages he/she is (Fig. 9).

The 'Search' section, often absent in other systems, has a friendly interface: when the user activates this function, a dialog box appears at the top of the view (Fig. 10) that contains:

- A textbox 'Search' where the user enters the keywords for the search.
- A back button that opens the view refers to what was previously seen.
- The 'search results list', that shows the list of selected POIs, has all items including title, short description and thumbnail.

When the user digits a letter on textbox, the system proposes and updates automatically the list of POIs containing the typed text.

In the 'Map' section, the user interact with the Google maps in traditional modalities by:

- Reading the information associated to the POI – by clicking on the icon, the system displays the previously designed 'callout' in authoring system (Fig. 11a); the 'callout' displays content, usually text for POI's description, images or links to photographic image, in a popup window above the map, at a specific location.
- Navigating with 'pan' and 'zoom' tools, the user can view more detailed elements of the map.

The user, selecting the grey button on the top right corner of the map, views his location on the map and can quickly find POIs nearby.

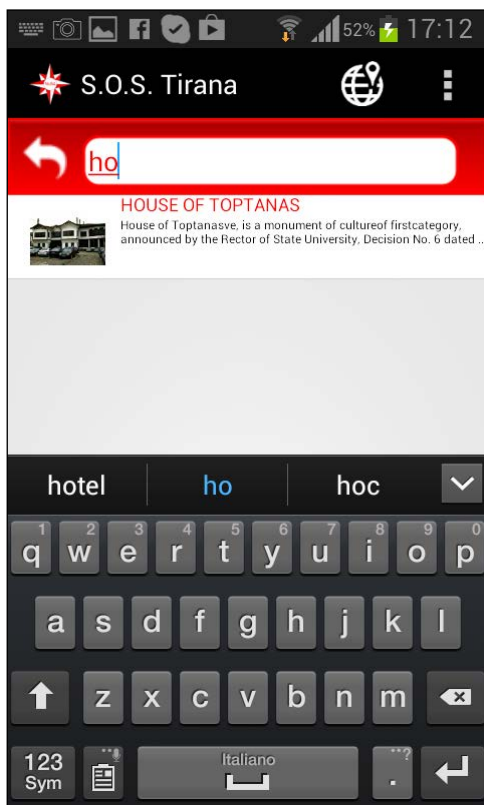
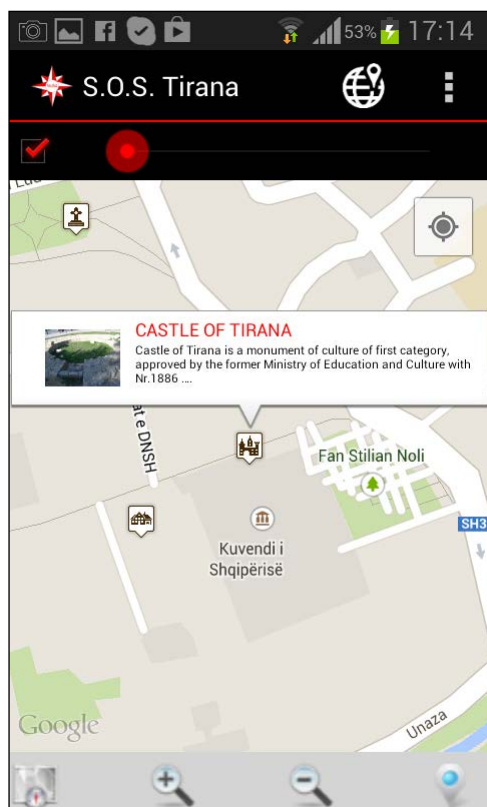
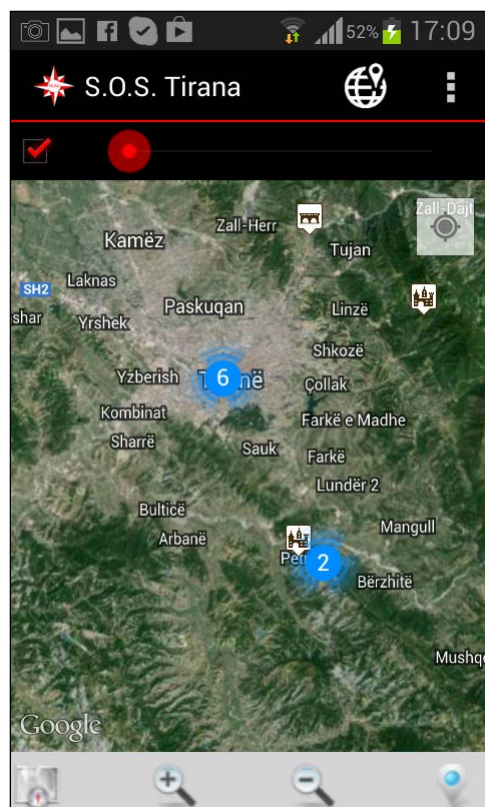


Fig. 10: The ‘Search’ section.



(a)



(b)

Fig. 11: The ‘Map’ section. (a) The map centered on selected POI (Castle of Tirana) displays the callout of the selected POI; (b) the map shows two marker clusters (blue round icons).

In this section a specific icon (marker, in Google maps term) has been introduced: ‘the marker cluster’¹². This is an utility to manage multiple markers at different zoom levels and to locate a large number of markers on a map without making the map hard to read.

When a user views the map at a high zoom level, the individual markers show on the map. When the user zooms out, the markers are clustered together, to make viewing the map easier (Fig. 11b).

5. Conclusions and Future Research

The paper discusses the implementation of an authoring system for the production of an interactive map for desktop (useful in the pre-travel stage) and for mobile (useful in the on-site stage), aiming to support the promotion of the cultural heritage. A first prototype has been developed including 13 heritage sites across the County of Tirana, which are supported by text and photographs supplied by the local partner, within the project ‘S.O.S. – Squiperia Open Source’, funded by the Apulia Region.

The mobile application was merely developed for Android; for the future, also a version for iPhone should be implemented.

A second prototype, still in testing, will be applied on a totem application to be installed in the cities of Siracusa, Riccione and Agordo within the ‘Smart City’ project¹³ funded by the National Research Council of Italy.

Currently we are developing an html5 version of the interactive map for mobile devices. This choice has been determined by the many advantages it offer, such as (Boiano et al., 2012):

- Optimising a website is usually cheaper than developing a new app, and the technology required is easier.
- One website is suitable for all devices (platform-independence).
- Only the website content has to be updated, and there is an independence from app stores publication policies.

Other points to consider are related to the maps and to the contents.

¹² <https://developers.google.com/maps/documentation/android/utility/marker-clustering?hl=it>

¹³ <http://www.anci.it/index.cfm?layout=dettaglio&IdDett=44321>

Google maps provides an excellent tool but, in order to avoid roaming costs, the inclusion of an off-line map should be considered.

The contents have to be engaging, worthwhile and suitable for mobile use; moreover consumers want (Compuware, 2013):

- Easy access to product and store information.
- Help planning and navigating trips.
- The ability to communicate in real time.

Finally, our interactive application needs to be evaluated from a usability perspective for improving their quality for the endusers. A systematic methodology called MiLE+ should be applied having in consideration the results of similar case studies (Schieder, 2013).

Acknowledgements

§ 1,2,3,5 Maiellaro; § 4 Varasano.

1. Authoring System and Interactive map for desktop:

- version 3.0 (<http://jargo.itc.cnr.it/PROGETTI/prototipo/turismo.html>): N. Maiellaro (requirements and tests); M. Padula (analysis); P. Scala and D. Di Pasquale (development)

- version 4.0 (<http://jargo.itc.cnr.it/PROGETTI/webgis4.0>): M. Padula (analysis); P. Scala and D. Di Pasquale (development)

- version 5.0 (<http://www.ba.itc.cnr.it/SOS-Tirana>): N. Maiellaro (requirements and tests); A. Varasano (development)

2. Mobile App for Android: N. Maiellaro (requirements and tests); A. Varasano (analysis and development).

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