Geographical Web Platform for e-Tourism

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Abstract

Nowadays it's basically mandatory for any tourist region to have a web site intended for the potential visitors. A wealth of new possibilities has recently sprung up with the support by modern browsers of new standards and technologies. Additionally, in contrast with other areas, for which various platforms are already available and simply require some customisation, this doesn't happen with tourism. This paper describes the design of a generic platform that can be customised to any tourist region, featuring integrated georeferencing of items from heterogeneous sources, trip planner based on a suggestion engine — considering the location and category of included points of interest (POI) —, interconnection of Events, POI, Routes and Itineraries. The result goes beyond what's currently available and is being deployed in the Douro Valley wine region in a proof of concept and case study manner.

Keywords: GIS, User Profile, System Recommendations and Trip Planning

1 Introduction

A bet on new technological solutions is the latest effort aiming the development of the regional touristic industry along with its goods (e.g., traditional products) and services. Tourist websites are starting to differentiate themselves from others by the features offered to the user. Information on how to get there, what to do, suggestions on what to see, where to eat, site maps, photographs, videos, trip planning, among others, are becoming standard for all tourist sites. However, unlike other areas counting with platforms already developed, each region needs to implement from scratch the same set of features, there's no reuse of components, and regions are not able to take advantage of the tests, problem solving and innovations. Additionally, the vast majority of tourism portals have an attractive design but support only a vertical navigation theme, giving little or no relevance to the geospatial context and the user profile. This makes up the motivation for the creation of a generic Geographical Web Platform for tourist portals, customizable to any region, based on the location and users profile, leveraging on an innovative experiment in terms of navigation and context: "What have I around me that interests me?"

2 Related Work

Tourism websites for tourism regions present many innovative features. The structuring around a few thematic pillars is prominently used by the region of Tuscany[1], Italy, focused on user preferences as the most relevant feature. Another significant feature, around activities, is quite well illustrated by the site of the state of California[2], USA. Web 2.0 features, like user content contribution, can be seen in comments, reviews, photos and trails submission in sites like Booking[3], Wikiloc[4] and Panoramio[5]. There are many others scientific jobs related, but by reviewing the state of the art, several cases can be observed applying different concepts to tourism. However, there is no integral solution for the implementation of Geographical Web Platform to touristic areas and e-tourism in general, independent of case study and easily customizable, by taking advantage of the innovative aspects in each single case.

3 Geographical Web Platform for e-Tourism

A major feature of the Web platform proposed here is to be developed on top of a geographical application that besides presenting contents it also provides further functionality. This geographic application aims to be used as the key tool to support travel planning, spatial search and geographic knowledge. Taking the novelty into account, this will be a reference to any tourism oriented portal. To implement the business logic described above, it was decided to structure the platform on three main areas (Figure 1).

Figure 1: Overview of the Geographical Web Platform for e-Tourism

As shown in the **Error! Reference source not found.**, the geographical application is always accessible from any page and has two visibility states: a traditional alphanumeric view and an innovative geographic application view. Even when browsing the classical mode, a small map is always present providing geographic context of the item that is begin displayed. For example, when the user is browsing some alphanumeric content of the portal that has geospatial references, the minimised state of the

[1] www.turismo.intoscana.it [Sept. 6, 2011]
[2] www.visitcalifornia.com [Sept. 6, 2011]
[3] www.booking.com [Sept. 6, 2011]
[4] www.wikiloc.com [Sept. 6, 2011]
[5] www.panoramio.com [Sept. 6, 2011]

platform is visible on the side and associated features of the page content are represented on the map using iconic representations in addition to functionality. This functionality consists on the action to switch the application to the maximised state. When maximised, the application offers all the features that will be describe in this paper.

Figure 2: The classical view mode featuring a minimised version of the geographical application; and the innovative view, which is the same geographical application, but maximised.

This platform includes a server with a spatial database containing alphanumeric and geographic information (Figure 3). This database is accessible by the various components through a Web Service that allows the manipulation and access to information that exists there. This server provides the necessary interfaces to implement the portal and their components (including the geographical platform), accessible via the Internet through any browser. However, if a given implementation requires the use of other database, for example on grounds of established protocols, its replacement will not be critical, since each component is developed in the most abstract way possible with the technology used by other components. The Geographical Web Platform has interactive maps for presentation and manipulation of georeferenced information, so it is necessary to have a map server. As the user navigates through the map, georeferenced items in the area are fetched via AJAX from the server, thus reducing data traffic to a minimum. There are many types of maps available in this Platform. Each type contains a few methods to handle retrieval and release of tiles, and properties that define its visual behaviour. The following map types are available in the project, Google Maps (*based Google Maps API v3*), Street View (*based Google Street View*) and 3D View *(based Google Earth)*; these last two are used in the offered virtual tour.

Since this is a regional platform, with a great amount of heterogeneous content, a data model was developed that brings together the information provided by several entities, allowing a uniform access to data. The information from any region will be stored in a database and can be derived from external databases, XML files or other formats. The main data stored refers to POI, Routes and Itineraries, Multimedia (photos and videos), Events and Highlights, all in the region with a spatial reference. All this content is properly categorized and sorted by relevance and are spatially searchable by bounding box and proximity to a previously defined location. Some particular POI, Events and Highlights can be relatable among themselves, to build custom Itineraries for trip planning. All these elements are always available for being georeferenced and readily accessible.

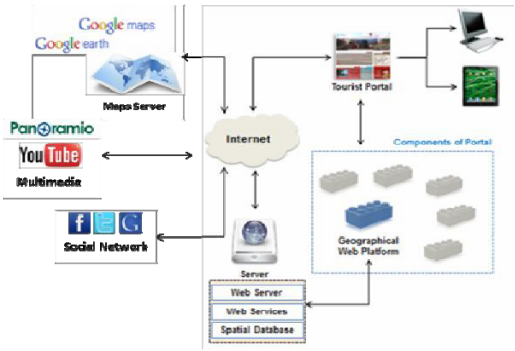

Figure 3: Architecture of the Geographical Web Platform

The interaction of the platform is primarily centred in the user profile, the spatial location defined by him, and filters that can be tuned. There's also the possibility of defining the visit period, allowing the system to give more relevance to the events that take place in that time frame.

A very important feature in this kind of platform is showing the tourist suggestions of what can be seen or visited at the destination, optimally in a personalized way. This can be thought of as a special case of relevant data selection for a user in information overload scenarios. However, one problem in deploying such functionality is the lack of user information suited to perform data mining when a new platform is brought online. This recommendation system combines a set of techniques, ranging from harnessing the information available in Flickr, crossing it with a POI database and using Google Prediction API to generate personalized travel suggestions, to the analysis of the itinerary the user defined, in order to come up with geographically nearby suggestions. Thus, a more flexible and adaptable model emerges with further possibilities than previous approaches. Detailed information regarding the design of the engine can be found on Personalized Travel Coelho, A., and Rodrigues A. (2011).

Traditional trip planning involves decisions made by tourists in order to explore an environment, such as a geographic area, usually without having any prior knowledge or experience with it. The features for this module enables an easier visit plan, as well as new possibilities for discovering new routes; it is a tool that improves the experience of travelling and hopefully will bring more people to the area in addition to having them do more. The application employs the concept of *My Trip*, based on the *shopping cart* design pattern - Toxboe, A. (n.d.). By navigating the application and viewing POI on the map, the user can pick up the items that interest him the most and add them. These can also be freely rearranged (i.e., the visiting order can be altered freely) and the final route is shown on the map interactively. To provide an added value to the tourist and local services, the selected route is analysed by the system to create suggestions of POI in the vicinity of the route. Taking advantage of Google Directions API it is possible to make the calculation and optimization of the current route. At all times, it is possible to export the trip plan created to a GPS using the

KML format or to download a PDF customized tourist guide file with information obtained through the travel plan.

The users of this platform can add and share georeferenced content, through social networks, like Facebook and Twitter, such as multimedia, descriptive information and comments. In addition, all authenticated users are able to rate a particular content, this influences the order in which the results are subsequently listed.

4 Case Study – Douro Valley

The target region of our analysis is the Douro region in the northern Portugal, classified as United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage site. Because this region has unique characteristics in the world, there is a strong financial and technological commitment to boost the region's potential as a tourism destination. Recently, an initiative sprung up, specifically for the region of Douro, with the goal of planning and developing a website that goes beyond the simple listing of places not to miss and a few photos. Resumed information concerning this research project can be found in BIP nº107, INESC Porto (2010). This innovative tourism portal, centred on the promotion of the Douro region, integrated and systematic georeferenced content from the region and take advantage of geographical generic platform developed.

5 Conclusions and Future Work

This platform aims at providing a modern and innovative image for touristic regions, creating momentum among all intervenients and acting as an asset in the dissemination of regional brands, products and services. The geographic application constitutes an innovative experience in navigating a tourism portal. In addition to centralize the discovery and exploitation of content, navigation becomes user-centric and context-aware. An important future development is related with new ways of promoting tourism in regions, such as allowing local organizations to advertise their products and services taking advantage of mobile devices capabilities and new location based services - Mobile Advertising. Coelho, A., and Dias L. (2011) explore this new concept with creation of the prototype solution. This poses the necessity to develop an appropriate business model and a geospatial search engine.

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