Open source software for tourism promotion: Lake Poli School (LaPS) education project

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Abstract: Management of geospatial data has become crucial in a broad range of new and non traditional disciplines. Here we investigate the application of open source geospatial software in the contexts of tourism and cultural heritage, and education. In our case master level students of environmental science, management science, and computer engineering work in groups to develop real projects proposed by real organizations with the assistance of junior and senior academics. The case study presented here tackled the issue of promoting tourism (particularly slow tourism) in the wonderful nature region located at the border between Italy and Switzerland. The project was carried out in collaboration with stakeholders, and it included a comprehensive managerial analysis and development of practical tools. After data collection, two web-based systems, one for desktop and the other for mobile devices, were developed using open source software allowing browsing and querying a rich set of tourism information. Both platforms were successfully tested with stakeholders. The study demonstrates the applicability of open source software not only for tourism promotion but also for educational purposes.

Keywords: Cultural heritage, education, mobile, open source, Web mapping

1 Introduction

1.1 Lake Poli School (LaPS)

A frequent weakness point of current research as well as business projects is the tendency to separate, instead of integrating, the different skills and competencies required for an overall understanding of the issues addressed. Reasoning in a "working packages" way often makes managers lose sight of the problem complexity, and accordingly find out inadequate or only partially-satisfactory solutions. Common examples occur in the field of cultural heritage and more generally in the public sector, where "perfect" applications and software are developed without properly designing/implementing the managerial infrastructure needed to operate and maintain them.

Against this background, an interdisciplinary educational project is carried out each year at Politecnico di Milano (Como Campus) which is called Lake Poli School (LaPS). The name recalls the city (Como is famous for its "Lake") and the university ("Poli" is an abbreviation for Politecnico di Milano) where the initiative is performed; while "School" highlights its academic nature. The idea at the origin of LaPS was linked to the aforementioned difficulty that both practitioners and academics have in overpassing the boundaries of their disciplines and languages. This limits the potentiality to innovate, creates tensions when cooperation is required among different groups, and can undermine long-term results. Starting from this seminal idea, LaPS is a multi-disciplinary initiative where MSc students from Management, Environmental, and Science Computing Engineering work in group to develop real projects proposed by local companies, and are supported by junior and senior academics. The course (5 ECTS) develops over 6 months, where "lessons" are substituted by "meetings". There are weekly meetings with three teachers (senior academics) from the three disciplines involved. Biweekly meetings at the university with the external companies are also scheduled. A key role in the initiative is played by the junior researchers assigned to each group, who become project managers as well as the main reference for both the group and the external company. There are no traditional lessons taught, but seminars or lessons "on demand" when gaps in knowledge emerge during the project development. The main role of senior researchers is to provide more experience advice to tutors and students, and to solve problems that can rise.

1.2 The case study

One of the proposed case studies in the 2013-14 LaPS edition was related to the valorisation of cultural heritage. Central to the project was the concept of slow tourism, i.e. the range of tourism activities focused on environmental friendliness and rediscovery of local traditions and cultural knowledge (Gardner 2009, Dickinson et al. 2011). Slow tourism is a special case of sustainable tourism, which, according to the definition of sustainable development (World Commission on

Sustainable Development 1987), outlines a tourism addressing the needs of the visitors, the industry, the environment and the host communities by taking full account of its current and future economic, social and environmental impacts (UN World Tourism Organization 2005). As the amount of spatially indexed available information (as well as the technologies to acquire them) have known a tremendous growth even in the field of tourism, GIS tools represent crucial elements to be exploited for a successful promotion of tourism-related activities including slow tourism. Nevertheless, it often happens that the use of GIS technology is either neglected or not accompanied by an adequate tackling of the problem also from the managerial point of view.

The LaPS project was focused on the promotion of slow tourism in the area of Via Regina, i.e. the road which overlooks the west coast of Lake Como and highlights a system of soft mobility links across a mountainous region at the border between Italy and Switzerland. Via Regina has been a fundamental trade and pilgrim route since the old Roman times, fostering cultural and commercial exchanges between Italy and Switzerland and throughout Europe as well. Despite outlining a variety of beautiful paths surrounded by an astonishing naturalistic landscape, this transalpine system has never been properly grasped from the tourism point of view. For this reason an INTERREG project between Italy and Switzerland, named "The Paths of Via Regina", has recently started (Brovelli et al. 2013) in which Politecnico di Milano is the project leader. Gathering experts from several disciplines (landscape planners and designers, geomatics engineers, and experts in cultural heritage), the project seeks to valorize the cross-border area covered by the paths through a rediscovery of the common European identity into the artistic and cultural heritage. Main beneficiaries of the project are the local communities, that can enhance and exploit the tourism potential of their territories, and the travelers and tourists themselves (both local and foreign) who can safely undertake a trip to appreciate the nature, and together exploit the services available along the paths. The LaPS case study derived from the whole INTERREG project but addressed the specific purpose of advancing slow tourism activities (e.g. hiking, cycling, and walking) in the cross-border area formed by Cernobbio municipality (Italy) and the extreme south part of Ticino Canton (Switzerland), covering together just a part of the INTERREG project region.

2 Methodology

According to the LaPS organization, the project team was composed of students from the three MSc Schools taught at the Como Campus of Politecnico di Milano, in particular three students from Management Engineering, one student from Environmental Engineering, and one student from Science Computing Engineering. The project aimed first of all to create a strategic plan and perform a market analysis, in order to control its development from the managerial perspective. Exploiting secondary data provided by both cultural organizations and

administrations (specially Cernobbio and Como municipalities) as well as primary data collected from direct interviews, the characteristics of the typical tourist flow in the area (i.e. provenance, period, length of stay, and age of tourists) were determined. The segmentation and targeting steps were then carried out to identify the most significant customer groups according to the project objective, which turned out to be tourists from Italy and Europe. A competitive analysis was performed afterwards to outline advantages and disadvantages of similar slow tourism projects according to four discriminating factors, i.e. tourism facilities, information access and quality, use of Web technology (including GIS), and focus on local traditions. Thanks to a positioning analysis, the combination of the last two factors was recognized as a key for the project to be perceived as a high-performance offer compared to the existing competitors.

Based on all these analysis, and in strict cooperation with the stakeholders involved (mainly administrations and cultural associations), some concrete products were created in order to fulfill the project objective. Technological innovation was first achieved by developing ad hoc GIS Web platforms to guide tourists through the discovery of the cultural richness and slow tourism potential of the area. To build these Web platforms a preliminary step of data collection and pre-processing was essential. The official vector cartography of the involved administrative entities (Cernobbio municipality and Ticino Canton) was already available at Politecnico di Milano as it was provided in the frame of the main INTERREG project. Other geospatial data were obtained from the cultural associations involved in the INTERREG and the administrations themselves, which provided several layers representing hiking, trekking, and mountain biking paths, historical and cultural information, transportation and public services. Several geospatial data (mainly related to lodging and eating services) were then manually obtained from an extensive research and/or a field GPS survey. Other useful data (including base maps and aerial orthophotos) are served through standard Web geo-services from institutional administrations (e.g. the Italian Ministry of Environment), and a Digital Elevation Model (DEM) of the area with ground resolution of 20 meters is also available. Many of these geospatial data required pre-processing operations to be optimally arranged (in terms of both geometry and attributes) for Web publication. This was mainly achieved using QGIS, on which a short course was given during one of the LaPS meetings.

Due to its high performance (McKenna 2011) and ease of use compared to other geospatial Web servers GeoServer was chosen to serve data as WMS/WFS layers. Two Web platforms were then developed allowing users to visualize and query the published data. The first was thought for an access from traditional computers and was developed using OpenLayers, Ext JS, and GeoExt (see Figure 1). Besides a map panel displaying the layers, it provides a layer menu, the traditional navigation commands, a scalebar, and an indication of the current map scale and cursor position. Users can select one among various base maps (including Google layers

and OpenStreetMap), and they can query the layers published by GeoServer in order to access their descriptions and pictures inside a popup.
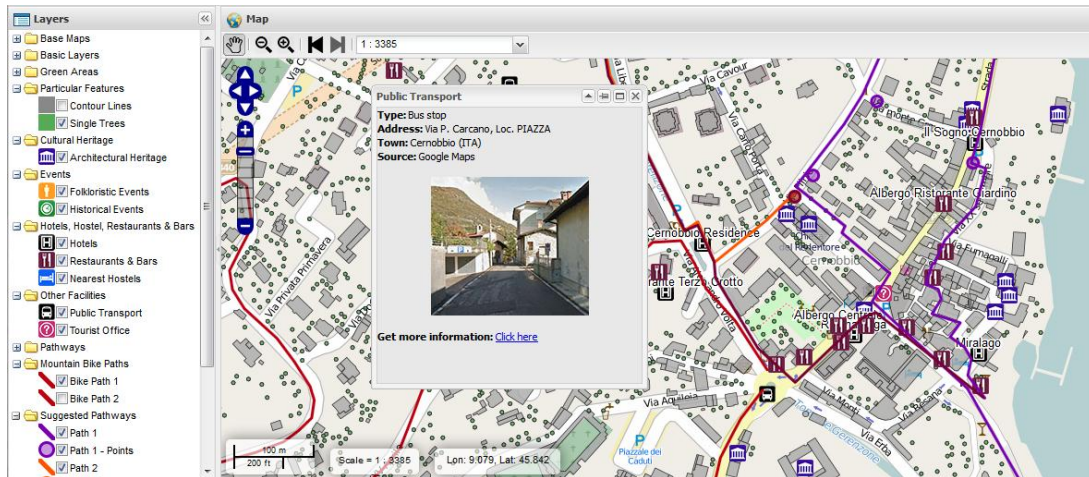

Figure 1: Web platform for traditional computers

The second Web platform was instead thought for being accessed from small-screen mobile devices (typically smart phones) while walking on the mountain paths. Coupled with the jQuery Mobile framework, OpenLayers was again used to build a touch-screen enabled application with an essential graphics (see Figure 2). Layers are this time manageable from a separate page accessible through the *Select Layer* button. Exploiting one of the mobile device geolocation services (e.g. the GPS), the *Your Position* button adds the user position as a new layer on the map. Query results are this time shown in a separate page (see Figure 2), thus resulting to be much more suitable for the small screen of mobile devices.

The managerial strategy finally included a promotional plan and a performance evaluation, which are key steps for the overall success of the project. Promotion was carried out through both online channels and physical channels. The former consisted of a dedicated website as well as social network interactions, whose purpose was to advertise slow tourism and attract new people to the project area. Physical channels addressed instead the tourists who were already present in the area. Examples were brochures and posters about slow tourism around Via Regina which were spread in restaurants, hotels, tourist offices, local shops, and travel agencies. A set of Key Performance Indicators (KPIs) was finally identified to quantitatively control the project development over time and measure its overall impact.
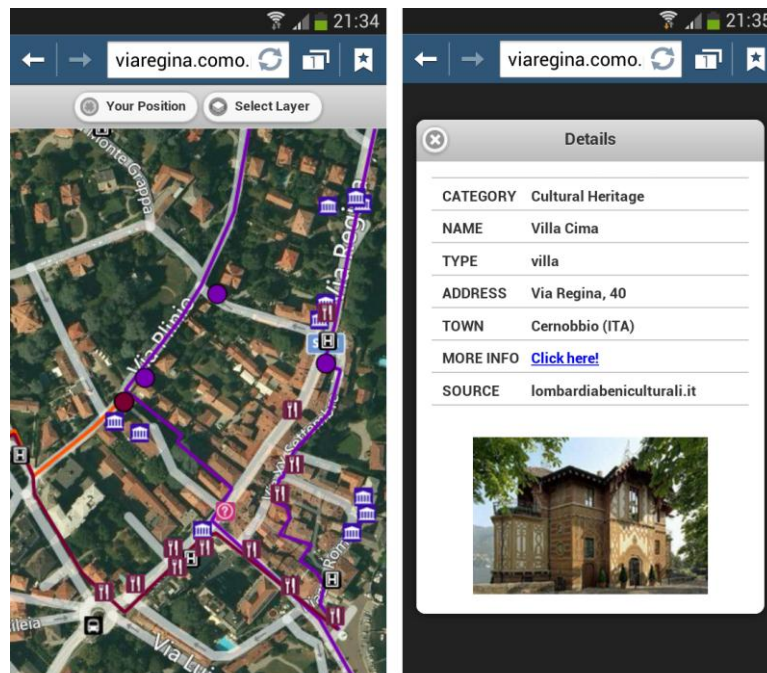
Figure 2: Web platform for small-screen mobile devices

3   Conclusions

Management of geospatial data is becoming increasingly important in a wide range of new and unconventional fields. One of them concerns disciplines such as cultural heritage and tourism promotion, in which projects tend often to discard either the use of GIS technology or the coupling of the related technical achievements with a proper managerial infrastructure that can frame and monitor the development. This study investigated the use of open source software in the highly multidisciplinary context of the Lake Poli School (LaPS) educational project. In the frame of a real research project, the student team addressed the issue of slow tourism promotion by tackling it from many complementary perspectives, developing tools that could be largely reused for similar case studies. The role of Management Engineering students was crucial in building the business model, which answered questions such as: who is going to maintain the system? Which tools can be designed to pursue a self-financing cultural network? GIS experts, on their side, understood the importance of considering these elements and tried to identify pilot areas for testing the INTERREG project feasibility on a small scale. The developed Web platforms provided support for a fruitful use of open source software in the field of tourism, as full customization of the products was possible according to the stakeholders' needs. The study also showed the suitability of open source software for educational purposes, as students were instructed on how to use the software and guided in the development of the applications. All in all, the work constituted a shining example of the interactions needed in both the

university and business worlds to overpass the boundaries of single disciplines, in order to better address and solve the complex issues of current society.

Acknowledgments

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