

Design and Development of a Dynamic Portal – Travel Guide for the City of Florina Concerning Smart Portable Devices

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Abstract. In the present work, an attempt was made to understand the user some basic concepts such as context with emphasis on location, the context - awareness, the GeoLocation, the mobile computing and some typical applications. Moreover, the user will be able to understand how the system was designed and implemented, what requirements posed by the user, the user interface and system evaluation. Because free software and free services on the Internet were used, such as Google Maps API, the final user is able to reproduce and extend this system, using the source code in its development. For programming mainly we have used the HTML language, PHP, MySQL, JavaScript, KML and we have extensive reference to all languages and technologies used.

Keywords: Context, location , context – awareness, GeoLocation , Mobile Computing, Google Maps, API, HTML, PHP, MySQL, JavaScript, KML, SQL, Database

1 Introduction

Everyone who is being in a new place, visitor - tourist or for other purposes, wish to visit the landscapes and attractions of this place, and navigate quickly and easily to different points of interest within the city. This paper tries to fill in a friendly and interesting way this gap, allowing the user to access any online features, navigate to various points of interest and arrange a visit to the place in the best possible way.

For the implementation of the work was based on several methodologies and technologies such as context and Location Based Services, which are used in other similar applications, but not the same.

The etymology of the word context refers to a situation where different events occur. This concept relates to the current situation that is perceived by humans because of observed events. The Dey and Abowd define context as "any information that can be used to describe the status of an entity" [2].

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According to A.Dey and G.Abowd, a system is context-aware if it uses context to provide relevant information or services to the user, the relevance of which depends on the user's task [1].

«Geolocation» is the recognition of the geographical position of an object in the real world, such as a mobile phone or any other device that can connect to the internet. The Geolocation API allows the user to share its position at trusted sites [4].

The «Google Maps API» is a Javascript API, enabling the incorporation of simple websites without special requirements on the part of the server. With its use, it is possible to incorporate a GoogleMap to an external site, at the site where the data can be superimposed [5].

"Geocoding» (Geocoding) is the process of converting addresses to geographic coordinates, which you can use to place markers or Map locations [6].

«Mobile Computing» is the ability to use technology to remote or mobile (not static) environments [7] [2].

As «Location Based Services» defines the services that depend on the location information of a mobile device. The position information is used to filter out irrelevant information and provide context (context) for different services [3].

Indicative some applications based on context-aware and the location information (location-awareness) are: Guide, Conference Assistant, Active Campus, Place Lab, Smart system for providing wireless service in the airport environment [8].

Internet applications that use the Geolocation are: Mozilla Firefox, Fire eaglem, LOKI, GoogleMaps, Google Earth and other Earth browsers

Mobile - Smartphone applications: Foursquare, Gowalla, Veladia, Yelp, Facebook Places, Brightkite, Loopt, MobiFriends.

2 Aim of the Study

The work aims to implement a system which will utilize the position of the user and in combination with other saved locations of various environmental and not point in the city of Florina, will provide the user with general and specific information.

This system is new, innovative, readily available and accessible to all, is visible to everyone at all times and it concerns the city of Florina. The idea of the work and its substantial contribution is the service, convenience and information browsing and finding sites in Florina and appeals to visitors, tourists, students, and not only, visiting the town of Florina for bit or will stay in this for some time. An effort is made so that the user can escape from the old and outdated instruments in the difficult tour of Florina as simple printed map of the city showing only roads and some illustrative points.

The purpose of the process is to allow any user at any time having an internet connection with the device (eg mobile phone), updated with a nice and easy way for the events that will take place in this place and how long, to see and identify where it is on the map at any time, and points of interest, such as: locations - parks, museums, churches, campuses, banks - ATM, etc.

3 Materials and Methodology

3.1 Materials

The system consists of a central server that stores the data from all sites in a database. Then, the user connects to the central server via the Internet or from the desktop, via a Broadband ADSL connection, either a laptop or mobile phone via wireless (Wi-Fi Hot-Spot) of Florina Municipality and draws Data wishes.

The system was designed and implemented to display locations (points on Google Map) on a portable device (mobile phone), depending on the desire and user options. In more detail:

Improving city tour of Florina: Easy to use, Effectively, Saving time, minimizing the possibility of user's deviation from the procedure.

Modern travel guide: Tour in Florina, Find points of interest, such as locations - parks, campuses, museums, banks, public services, entertainment etc.

«Smart Map», which is much more convenient, replace the print simple map and adapted to each user. Adaptation Aid for young students or people who visit and stay for a while in the city.

3.2 Methodology

For the implementation of the system combined several technologies, which were implemented on many platforms. The embodiments were internet (web) to be available then (24 hours all year round) and accessible by all (figure1).

Detailed description of the technologies found at references. Phrases is primarily using the following technologies: php, mysql, javascript, html, Kml, Geolocation, Timeline, GPS.

Originally acquired space on the Internet for "free web hosting» (free hosting web), was selected and used 000webhost.com. Opened space with special domain within the servers of, <http://florinorama.comli.com/>. Through the control panel is managing MySQL Databases (via phpMyAdmin) and the File Manager we can upload files to use and beyond. In the system used html, php and kml files.

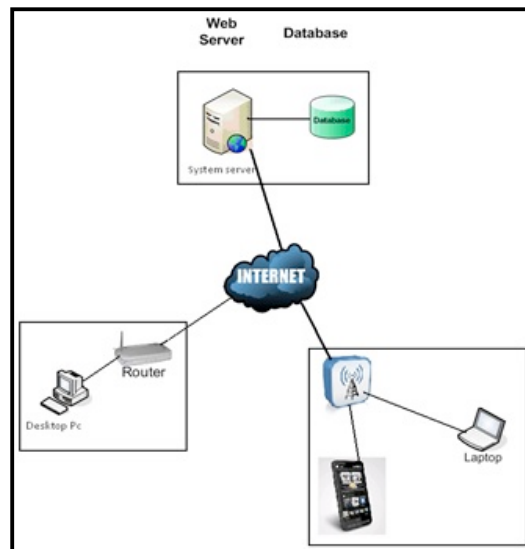


Fig 1. The structure of the information system.

To make the system easy to use but also to meet the requirements set, such as writing a new user and a new Administrator, their entry into the system, the uniqueness of their account, search for locations, adding new and delete old and the emergence, modification and deletion of data users and management, use of a database, which contains four tables, as seen in Figure 2.

The first two («users» and «admins») include details of users and administrators. Specifically initially contain the ID name and the user name or the Manager, the email will be declared and the username and password.

The first table is the «placemark» and contains the details of each Pin that we have built and meets at point (a location on the map) of the city of Florina, such as ID, name, style, coordinates - coordinates (longitude & latitude) and a description of what this point. The other table is the «tag» and includes the name of the tag and Placemark of (tag).

With these two tables and a code in php programming language and queries in SQL (MySQL uses the 000webhost server), can be stored a Pin from the map in the database and back to display on the map Pin we have stored. Moreover, because the components of the Placemarks in the database we want to be used in portable devices (mobile phone, laptop, netbook) but at the same time can be processed by the Google Map or Google Earth, KML technology used and the corresponding files, as shown in Figure 3.

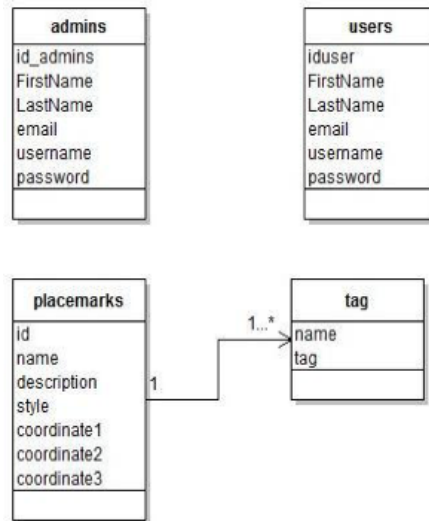


Fig 2. The database of the system.

Keyhole Markup Language



KML

Filename extension	.kml, .kmz
Internet media type	application/vnd.google-earth.kml+xml, application/vnd.google-earth.kmz
Developed by	Keyhole, Inc., Google
Type of format	Geographic Information System
Extended from	XML

Fig 3. KML file

Example of a file KML:

```
<? Xml version = "1.0" encoding = "UTF-8"?>
<Kml xmlns = "http://www.opengis.net/kml/2.2">
<Placemark>
  <Name> New York City </ name>
  <Description> New York City</ description>
  <Point>
    <Coordinates>-74.006393,40.714172,0
    </ coordinates>
  </ Point></ Placemark></ kml>
```

Then, we present the data flow diagrams and activities to be better understood by the system (Figures 4 and 5). Regarding the system data flow diagram for the user, it is worth mentioning that the system starts with the user's entry (login). Immediately after, the user is informed for the various events taking place in the city of Florina. The system detects the "position" of the user and urges him to choose one category from the available, which include the points outlined by category. The system communicates with the database and displays the results (how many points found for this category). The user can then use the information (via File KML) on his phone with the Google Map for Mobile program or computer, the Google Map application online. At the same time, but to view the information on the map, but it can process them. Diagram activities, figure 5, we see that the system has a beginning, middle and end. It starts with sightseeing in internal and external links, calls to make logging in, if already registered, otherwise encourages him to enroll in the system. Then informs the user (for events taking place in the city of Florina), the system detects the location of the user and the end user can select a category to be offered to the information they want at any time. Immediately after, we see that the system enables multiple options to the user.

The user can either download the KML file (which contains the information of points of the class chosen) and to use his mobile phone (through the application Google Map for Mobile) and the computer from the Google Map web application or to simply see the map points category chosen.

The user is following the flow of the system may, if desired, choose another category or else again to make disconnect and exit the system.

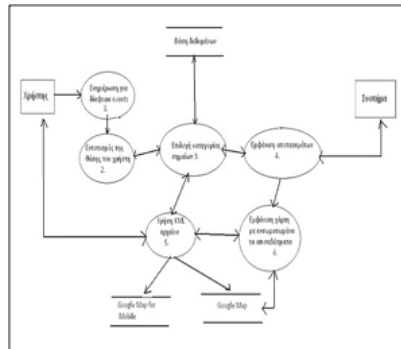


Fig 4. Flow chart for the user.

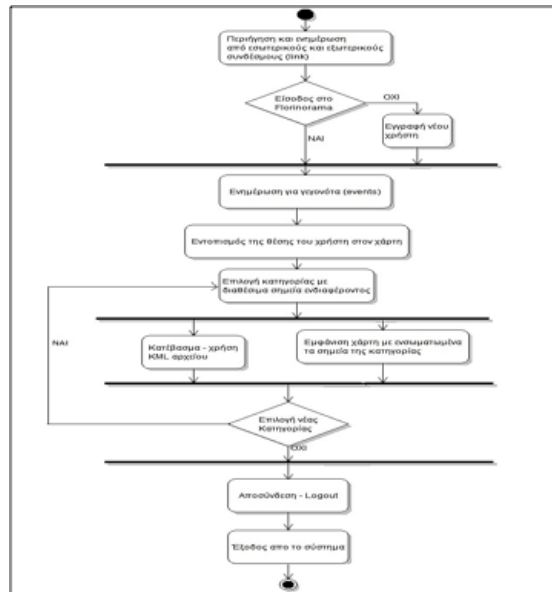


Fig 5. The activity diagram.

4 Results

By typing in the address bar a browser email address <http://florinorama.comli.com/> appears homepage FLORINORAMA. On the home page provides some general information on what is FLORINORAMA.

The system can use three types of users:

1. Guest,

2. User (registered user to FLORINORAMA)
3. Administrator

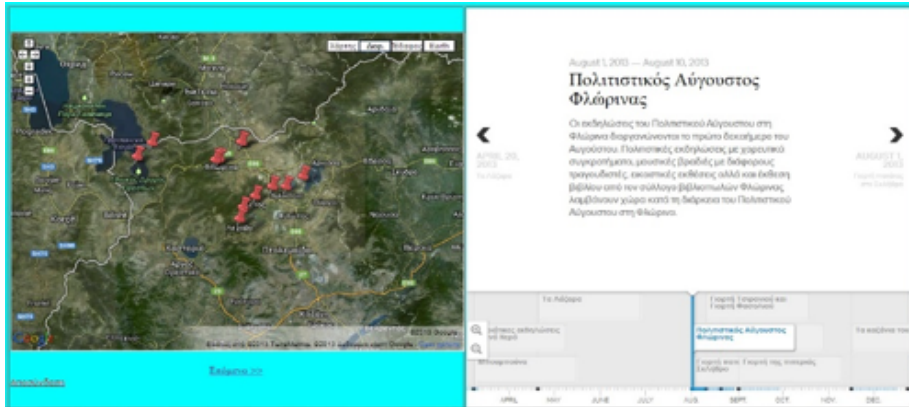


Fig 6. First view with the map and timeline.

Detailed description of system pages for the three categories you can find in [8] References in Chapter 4. Examples presented with images the timeline and identify the position.

By entering FLORINORAMA (Figure 6), the user switches to the page, where there is a Google Map includes some illustrative Placemark and next to the map is a timeline bar, in which the system administrator adds several facts from more simply, as when the Placemark added, paths and polygons to and played some events, how long does an event happened and the duration of this event.

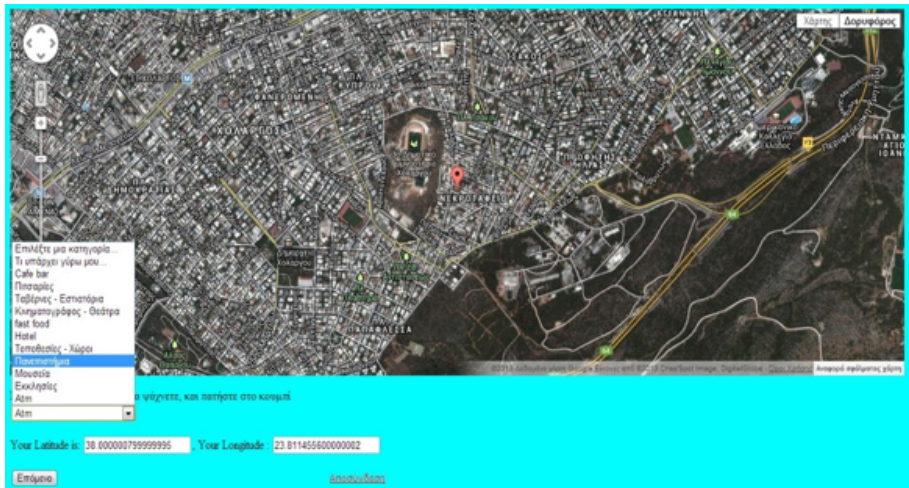


Fig 7. The use of geolocation technology.

At the next site, where the user enters selecting "Next >>" makes use of Geolocation technology. In this system, therefore, the Geolocation deliberately

performed with functions, for reasons of ease of use, convenience, and simplicity of the system (do not want to force the user to install an application) rather than applications such as those offered by Google maps API (Geolocation, Geocode, formerly the Gears API and several others). Thus opening the site created a map with a Pin at its center. The Pin is located in the center of the map and shows the nearest node from which the respective provider provides internet user.

This feature of the internet is possible only from computers (desktop or laptop). For mobile this function is meaningless because the traceability provided by the application Google Maps combined with GPS that integrates third-generation mobile phone.

Moreover but at the same site, as shown in Figure 8 runs a php code which displays the coordinates of the Placemark and below there is a form with various possible categories that the user can use any time. These categories include the Map locations of the points indicate the category and then selecting next >>, the user goes to the next page, while the variables are transferred.

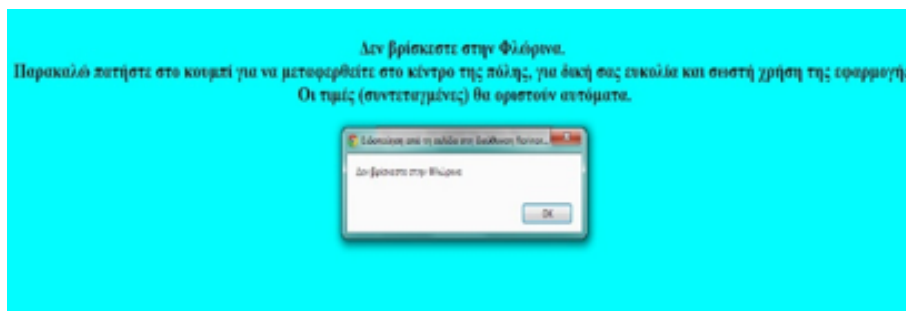


Fig 8. Control of user's location.

Before the user browses to the main page of the system with basic functions, a check is made whether the user is actually located in Florina.

5 Conclusions

The system implemented is innovative and completely different from the existing Web services that use location of the user. The existing system identifies the location of the user (when it is connected only to laptops or desktop computer, because the localization of the mobile devices is made by applying Google Map or Google Earth and the use of GPS mobile phone) and then urges him to choose the information he wants.

Applications like this are designed and made having as a goal to inform and advertise the city, various places, locations and shops, but also to serve tourists, visitors and anyone else who is going to stay in town for a period. It concerns portable devices, especially mobile phone, to have immediate results.

The system lets the user the freedom to choose the category with points of interest and then to load them in mobile phone or process them by computer (like KML

files). All information occupy the mobile phone user (the application Google Map or Google Earth) for future use.

This system can be used directly, in real conditions, but having a small range information. Then however the correct constant support, renewal and expansion could become very popular and serve many users.

The disadvantage is that it is available only for Florina. The advantages are many: many categories of information, the ability to display the perimeter points of interest to the user, the access from the mobile phone and the computer (portable and fixed), the direct transfer of information to the device as a KML file, ready for processing by an Earth browser (e.g. Google Maps, Google Earth and others).

The biggest advantage, however, is the possibility of adding a new location or from the mobile or the computer (laptop or desktop) to the system and the direct use of the system. Furthermore, the system to the home page, using the Timeline, presents chronologically different events taking place in the region of Florina, and their duration.

Other mobile applications such as the Foursquare, Gowalla, Veladia, function as social networks (socializing networks) and allow the user to communicate with others (and to become friends) and several other functions that do not focus the existing system of whose purpose is to provide information and raise awareness about the different parts - sites in Florina.

References

1. Dey, A.K., G. D. Abowd, "Towards a Better Understanding of Context and Context-Awareness"
2. Christopoulou, E. (2008) "Context as a Necessity in Mobile Applications", Chapter 12 in J. Lumsden (Ed.) Handbook of Research on User Interface Design and Evaluation for Mobile Technology, pp 186-203, Information Science Reference (ISBN: 978-1599048710)
3. Ramaprasad U.,R. Harmon (2003) "Location-Based Services: Models for Strategy Development in M-Commerce".
4. <http://en.wikipedia.org/wiki/Geolocation>, last update 22 May 2013
5. http://en.wikipedia.org/wiki/Google_Maps
6. <http://code.google.com/intl/el-GR/apis/maps/documentation/geocoding/#Geocoding>,
7. Veronikis, S. (2007). Portable devices: technologies and capacities. 16th Hellenic Congress of Academic Libraries. University of Piraeus. Greece.
8. Solakis, D. (2013). "Creation and development of dynamic website - travel guide for the city of Florina using internet technologies" <https://dspace.lib.uom.gr/handle/2159/15694>
9. Tryfonas, C. (2008). Advanced Internet Technologies. Ionian University. Greece.