"DEVELOPMENT OF WEBGIS BASED APPLICATION FOR TOURISM"

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Abstract:

Nowadays, many people rely on online services to plan a trip. However, they are usually faced with the problem of being supplied with lots of information. In consequence, they have to invest a great deal of time to decide what to visit, when, etc. This huge amount of possibilities available on the net makes it difficult for users to discern the more interesting offers from the rest. As a result, the more appealing offers can go unnoticed. WebGIS being an information system that is capable of answering questions about where facilities and resources are located represents enormous benefits to the tourism sector of any economy.

For the present study, Warangal district in Telangana state is taken as study area. It is one of the historically important places of India. This study is to create a web application for the tourism and providing an innovative way to the users to access spatial orientation of the city. The web application is made in ArcGIS platform. Webapp builder is the software used for it. In order to improve the tourist experience, recommender systems offer personalized route planner, shortest path to users. In other words, the system selects the more suitable and adequate offers for users and offers activities appropriate to their interest. GIS content forms the core component of this application as it provides the world wide users with spatial information about the place that is very close to reality.

Keywords: Geographical Information System (GIS), WebGIS, Tourism, Warangal, Webapp builder.

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Introduction

Tourism has a significant economic impact at an international, domestic and regional level. This impact is underlined by statistical evidence (WTTC, 2004; WTO 1999) demonstrating the significance of tourism in terms of GDP (Gross Domestic Product), employment and economic development (Marius, 2015). The rapid development of modern communication technology, attached with the increasingly high penetration rate of Internet, wireless systems and mobile communication, is promoting a technological emphasis in both enterprises and consumers. Progressively, the tourism sector has become one of the main activities that collect more money around the world; not only for the direct contribution it supplies, but also for the expansive effect that has exerted on a large range of related activities. Tourism is said to be the activities of people travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, commercial and other purposes related to the exercise of an activity remunerated from within the place visited.

The popularity of heritage tourism will increase in the coming years and the growth rates in this segment exceeds the world average, especially since it includes different sub-sections: archaeology, architecture, art, tours of churches and cathedrals, historic tours, museums, military history, music festivals, opera and pilgrimages (Neuts et al, 2013). Tourists plan travel and gather information using social networks, they collect tips from friends and other virtual contacts and the decisions are strongly influenced by these networks. Social media, due to its advantages related to cost, relations, audience, time, became a preferred marketing tool by businesses, especially during the economic crisis. It offers the major advantage of reaching customers in different parts of the world and receiving feedback in real time, employing minimum resources (Marius, 2015). Currently, tourists have the possibility to make reviews, comment, and present different perception of destinations, which may be read in various parts of the world using social media networks. Consequently, tourists became presumes in social media, meaning that they are benefiting from marketing activities initiated by companies, but also getting involved in promoting and improving the tourism products and packages. First step towards effective promotion and market strategies is to computerize the tourism industry in India. Second step Duran et al. (2004) explained the designing and marketing of geo-information product which dynamically generates interactive tourist maps that offer a variety of trend-setting functionalities like integration of vector shapes, images and text, high performance zooming and panning inside of graphics. Yuxian and Lyndon (2012) developed a tourist route model that is based on the integration of GIS spatial analysis functions and a kind of heuristic search algorithm based on local optimization. Cao and Schniederjans (2006) proposed an e-tourism recommendation system that focuses on reputation and quality, instead of price cantered systems. Sunil et al. (2011) explained how to develop a Geo-referenced information system for tourism (GeoRIST), Internet based Geographical information system which integrates spatial data base,

statically data and textural information in order to develop a data model. Puyam et al (2012) explains that there is growing needs for web based GIS for easy and fast dissemination, sharing, displaying and processing of spatial information which in turns helping in decision making for various natural resources based applications. Marius-Razvan et al (2015) focused on heritage tourism business and concluded that Heritage tourism entrepreneurs need to be more closely involved in using social media tools in the development and promotion of their heritage tourism offers, and to not neglect their benefits in terms of costs and advertising impact. Considering the above advantages the main objective of this work is to create a geospatial based web application which is user friendly and can be access by any user.

Methodology

The methodology which adopted for the development of the tourism web-based development for Warangal is shown in the Fig 1. The methodology adopted is divided into two stages. The first stage is GIS database preparation. GIS database is a combination of spatial and non-spatial data. The spatial data is collected from the satellite imageries, images downloaded from Google earth, and Survey of India topographical sheets etc. Various layers like district boundary, taluk boundaries, road networks, hotels, shopping malls, restaurants, railway network, places of interest and heritage structures are prepared. The Non-Spatial data includes the history, importance, specialties, working time and entry fee of the each site. Non-Spatial data collected is to be coupled with the corresponding spatial data thematic layer in the attribute data table. The second stage is the development of web application. Here, the spatial data is first loaded into the MySQL/ArcGIS. Map files for each shapefile are created and the connection to the ArcGIS is made in the configuration file of the web development application. The geospatial data is then retrieved on the browser.

Study Area and Database preparation

Warangal, Telangana is taken as the study area for its worldwide recognition of heritage structures. It is one indian city with three national prestigious awards, "HIRDAY" award, "AMURT" award, and the smart city. The city was planned around Badhrakali tank as a central place in grid pattern. The city is situated at an altitude of +274.3 m above Mean Sea Level at latitude of 18° north and at longitude of 79°35′ east(figure 4.1). Warangal is the second developed city in Telangana with massive growth in population of 2 lakhs in 1971 to 9 lakhs in 2009. The location map of the study area is shown in Fig 2.
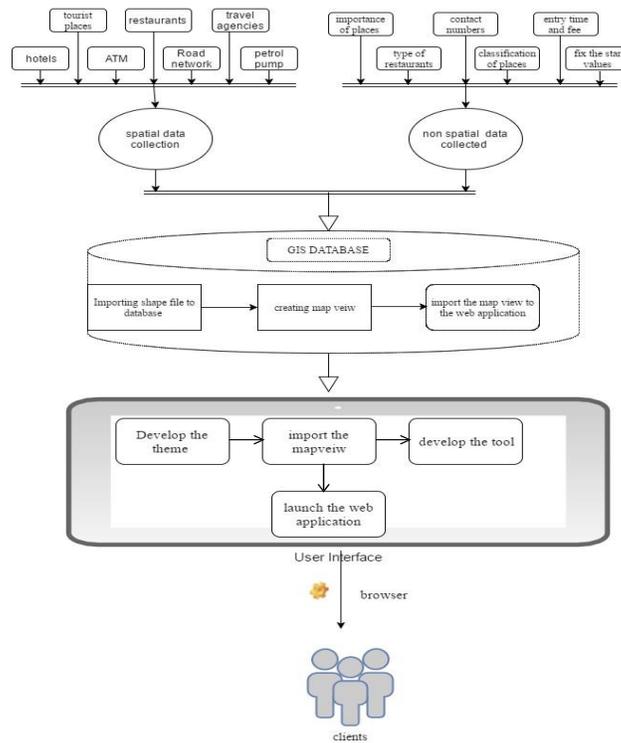
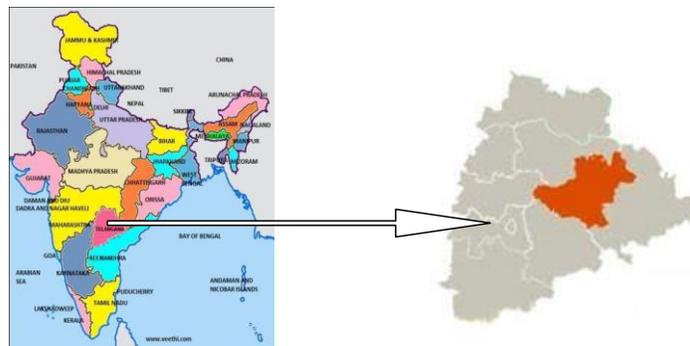Figure 1: Methodology adopted for the proposed work

Figure 2: Location map of study area

The data collected in the study area can be divided into different classes such as tourist places, hotels, restaurants, ATM, shopping mall, petrol pumps, travel agencies etc. The created map view of different thematic layers is shown in Fig 3. Google chrome browser is used to develop this interface. It is one of the most widely used web browsers. It displays the data in its built-in style sheet. It also features full user control of ActiveX and better security framework. During the development of a web interface, chrome is best supported while aligning the tabs or features in it. The loaded shapefiles in the database server can be retrieved on the browser.
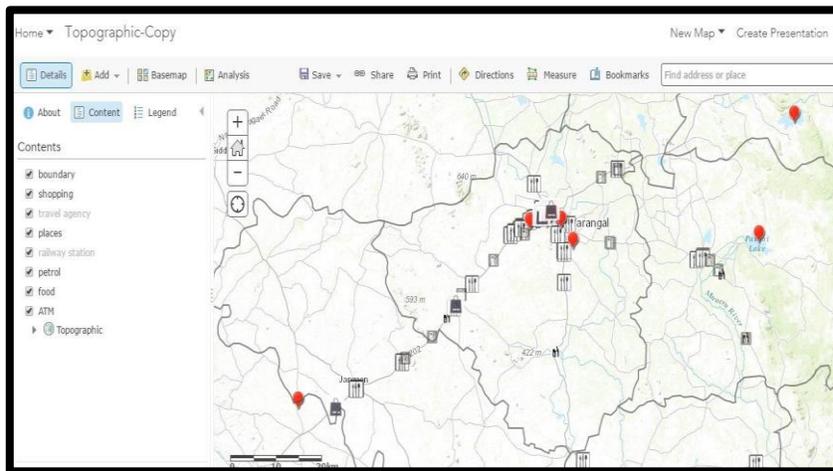
Figure 3: Tourist places in study area

Web Application Interface Development

For the interface development, a new website project is created in web app builder. An inbuilt template of Visual C++ and ASP.Net empty website is used. The whole interface is developed with 2 pages, home page and interface page which then redirects to the geospatial information system. The geospatial interface provides the geospatial data visualization, tools to analyze and spatial query. Home page of the application is developed in html and java subscript code. The home page gives a brief idea about the web application. The interface of home page is shown in Fig 4. It consists of a logo image of Warangal tourism ("EXPLORE WARANGAL"). The image and heading is linked to the interface page of the application. Once the user clicks the page it redirects to the interface page. The GIS interface is the final output of the WebGIS development of the study area. Fig 5 gives the overview of the interface and its features in it. The interface is built by features like web map, legend tab, label tab, search, scale bar, zoom in and zoom out, shortest route analysis, route planner, and query analysis.

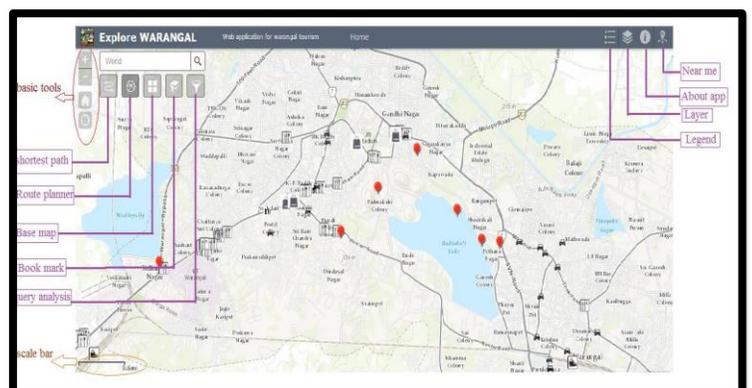

Figure 4: Home page of web application

Figure 5: Interface page of web application

The map view displays the shapefiles which are loaded into the web app builder database and 3 type of base maps (satellite images, street map, topographic map). The map that is displayed in the web map will show the topographic base map by default and the shapefiles which are loaded to the database. The basic tool bar consist of tools like zoom to full extent, zoom in, zoom out, my location, search tool, scale bar, coordinates are the basic visualization functions for most tourism application to access the spatial data map in the map view. The Layer List widget provides a list of operational layers that are added into the database and are called on to the browser and their symbols, and allows turning individual layers on and off. The order in which layers appear in this tool corresponds to the layer order in the map. The layers added in the interface are tourist places, restaurants, ATM, petrol pumps, railway stations, travel agency and hotels.

The Legend tab displays labels and symbols for layers in the map. The tab is set with respect to the scale dependencies of the layers in the map. This can be a useful indicator to map readers that additional data layers are present in the map. The Near Me tool gives the features within a specific buffer distance in the zoomed map. The tool will gives the feature's name, its symbol and how many are present in the buffer distance from the center of zoomed map. Popup tool will generate the popup which gives the attributes of the selected point. Since it gives all the information about the selected feather as a popup tab, it very useful to the user. The Query code was written for the attribute table of the shapefile which are loaded to the database. It could be written for the access data which are joined to the shapefile. The following are the attributes selected to perform the query analysis:

· No of stars assign for tourist places.

· Classification of tourist places.

· Vegetarian and non-vegetarian food.

· Number of stars assign to restaurants.

Fig 6, Fig 7, shows the query analysis carried out for finding out the number of stars assign for tourist place and the classification of tourist places. The shortest path direction tool provides a quick and efficient method of calculating turn-based directions between two or more locations. This tool uses both a network route service and geocoder service. The user needs to select the starting point and destination point in study area, after that select get direction.
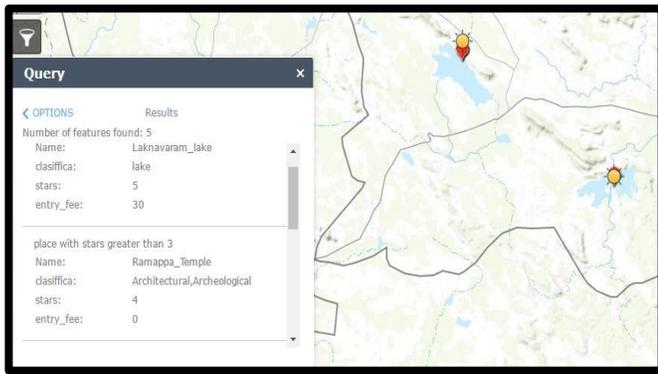
Figure 6: Interface displaying the tourist places with more than 3 star values
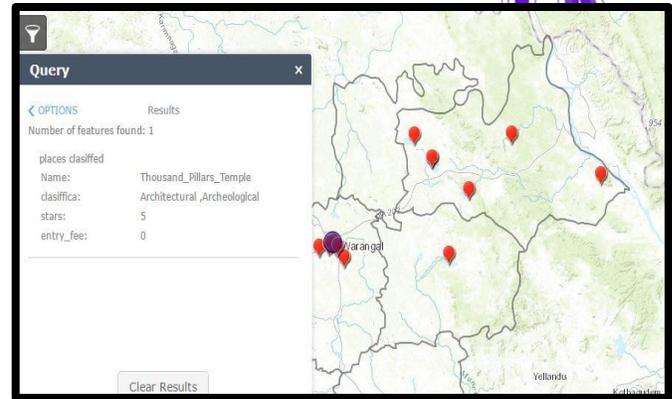
Figure 7: Interface displaying the tourist places with is classified as architectural and archeological

Tourist planner is the final tool in the application which generate path between the tourist places according to users interest. The output of this tool represents the candidate tourist sites and shortest path between them. By selecting the mode of transporting, time of transportation can also be calculated. While calculating the shortest path, the algorithm also considers the mode of transportation and time taken in each site. So this tool can generate a whole route planner.

Conclusion

Tourism has a significant economic impact at an international, domestic and regional level. Heritage tourism offers tremendous economic and social opportunities for local communities in terms of supporting the development of entrepreneurship. Warangal district in Telangana state, India has been taken as study area for the present work. Recent technological advances in spatial technology make considerable impact in the planning of developmental activities in rural areas. To develop the web based geospatial information system Microsoft Visual Studio, web app builder, arc gis online, and arc gis are used. Geospatial data has been loaded into ArcGIS converted into shapefile. Mapfile is developed in the web app builder. Web application Warangal tourism is developed. Visual studio is user for developing the application and interface. The developed interface is designed with various tools like refresh map, zoom in/out, pan, selection tool, spatial query tools, shortest path tool, near me and route planner. It is also developed with the functionality tools like layer tool, legend tool, basemap. The developed web application for Warangal tourism consists of various useful GIS tools for spatial data visualization, analysis, querying and finally production of maps in the form of map prints and user friendly interface. The use of an effective database management system allows for effective storage, management and retrieval of spatial data. The adopted approach and its implementation using ArcGIS, web app builder for developing the web application provides public users data sharing.

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