

# A Location Based Service of Xi'an City Lintong District Tourist Guide Service System Research

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## Abstract

The traditional method of travel management has been far cannot meet the needs of modern tourism development. To build a have information dissemination, data sharing, location query, tourism GIS service platform for the public is very necessary. By analyzing the needs of tourists, research data management of TGIS .The system followed the software engineering ideas building Lintong tourism guild public service platform, followed ArcGIS Server technology, RIA and Flex technology, buffer analysis technology, ArcGIS Server API for Flex technology and uses B/S (server/client) mode, in Flex Builder 3 environment, initially completing design and development of system, having application-oriented GIS query, analysis, management, printing, Bookmarks, operation Map and other basic functions, and can be video, illustrations displayed in the form, achieving the spatial data resource sharing and publishing, meet the tourists before departure destination information necessary to understand, after reaching more To learn more about the needs, supporting online bulk access, providing service interface scalability.

## Keywords

GIS; travel; TGIS; ArcGIS Server; Flex.

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## 1. Introduction

All Tourism has a very close relationship and geographic location of tourist attractions in the distribution and service facilities, road information, so based on the corresponding geographic coordinates [1].Using GIS spatial data management capabilities, and can be integrated extremely rich spatial and non-spatial information on an electronic map, unified management with information management software, from the macro to the tourist information for testing. Tourism Geographic Information System is an acquisition, query retrieval, management, analysis, expression and application of tourism geographic information multimedia system [2].Based on the analysis of the needs of tourists, visitors to the information concerned the classification, building databases and functional structure TGIS and Lintong District 4A and 5A level scenic spots, for example, to build Lintong tour guide public service platform.

## 2. Systems Analysis

### 2.1 Needs analysis

Through investigation, before traveling, people want to collect all kinds of tourist information, and then make decisions based on their own subjective bias. Differences between natural and human environment is an important reason for the driving behavior of tourism. People in the tourism always inclined to the pursuit of maximum benefits of tourism in the limited time and money, which is the

maximum amount of information acquisition. The expectation is more intense after arriving at the destination. So the design of the system is necessary to help visitors a comprehensive, intuitive access to the scenic detailed information and provide travel advice.

Lintong district is rich in tourism resources, HuaQing Hot Spring and Terracotta Army are two 5A level scenic spots, Mount Li and The Hole are two 4A level scenic spots. In addition, Terracotta Warriors and Horses also belong to the world cultural heritage. The system is aimed to create Lintong District tourist culture, food, clothing, housing, historic line formation attractions, cultural heritage, integration, visualization and intuitive unfolded. So that visitors learn more about the scenic, query retrieves analysis Resorts close to facilities, providing position service and map browsing the help and advice for visitors[3][4].At the same time to help the management to the scenic area, strengthen the tourism propaganda, improve their management efficiency, for the evaluation and prediction, tourism analysis help.

**2.2 Analysis of the basic functions of the system**

Tourist areas are not isolated, but rather a set of geographical and cultural elements in one complex. It is closely related to the construction and development of the environment, the economy and other factors. Planning and design of various information elements and tourism, management, and maintenance work must be put together, and the application of computer technology to be able to meet customer needs. So tourism geographic information system is essential part of the information system. It not only provides an intuitive visual effect, with geographic information as the basis for inquiry, statistics and display, but also provides a basis for the development of tourism decision-making is more important. Tourism geographic information system requirements are obvious in many ways. Its application requires the following aspects:

Rights management (data management, user management, etc.).

Map operations (zoom, refresh, roaming, etc.).

Layer Management (control layers visible or invisible).

Information Query (in the form of audio, video and illustrated query).

Spatial analysis [5] (the shortest path, buffer analysis, etc.).

Bookmark function.

Map printing.

**2.3 Data Source Analysis**

TGIS data type is based on geographic data, tourism thematic data and socio-economic data. see Fig. 1.

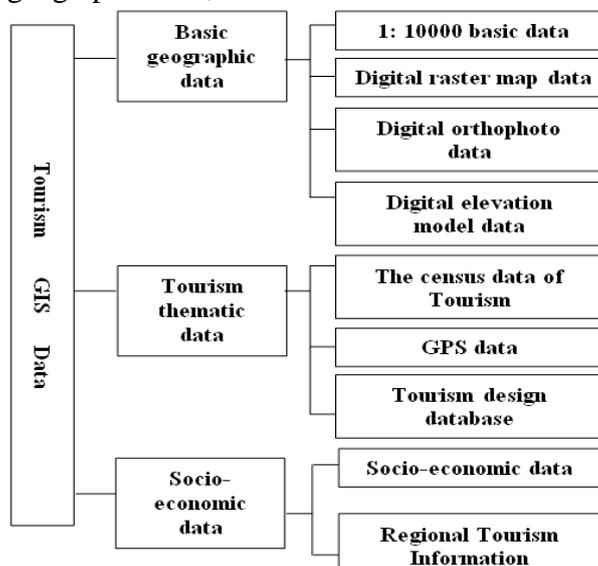


Fig. 1 Tourism GIS data source schematic

### 3. Prepare Your Paper Before Styling

#### 3.1 Database Design

Spatial Data structure is divided into four layers. Each object in it by extending all the objects formed MFC. They are the layer of map data, the layer of data, the layer of meta-data , the layer of auxiliary system [6].Use ArcGIS database management systems: Personal Geodatabase. It is divided into spatial data and attributes data. see [Table 1](#).

Table 1 Hierarchical Spatial Data Table

Layers code	Layer Name	Dataset type	Description
JQ	Scenic	Surface	
GL	Road	Line	
JD	Scenic spots	Point	
BG	Hotel	Surface	
YY	Hospital	Surface	
YH	Bank	Point	
BZ	Callout	Text	Each layer name labels
QCZ	Bus station	Surface	
FD	Restaurant	Surface	
LYY	Nursing home	Surface	
JYQZ	Gas station	Point	
YJ	Post Office	Point	
XX	School	Surface	
.....	.....	.....	.....

Property database is a two-dimensional data table [7].The database related to the data structure of the table. see [Table 2](#).

Table 2 Data Structure Table

Database table names	Relational schema name
Attractions	景点
Business Office	营业厅
Bus station	汽车站
Road	道路
Bank	银行
Post office	邮局
Restaurant	饭店
Supermarket	超市
Hospital	医院
Gas stations	加油气站
Hotels	酒店

There are many data structure table in the system. Attractions of the data structure of the table with an example. see Table 3.

Table 3 Attractions Data Structure Table

Field name	Field Type	Constrained control	Explanation
A_No	char	Primary key	景点编号
A_Name	char	Not null	景点名称
A_Position	char	Not null	景点位置
A_Telephone	char	Not null	景点电话
A_Description	char	Not null	景点简介
A_Fare	char	Not null	景点票价
A_Short season	char	Not null	景点淡旺季
A_Opening Hours	char	Not null	景点开放时间
A_Bus lines	char	Not null	景点公交线路
A_Grade	char	Not null	景点等级
A_Travel Advice	char	Not null	景点旅游建议

In order to achieve interactive query spatial data and attribute data, you must establish a correlation between the two data identifier table (ID), then come to the relationship between the two based on ID, to achieve its interaction [8].

### 3.2 System architecture design

Using B / S structure, the application system is divided into three layers, namely, the application layer, service layer and data layer.

Application layer is designed and implemented by API Flex and Flex framework. It can be used to respond to requests Flex rich client. Meanwhile make the relevant type of response based on the user's request. Programs offered through the use of REST interface Servlet API Flex interface will be able to respond to a request to provide the client issued, and return the results on the server side. Ultimately through Flash Player unfolded.

Web service layer is composed of a server and GIS server. Web server is to enable users to request a Web browser and a Web service to send will interact directly with the back-end database Web services, access to relevant information. You can also obtain the corresponding map service objects based on user requests in the GIS server. GIS server has the role of two aspects: first is to use the map slicing technology that can make the system fast response to user requests, also request a map pictures and map overlays, to minimize the computational load of the target server; the second is to provide users with access to map REST interface, REST interface is composed of one or more server object container Serve Object Container and Server Object Manager Server Object Manager configuration, use the interface services and API Flex were used in conjunction with ArcGIS Server can be combines Flex and Flex development environment under.

Data layer is the underlying system for the entire data source systems to provide a guarantee. It is responsible for access to spatial data and attributes data, and maintains relationships between data. Its content has two main aspects: first is the spatial database storage of spatial data; the second is a relational database to store attribute data. ArcSDE spatial data is to use a unified management; the same division of the same type of feature layers. Attribute data is to use a relational database system for storage.

### 3.3 System function design

System function is the greatest extent possible to meet user demand for the design principles. see Fig. 2.

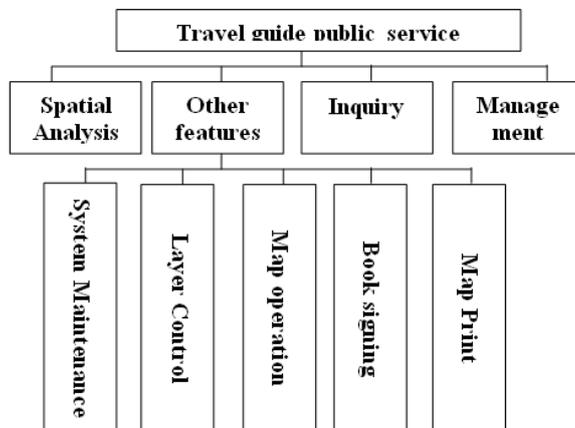


Fig.2 Functional Design Module

Query function modules:

This module provides various services wizard process and its main tourist information. It includes tour guide, shopping guide, hotels guide and traffic guidance. It can be displayed in the message window major shopping malls, travel goods shopping malls, hotels and other phone numbers and addresses, shows a train ticket, air ticket, show attractions address, opening hours and other information, and also to show the associated map window location.

Map View module:

The main achievement maps and attractions picture browsing function. To appear in the Map window to zoom in, zoom out, pan and other general operations, and according to the selected sites, a corresponding picture and detail.

Thematic modules:

To achieve the overall and specific information display, can display maps hotels, railway stations and other distribution. Specific information is a detailed map of a scenic spot display. When the distribution layer attractions are opened, just click on the map attractions, you can browse to the appropriate spots detailed map and get introductory video information.

Analysis module:

The map sites or between the target distance measurements etc..

System tools and system help module:

In the system of tool module can according to user needs change, part of the user interface, change the display scale map. The system can provide attractions networking help and support bookmarks stored and paper printing.

## 4. Key Technology and Technology Road Map

The keys technologies of system implementation are ArcGIS Server technology, Rich Internet Applications and Flex technology. Its purpose is to reduce the complexity of development, improve the scalability of the system. Buffer analysis is one of the basic GIS spatial analysis function. In this system, based on a distance map element set size, and form a buffer element around its multilateral body, such that the spatial information is expanded in the horizontal direction. For example attractions within 5 km mark 'A' scenic surrounding ranges, restaurants and hotels and so on. It also can interest in the actual situation, time and economy based on the interest of tourists, visitors set different travel routes. There are two ways to publish a series of services ArcGIS Server. First is through the Arc Catalog to publish, the Second is through the ArcGIS Server Manager to publish. It can provide many services. For example, Map Service, Geocode Service, Geodata Service, Geometry Service, Geoprocessing Service,

3D Globe Service and Image Service. Map service can provide maps and mapping services on the basis of map data browsing services. It released the format and OGC (Open Geospatial Consortium) standard compatible.

The technology roadmap. see Fig. 3:

Data processing, using ArcGIS software for data processing;

Data warehousing, import the data into ArcGIS database;

Publish and share data in ArcGIS Server platform for publishing and sharing data;

Systems development, systems development using Flex Builder;

System deployment release, through the deployment of IIS server to publish;

The client browser, the system client browser IE browser.



Fig.3 The technology roadmap

## 5. Function Realization

System functions are implemented, including the following aspects.

(1) The user management and login screen

When the user enters the system, the user first enters the system management interface. The interface is the first impression to system users, the system must be simple login screen. see Fig. 4.



Fig.4 User management system login screen

System users are divided into ordinary users, administrators. Administrators can perform maintenance on the data, while the average user does not have the authority. User login required permissions to verify that the user exists, the password is correct, only through authentication to enter the system.

(2) Rights Management

It includes data management, user management, the main operation to add, modify, and delete data; the data is updated in a timely manner, but also to modify the user login information. The system is through the background to the data management and user management. When new data is updated and new user registration, administrator by changing information in the database later point achieved update.

(3) Map operation

By directly into the program to achieve zoom, full map display, refresh, on one view, the next view, and translation and other operations.

(4) Layer Management

The system administrator or the user can control the visible or invisible layer. To display a layer only checked to display layer. see Fig. 5.



Fig.5 Layer Control

(5) Distance query

Functionality through the use of distance measuring draw a line between any two points can find out the actual distance between the corresponding points. see Fig. 6.

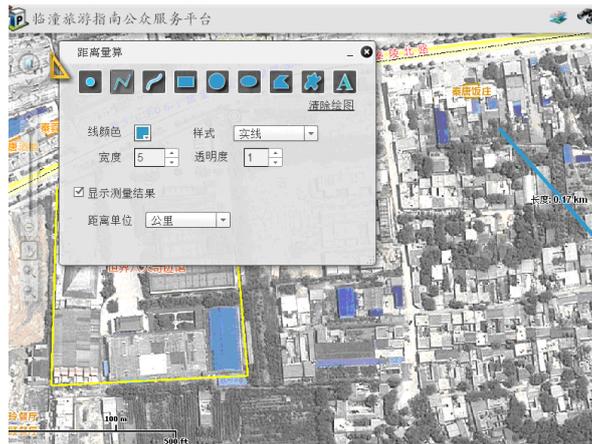


Fig.6 Measure Distance



Fig.7 Information inquiry by video

(6) Information inquiry

Find graphics attributes, attribute lookup graphics. After clicking on the graphic object properties will automatically pop up the results of the query. The results are the basic information about the object

(such as a text of attractions), picture messages, the official website links and videos to explain. You can also find the graphic based on the attribute information. You can select different types of queries (such as hotels, offices, hospitals, bus stations, train ticket purchasing point, bus lines, etc.) will automatically get this information name, and to support fuzzy queries. see Fig. 7.

#### (7) Space Systems Analysis

The main function of system implementation analysis is buffer analysis. By establishing point buffer (such as bus station), line buffers (such as roads) or face a buffer (such as scenic), automated analysis of tourist information within the buffer range.

First select the buffer analysis function, input buffer source, select the required buffer target, set the buffer distance. After the system is determined on the map will show the result buffer. For example, the Terracotta Warriors buffer source, and its surrounding attractions goal buffer, the buffer radius of 100 meters as an example to illustrate the results of the implementation of the system.

#### (8) Bookmark and Print

When you want to save a view, the bookmark function of the operation, if need be by printing a paper map, you can get the relevant information.

## 6. Conclusion

The paper combines the characteristics and needs of tourism geographic information system. Tourism resources in Lintong District, Xi'an city as an example, using B / S structure established Lintong tour guide service system. System to achieve the sharing and dissemination of spatial data resources, support online bulk access, provide service interface. It's scalable, have a good interactive performance. The system also implements data management and data maintenance (data backup, update, restore), Tourist map operations (zoom, pan, full map display, refresh, etc.), Tourism Layer Management, Tourism Information, Tourism buffer analysis, Bookmarks, Map Print, and so on. It also incorporates innovative video and other illustrations in the form of reports. The system can be ported to mobile devices, such as mobile phones, tablet computers. In addition, because the limitations of hardware and software conditions, it can be used ArcSDE (Spatial Data Engine) to achieve high-volume distributed spatial data access in future.

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