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# The Design and Implement of Tourism Information System Based on GIS

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**Abstract**

From the geographical information system concept, discusses the main contents of the geographic information system, and the current of the geographic information system key technological measures of tourism information system, the application of tourism information system for specific requirements and goals, and analyzes a relational database model based on the tourist information system in GIS application methods of realization.

## 1.Introduction

With the rapid economic development of Chinese society and people's living standards rising rapidly, consumer demand for mass tourism, life and spirit of the multi-layer surface showed substantial growth. Sichuan province is one of the domestic hot tourist routes in China. Literature is quite distinctive in Sichuan province, and its food culture is a special skill. Therefore, Sichuan province is growing into an upward trend in tourist arrivals, tourism information inquiries will be travel and want to travel are those who will do the job, but the dispersion of information letting the work become a relatively complicated matter.

The tourist information system based on GIS is just to solve this problem, can focus on the information of travel sites, can more intuitive in electronic map see tourism site, providing intuitive information, user-friendly timely queries to the tourist information they need.

## 2.Program demonstration

### 2.1.The Main Work of System Design

- *Design the part of travel geographic information*

Means tourism information database design and built, which including spatial graph database and property database. Primarily on tourist attractions, transportation, place names and other graphics library, the unified management of graphics data.

- *Design the part of graphical interface program*

Mainly consideration on the user view of convenience, a simple, direct ideas to design a graphical interface, to fully take into account users are not familiar with computer, as much as possible will use simple, graphical buttons of the function, do not need to set directly can finish the capabilities that users need.

## 2.2. Design Scheme Introduction

Designed using VC++ 6.0 and MapX control method implementation, the map drawn by MAPINFO, the database using SQL Server 2005.

- *VC++ 6.0*

Microsoft Visual C++ 6.0 is an excellent integrated development environment, which based on Windows system launched in 1998. It contact close with the Windows operating system, Microsoft develop the powerful MFC (Microsoft Foundation Class) for Visual C++ 6.0, makes the use of Visual C++ 6.0 application have more advantages such as small size, with fast speed and high efficiency than the other development language.

- *MAPX*

ActiveX is Microsoft proposed a set of COM (Component Object Model) and makes software components interact in network environment of technical sets. It has nothing to do with specific programming language.

MapX is a programmable control based on ActiveX technology. It uses the same data format with the MapInfo Professional, and implemented most of the MapInfo Professional features [1].

MapX provides developers with a fast, easy to use, powerful map of the components. In VB, PowerBuilder, Delphi, VC and other visual development environment, only in the design phase will MapX controls in form, and carries on the programming, to set properties or calling methods or corresponding events.

MapX defines a class system in order to effectively organize the graphic elements, layers, attribute data and other objects. MapX main features include: display MapInfo format map; on the map to zoom in, zoom out, roaming, select and other operations, thematic maps, layer control, data binding, dynamic mapping layer and user layer, create and edit map objects, simple geographic inquiry, the boundary check, the address query etc.

MapX has strong data binding ability. Realizing data in database and the MapInfo map in MapX relations by binding, making the map objects and connect the relational database data item corresponds. After data binding, can be made special charts data in the data, or on the map query data, and through the SQL statement realization on the map query.

- *MAPINFO*

MapInfo is a powerful map-based Windows platform solution. Using MapInfo Professional, business analysts and GIS experts can easily be the relationship between data and geographic information display and intuitive [2].

MapInfo Professional 7.0 adds more favorable object processing and editing functions. It provides customers with more options for data to create manipulate and analyze. Object rotation function for spin target map provides a more simple and effective user interface. Through this interface we can create the agency point of the range of data and trade area. The usefulness of this feature is very extensive, for example: seeking total retail sales location, the establishment of cellular models of urban coverage, and even a reasonable way to use point data-intensive work.

## 3.GIS data model

### 3.1.Data in GIS

- *Data types and formats*

The first step of Geographic Information System to establish a database is determining the system's data source. Overall the data source data source can be divided into image data source and text data types.

Image data: including existing maps, engineering drawing, plans, pictures, and so on. At present various types of map is important data sources. This is not only because the contents of intuitive and map is rich, but also due to the geographical information system before the advent of the map is representation space with the spatial information powerful means. In a sense, a volume of complete project atlas is a topic good manual operation geographic information system.

Text data (attribute data): including all types of investigation report, documents, statistics, experimental data and field investigation of the original records, such as demographic data, economic data, soil composition, and environmental data. Identify the types of data is determined by the function of the system, such as to establishing tourism geography information system that the required data are topography, attractions distribution, transportation lines etc.

- *Information input*

GIS information input include: spatial data input, attribute data input, spatial data and attribute data link [3].

Spatial data refers to the space in which the location of such data.

Attribute data (or non-spatial data) is the definition of such data mapping features of spatial data or content expressed.

Enter the basic spatial information in two ways:

a) Geographic information entities to X / Y coordinates in the form of a clockwise or counterclockwise input method.

b) With points, lines, polygons, and grid method that links geographic entity.

### 3.2.GIS Spatial Data Model

The spatial data can be collected according to their ways, storage methods, illustrate contents, use target, etc, with different data model is organized. A spatial data modeling may have several optional data structure and each kind of data structure and may have many file formats for storing. Geography information system is the most commonly used data organization way for vector model and grid model. In vector model, with dot, line, surface express world, in the grid model using spatial units (Cell) or Pixel to express.

- *The characteristics of GIS spatial data*

Data is the basis of information systems. Generally speaking, the data is information carrier, and information is the data content. Using computers to process data, extract information is the basic functions of information systems. GIS is mainly to deal with the data which related to space location and spatial relationships. In general, the data has the following basic features:

a) *Selectivity:* Data from certain side describe object itself.

b) *Reliability:* There are many possible reasons influence the data, such as data in acquisition, storage, management process to make mistakes, there will be errors, leading to data distortion. The reliability of data must be ensured.

c) *Timing:* Thing is dynamic, development, data can only reflect the state of things in the state of a certain time.

*d) Completeness:* Incomplete Data often lead analysis results of not perfect, even cause decision-making errors.

*e) Comprehensive.*

The spatial data, except for its general data features, still have some difference with other data characteristics. Constitute the spatial data main features is spatial and abstraction.

- *Spatial data model*

Spatial data model is the space on the real world entities and their interrelated concepts, which describe the spatial data for the design of spatial database organization and provides the basic methods. In general, according to the model by way of database systems, GIS spatial data model can be considered from the conceptual data model, logical data model and physical data model composed of three levels of organic link, as shown in Figure 1.

*2) Spatial conceptual data model*

Conceptual data model is the abstract concepts of geographical spatial entities and phenomenon, which is integrating geographical data semantic interpretation. It is considering the needs of the user, generality, use the same language description, comprehensive and integrated each user view. From the computer system's point of view, it is abstract top level.

In the world all sorts of geographical phenomena and object is complex, use different methods or from different angles to view geographic space, probably produces different conceptual model. Based on GIS data organization and handling, at present the geographical spatial concept data model can be broadly divided into three kinds, namely based on field (field - based), based on object (object - based) and based on network (network - based) data model.

### 3.3.The Spatial Data Structure

The spatial data structure refers to a reasonable spatial data organization, to computer processing. The data structure is the middle of the media between data model and file format. The chosen of data structure depends on the nature of the data and the use of way. Different structure used in different tasks. The expression of spatial data can be two forms: raster and vector.
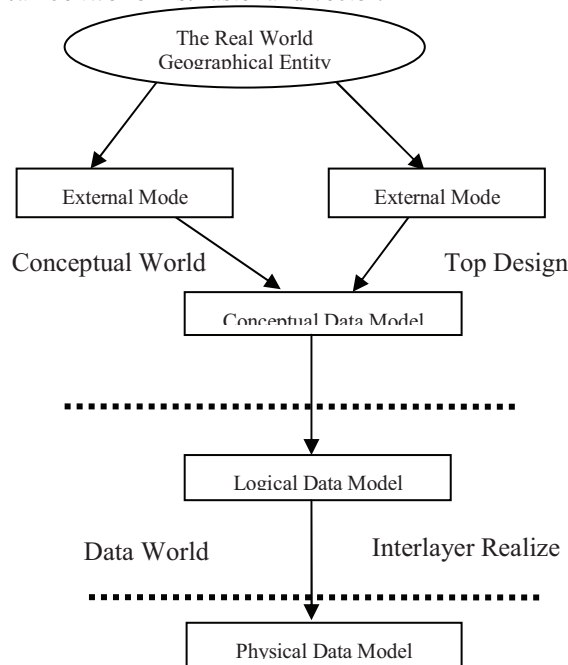
Figure 1.   Three levels of data space model

## 4.Tourism geography information system design

### 4.1.The System Design

This tourist information system based on geographic information system technology is the new space information management system. Sichuan provincial tourism information GIS system based on the tourism resources in Sichuan province, considering the resource protection, development and utilization, and tourism supporting project for background, in geographic information system technology support, complete the relevant data collection and digitization work.

### 4.2.System Function Module Design

According to the function of this system , it divided into two parts, one is not GIS part, mainly provide with the Sichuan provincial tourism related all kinds of information, including major scenic spots and tourist etc, the other is GIS part, provide GIS inquiry services.

### 4.3.Database Connection

When the users browse search and analysis in the spatial data, they usually hope response speed. But because the map of large amount of data, transmission speed is slow, in the client users' digital map when operating procedures response speed is slow, if there are many users access WEB server simultaneous, then access speed naturally more slow [4]. Due to the problems caused by the network transmission speed is difficult to overcome, but to improve access speed have worked to do. Improve data access speed can be set to establish an efficient database connection.

### 4.4.Control Layer

Dot layer itself is not very useful, but when the map formed by such dot type coverage in linear map and regional map, it is a very useful map. Every portrait of the map is a layer, MapX make maps for storing layer collection. Layers collection provides a set of control method for layers [5]. In the specific design through programming can change to frame, such as create a new layer, delete layer, and change the layer visibility and operation style and etc.

Create layers can create new temporary or permanent MapInfo table layer. This method returns the Layer object, which is added to the collection of Layer object. Part of the code is as follows:

Layer lyr;
lyr = Map1.Layers.CreateLayer ("cityname") ;

Layer zoom guaranteed a map layer alone in some zoom level display. Layer zoom control map layer of display, making it only the local figure zoom level in pre-set distance will show [6]. For each layer set up different layer zoom levels. For example, if the map including street map layer, when the user is too narrow map, may find streets become almost illegible. Use layer scaling can build when the user narrowing the map to show greater than 1 km MapX region can be automatically hidden street map.

The following code use Add method of Layers set is to add layer in map and by modifying the Layer object's properties to create layer zoom.

Layer lyrs;
lyrs = Map1.Layers.Add("streets.tab", 3);

lyrs.ZoomLayer = True;
lyrs.ZoomMin = 0;
lyrs.ZoomMax = 1;

Once installed layer scaling, the map zoom level between the minimum and maximum zoom, the layers will be displayed on the map.

## 5.Conclusion

Tourism geography information system as a special management system, which is based on the map data, emphasizing the two-dimensional data, in the design process to remove the original three-dimensional Mapinfo in data processing parts, greatly provide system running speed, user-friendly rapid extraction needed information, to provide users with a quick and convenient travel information query method, To help tourists comprehensive understanding of Sichuan province and its surrounding environment, accurately grasps various conditions.

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