The Design and Research of Inner Mongolia Tourism Resources Management Information System*

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Abstract: Tourism resources are substance and precondition of tourism development. Only being scientifically and effectively managed, it could be rationally exploited. Tourism Resources Management Information System (TRMIS) is designed for collection, storage, analysis and management of tourism resources. TRMIS makes realization of scientific and standard management tourism resources. In this article, we mainly discuss the Inner Mongolia TRMIS's aim, principle, the system structure, database content and system functions, ect.

Key words: Inner Mongolia; tourism resources; database; information system.

1.Introduction

Tourism resources are material basis of tourism development and the object of tour activity. Tourism resources' classes, quantity, quality, developed potentiality and exploited degree are the basic factors of tourism development in one place. Reasonable exploitation and planning of tourism resources is prerequisite of tourism development. The Inner Mongolia Tourism Resources Management Information System (IMTRMIS) is an essential component of Inner Mongolia tourism development plan. The purpose of IMTRMIS is to manage Inner Mongolia resources by modern information technology and offer rudimental support for development of Inner Mongolia tourism.

Inner Mongolia autonomous region has vast territory and long history. There are rich natural and human tourism resources in it. That will consume much time and be inefficient if these resources are managed by traditional means. The development of technology provides the new means and method which are used to manage the tourism resources quantity, quality, spatial and temporal distributing.

By utilizing various advanced technology and equipment, Inner Mongolia Tourism Resources Management Information System could realize systematization, standardization and modern effective management of tourism resources and afford prompt, accurate information services to programming, management and decision-making of Inner Mongolia tourism resources.

Tourism Resources Management Information System (TRMIS) is a technological system supported by computer hardware and software system. TRMIS can gather, store, manage, analyze, display and describe tourism resources and their relevant information. The objects that TRMIS

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deals with and manages are many kinds of tourism resources spatial data and their relationship, which include spatial data, figure and picture data, attribute data, ect. IMTRMIS could be used to analyze the distribution of tourism resources in a region and solve the complicated planning problem, decision-making and management, etc. Article has made a discussion on design of the Inner Mongolia TRMIS.

2. Objects and principles of system design

The core of Inner Mongolia Tourism Resources Management Information System is to manage Inner Mongolia Tourism Resources. The main functions of IMTRMIS are enregistering, classifying, storage, management and analyze of tourism resources and other relevant information. In order to reflect characteristic, structure and distribution of Inner Mongolia tourism resources on the whole, IMTRMIS processes tourism resources and their relevant information from two aspects of spatial and attribute. IMTRMIS could provide the modernized management tool and decision basis for tourism supervisory department and administrators at all levels, offer abundant tourism information for planner, researcher, tourist enterprise and other persons who are interested in tourism.

2.1 Open and standard

IMTRMIS can offer data interface with other application software and has ability to upgrade in changing environment.

2.2 Practicability and advance

The system is based on high starting point and high-level. The structure, function and interface of system must be convenient to operate and satisfy user's demands. The software and hardware of computer and choice of network should meet the goal of system to the maximum extent.

2.3 Economy and continuity

On the condition of meeting system functions and keeping its advances in the future, we try our best to save expenses and form high quality and low price. System could support the constant change of tourism market and have a well ability to upgrading.

3. Total design of system

The major design principles of system are realizing combination geographical space with tourism resources in it, reflecting the distribution and structure of tourism resources. GIS software is the core of system. System integrates with map, text, charts, pictures and images of multi-media information.

On ground of census, evaluation, development and program of tourism resources，the system could make spatial analyze, spatial evaluation and spatial management of basic tourism resources, landscape, tourism market and tourism management.

System employs related national standard on the design, such as National Tourism Resources Classification, National Information System, Design Standard, National Basal Geographic Information Standard.

3.1 Design of database

Design purpose of database is to construct the best database structure for a certain environment, establish database and applied system that could store, process and analyze database effectively, which decides composing and saving structure of data.

The aim to be realized in IMTRMIS as follows:

1) The degree of data accuracy and integrity are high,
2) The present situation of the data is strong,
3) Data structure favors fast search,
4) Database structure with low redundancy is reasonable,
5) Data is convenient to maintain and renew.

3.2 Database field and database conjunction

Assurance of database field is very important，because it relates to the usage, extending and system applied foreground. Each field should be basic data that can't be disassemble again. Following the "basic－whole" principle, field setting possibly covers all information.

Database connection should imitate human behavior. While conjunction of many databases will take advantage of computer. Two databases are connected by common field, that's logic link.

3.3 Tourism information database

Tourism information database includes three parts which are tourism region information database, single tourism resources information database and tourists' source information database of Inner Mongolia autonomous region .

3.3.1Tourism area information database

Tourism area is made up of by one landscape or some sight spots. IMTRMIS has collected 504 tour areas detailedly. Database contents include region name and its code, developed degree of tourism, position, acreage, property, supervisor section, open age, introduction of landscape, tour item and special landscape ,etc.

3.3.2 Basic tourism resources information database

We consider tourism resources that could be appreciated singly or made use of alone as the basic tourism resources.

The combination tourism resources with area that they belong to reflects the distribute regulation of tourism resources.

Inner Mongolia Tourism Resources Management Information System has collected 1270 basic tourism resources. These basic tourism resources are statistical by the National Standard. Among these tourism resources,

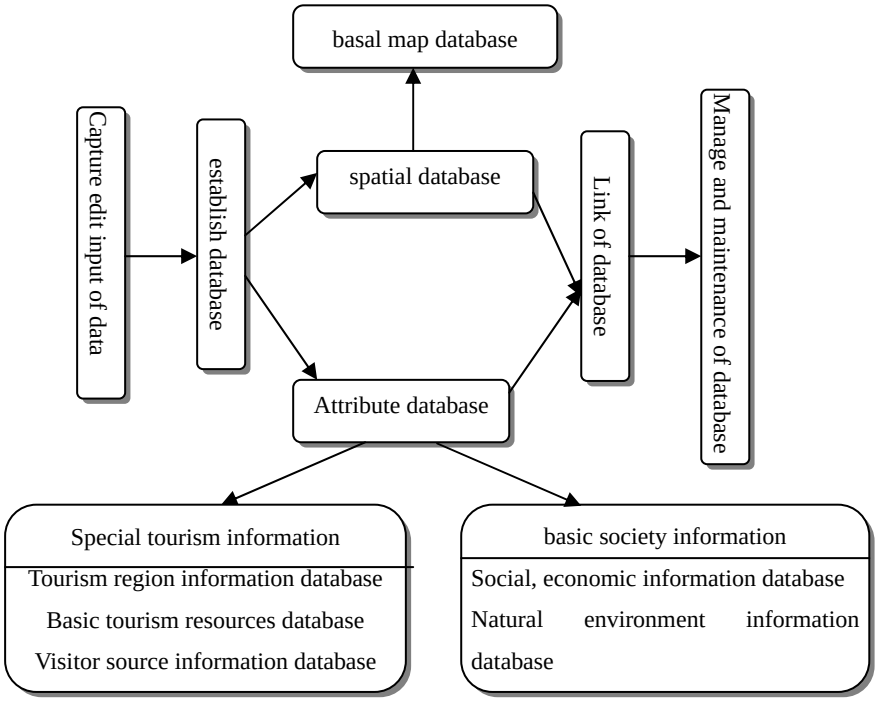

Fig1. Configuration of database

there are 121 water landscape entities, 182 geology views, 120 biology view entities, 120 natural phenomena weather and other special entities, 51 tourism resources types, 69 kinds of human activity, 132 ruins views and 475 architecture entities.

The major contents of database are name and code of basic tourism resources, city and county name and code of Inner Mongolia, main class and second class of tourism resources, statistics value and data sources, etc.

3.3.3 Tourism resources information database

The system has respectively recorded the received person-times of visitor who came from Inner Mongolia autonomous region inside, Russia, the United States, Korea, Singapore, Thailand, Hong Kong, Macau, Taiwan, Japanese etc. from 1997 to 2001.This will provide the basis for confirming tour market position, grading tour market and expanding source market of Inner Mongolia.

3.4 Social information database

Social information database includes three parts which are social economic information database, natural environment information database and map database.

3.4.1 Social economic information database

Social economic information database mainly reflects every county's quantity of population, level of science and technology, education status, gross national product, economic structure, national income, medical treatment condition, transportation and communication industry and other things related to tourism, ect. This database will offer radical information for tourism program and tourism resources management.

3.4.2 Natural environment information database

Natural environment information database mainly reflects the natural factors of tourism environment in Inner Mongolia, such as geology and physiognomy, weather and climate, hydrology, propagation and natural disaster, etc. This database will provide the rudimental natural environment information for tourism program and tourism industry development.

3.4.3 Map database

The basal map scale is 1:250,000. The map database is composed of city and county map, roads map, residents map, river system map and DEM map. We could establish three-dimension terrain model of Inner Mongolia by DEM map.

4. System structure and main function

Inner Mongolia Tourism Resources Management Information System takes ordinary computer as platform，chinese version Windows9x/2000/me/xp as operating system, visual C++ 6.0 as developed tool.

The system is composed of a series of modules which are Input/output, information search and index, statistic, decision and evaluation, map-layer, database and resources management and three dimension module. Excepting input and output function, System has map-layer operation function, data operation and management, query and search of tourism information, statistic, resources management, showed and display of three-dimension terrain, etc.

The interface of system is made up of map window, control bar, shortcut tool and menu. Map window lies on left. Different maps are controlled by different map layers, which not only could be display on the same layer, but also could be display respectively.

4.1 Tourism resources management

The purpose of tourism resources management is to realize the fast query and search. IMTRMIS could fast query tourism resources and visually output, that contributes to share the tourism resources and automatic office. System utilizes different modules to comprehensive

evaluate tourism resources. On the control window every basic tourism resources and tourism region have their related attribute information page, which are composed of resources summary, resources brief introduction and their pictures. Double click the menu of basic tourism resources or tourism region, there will hit corresponding information page.

4.2 Map layer operation

The system could quick organize and manage map layers and carry on various operations on them, such as map layer display/close, zoom in/out, intelligent zoom, attribute set, full screen manifestation, intelligent index, etc. At the same, user could change map color, edit legends, etc. This operation is very simple, convenient, fast and accurate.

4.3 Data management

Data operation includes inputting, saving, editing, management, analysis and output of attribute and spatial data. The system manages attribute database with relative database management module. While it manages spatial database in means of map-layers.

Input module could read and convert any kinds of GIS space data, such as vector format data arcinfo SHP, mapinfo MIF, autocad DXF, etc. and grid format data BMP, TIF, JPEG, GIF, PCX, etc. It could also read and convert other database formats which are in common use. It can make data in different application environment to operate with each other, which establishes foundation

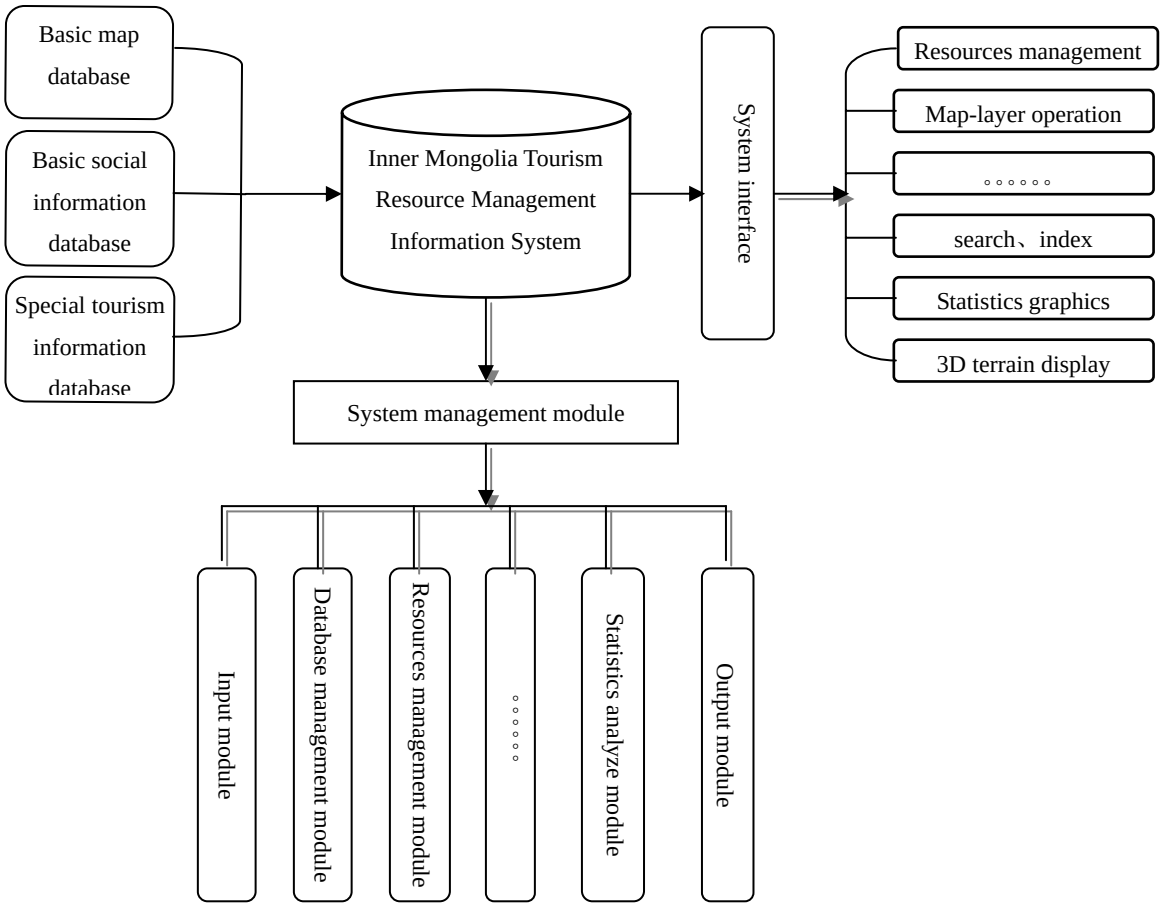

Fig.2 Structure of Inner Mongolia TRMIS

for network data share in the future. Output module not only could export print text, figure and chart, but also form general GIS space formats and other database formats in common use.

Tourism resources information data, social data, economic data, natural resources and environmental data need to be renewed yearly. The system provides the convenient data operation

and renewal function. Customers can add, delete, modify, edit data, they also can establish database and modify the structure of attribute database. This function guarantees the present situation of data information and reduces the redundancy data.

4.4 Information index and search

Function of information index and search is the essential function of IMTRMIS. The function of general information system limits to index and search of attribute information. While IMTRMIS could index and search attribute data and spatial data at the same time, realize the search and query between attribute information and spatial information and the accurate position of attribute information and spatial information.

There are place name information query, logic query, landscape information search, key words search and other related search in IMTRMIS. These search operations are very brief. The place name query includes all landscapes and name and quantity of basic tourism resources and spatial position of tourism resources and district that they belong to.

Search fields, logic operation signs and field values constitute logic expression formula. For example, click name search button, the name dialogue window will flick on the system interface, input “forest ” on the dialogue, then click enter button ,you will find 19 matched records. Every matched record could be found in the control bar.

4.5 Graphics function

Graphics of IMTRIS are divided into gradate graphics and statistic graphics. Gradate graphics aims to operate on map. It sets up colors and signs of map. The fields of gradate graphics are region-id, area, perimeter and id, etc. Customers could select gradation and edit it. They could create individuation map with help text.

Statistic graphics utilize map database and attribute database to cartography. Selecting index from attribute database, with the help text we could make statistic charts on map correspond district, such as city tourism income schematics. Statistic graphics make statistic data relate with its map position, that favors attribute data analyze. IMTRMIS provides 36 categories of two-dimensional symbol and three-dimensional symbol, they are histogram, strip diagram, cake diagram, circle diagram, fan-shaped diagram, ball diagram, pyramid diagram and percent diagram, etc.

5. Conclusion

Tourism resources management information system is GIS application in tourism. It could offer information services for tourism plan supervisor, management department, researchers. Making use of TRMIS, We can quantitative analyze tourism problem and combine attribute information of tourism resources with their spatial position.

With development and application of technique about GIS, computer, GPS, RS, three-dimension, network and intelligent decision, TRMIS will develop at the direction of intelligence, network and multi-dimensions.

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