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Research Article

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Research on the construction of the tourism education information platform: A case on the geographic information system of the ice and snow tourism in Northeast China

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ABSTRACT

With the global informationization tide becoming large-scale, the tourism industry is increasingly competitive. The situation urgently needs the tourism personnel, tourism management talents and practical tourism talents with high-quality at grassroots level as support. This is a challenge for traditional tourism education mode in China. It has become a historical necessity that GIS and other advanced technologies are introduced into the tourism education system. This article is taking the construction of the geographic information system of ice and snow tourism in Northeast China as an example to discuss the relevant problems of the construction of tourism education information platform.

Key words: The geographic information system; tourism education information; Northeast China; ice and snow tourism

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INTRODUCTION

Tourism management is a new major which has developed with the development of the tourism economy and the tourism industry in China. At present, the application of modern technology means in the teaching of the major has focused on the use of multimedia courseware and simulating of the tour guide. With the rapid development of the information age, GIS technology with better appliance in the tourism is still in the initial stage. The application of GIS in tourism is to collect the various sources of data and information together. And through the function of the statistics and coverage analysis, the system provides the statistics of tourism resources with the variety of combination of conditions and the rapid reproduction of original data according to the boundaries and the conditions of property. The system has greatly improves the effectiveness and operability in the tourism resource management. The construction of the tourism education information platform supported by GIS may promote the research and practice of the education informatization of tourism to the further development.

The unique needs of geographic information in the tourist areas and the function of GIS determine the advantages of the application of GIS in tourism. This has formed the basic application patterns of GIS in the tourist resources, ecological tourism, tourism information service system construction, tourism traffic and tourism accessibility. Cheverst[1] used the GIS to develop a guide system. Desmet[2] applied the GIS in the evaluation of tourism resources. Huang[3] tried to put forward to the concept and theory system of Tourism GIS. Wang[4] proposed the regional tourism geographic information system. Zhang[5] introduced that the Internet technology and GIS technology were organically combined so that the design of information system headed for the data model of Internet data resources from the self-sufficient data model. Wang[6] discussed the multimedia technology embedding in GIS. And apply the system to the tourism development and management. Wang[7] showed the case study of the cultural relics

information management system in an ancient cultural relic in Shanxi province. Gu[8] used GIS technology for the analysis and the dynamic prediction of tourism landscape in Jiuzhaigou. Some scholars[9]-[10] applied the model of GIS in the analysis and evaluation of the information management in ecotourism region. Chen[11] used the GIS to the division of ecotourism area in Sichuan province. Wang[12] studied the tourist flow with GIS and established the dynamic monitoring and forecasting model of tourism flow. Wang [13] explored the tourism domain model and its combined application with GIS. The above analysis shows the application of GIS in tourism deepening.

EXPERIMENTAL SECTION

This paper discusses that the ice and snow tourism geographic information system provides not only the efficient and intuitive tourism information service and support for tourists, but also a scientific and effective management decision tool for tourism management and tourism planning department. As an information processing and analysis system, GIS has the following functions. **The data collection** It includes the manual coding, data mapping, attribute data collection, and ensures the data integrity and consistency in the content, format and the space. **The data arrangement** It includes data checking, error correction, format and conversion. **The data storage** The data from the different sources with different attributes is stored appropriately to the spatial database and attribute database. **The results showing** Through the screen and printer, the system displays the various forms of the results such as the map, image and table generated by GIS. It includes the object location, changing trend, spatial pattern and simulation results. **The spatial analysis** It includes the geographical manipulation and translation and statistical analysis of data such as the buffer analysis, overlay analysis, domain analysis, network analysis and etc. (Fig. 1)

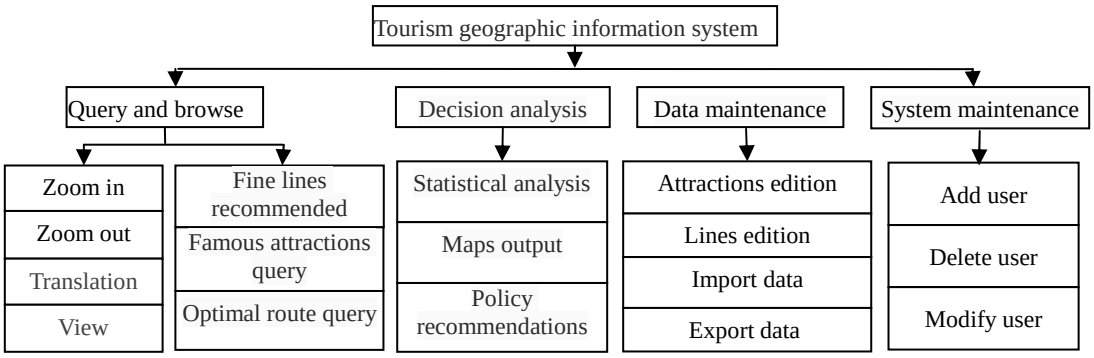

Fig.1 The system function structure

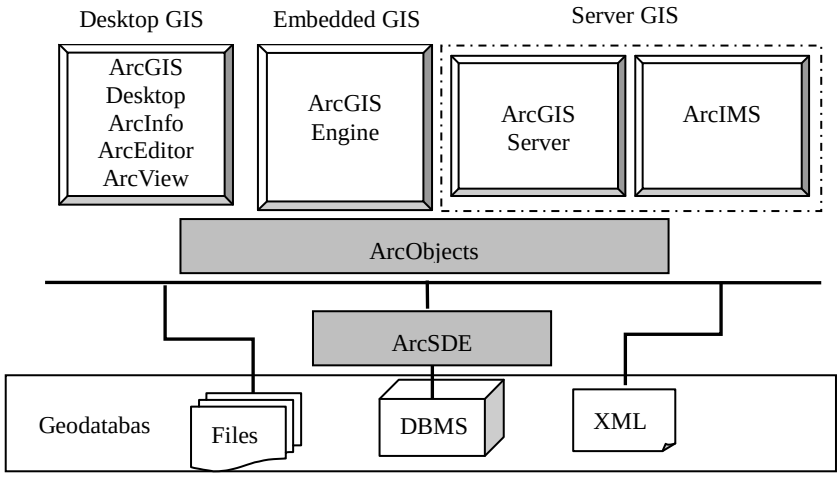

Fig. 2 ArcGIS Framework

The system is the second exploitation based on of ArcGIS Engine[14]. It can quickly develop applications according to the customers' requirements. ArcGIS Engine is a complete embedded component library based on ArcGIS. ArcGIS Engine can be run on the desktop of Windows, UNIX, and Linux and it supports a series of application software development environment, such as Visual Basic 6 and Java development environment, such as ECLIPSE and JBuilder. Integral component of ArcGIS is as follows. (Fig.2)

RESULTS AND DISCUSSION

The profile of ice and snow tourism in Northeast China

The northeast area in this paper includes Heilongjiang, Jilin, and Liaoning Province. This area is one of the most concentrated areas of ice and snow tourism distribution in China. The ice and snow tourism in the three provinces started the earliest in China and is most historical area. The ice and snow tourism is the special tourism resources in the area, and plays an important role in the development of the regional tourism. Since 21st Century, the ice and snow tourism in Northeast China has gained rapid development. There have been more than 100 ski fields in this area (Fig.3). The ice and snow tourism in Northeast China relies on the unique natural conditions to become the largest developing scale in China and the greater influence in the international tourist market. The World Tourism Organization positioned Heilongjiang Province as "Chinese tourism COOL province". The existing ski fields accounted for 50% of China. Jilin Province is one of the training bases of early ice and snow sports in China. At the same time, the rime landscape in Jilin City also has strong attraction for tourists. Liaoning Province, with its unique leisure travel of the combination of ice-snow and hot spring has attracted a large number of tourists at home and abroad. The ice and snow tourism in Northeast China cooperating with the Folk Culture in Northeast China which has the unique regional characteristics and the national cultural connotation formed the ice and snow tourism system including the financial activities, production and living and entertainment festival.

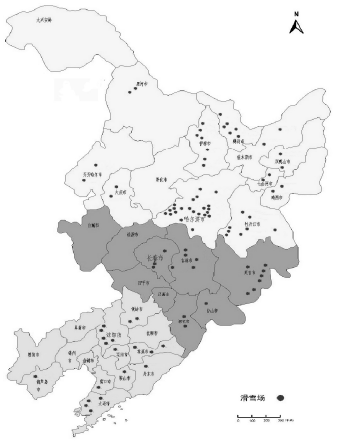

Fig. 3 The main ski fields in Northeast China

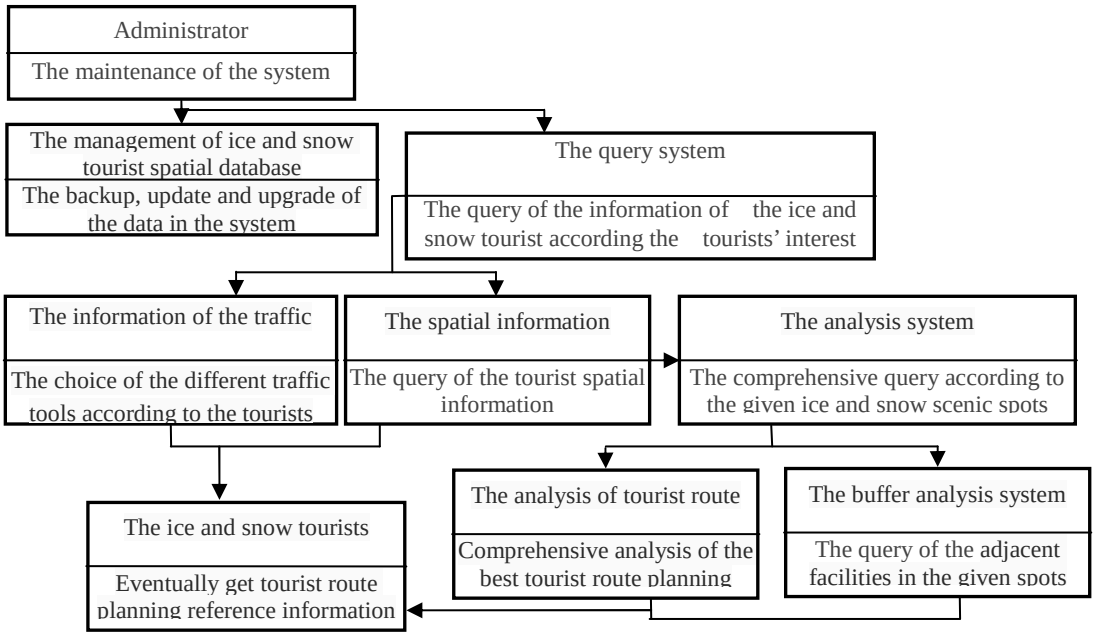

Fig. 4 The process of the system

The ice and snow tourism geographic information system design in Northeast China

The system requirements analysis

The most concerned problem for the tourists is to choose the tourist attractions, tourist hotels, transportation and etc. After extensive investigation and study, the ice and snow tourism GIS should have the following functions. The tourist spatial database management (data backup, update and upgrade), The map basic function operation (zoom in, zoom out, roaming, etc.), The tourism spatial information query, The multi-source information query of the attractions (pictures, sounds, video, etc.), The traffic information query, The tourism spatial analysis (tourist route analysis, neighboring facilities query), The map output, print function According to the result of system requirements analysis, the process of the whole system is shown in Fig. 4.

The system structure

This system regards the spatial attributes and multimedia tourism information data such as the scenic spots, hotel and traffic lines as the core. According to the demands of tourists, the system explores the function to provide the travel route reference scheme and the facilities query for tourists, so that tourists can get newer and more useful tourism information, and get tourism services which are more concessions and with higher quality. The system structure is shown as the following. (Fig. 5)

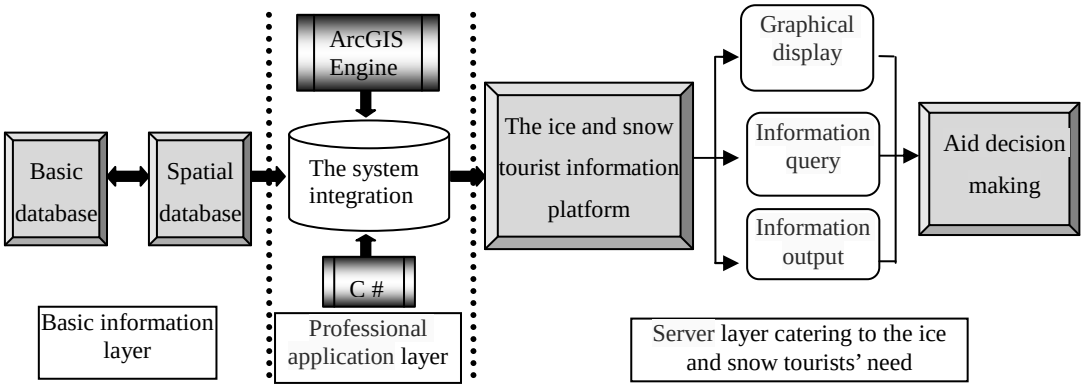

Fig. 5 The structure of the system

The composition and origin of ice and snow tourism data

The data used in the ice and snow tourism geographic information system can be divided into spatial data and attribute data. Travel data includes the spatial information and attribute information of the ice and snow attractions (text, picture information, video information), that of the hotel and more tourism basic information, such as the spatial information of the road, the airport, the train station and the administrative region. The tourism data of this system includes the tourism maps in Northeast China and the basic attribute information related with the tourism. The relationship between these two kinds of data is shown as following. (Fig. 6)

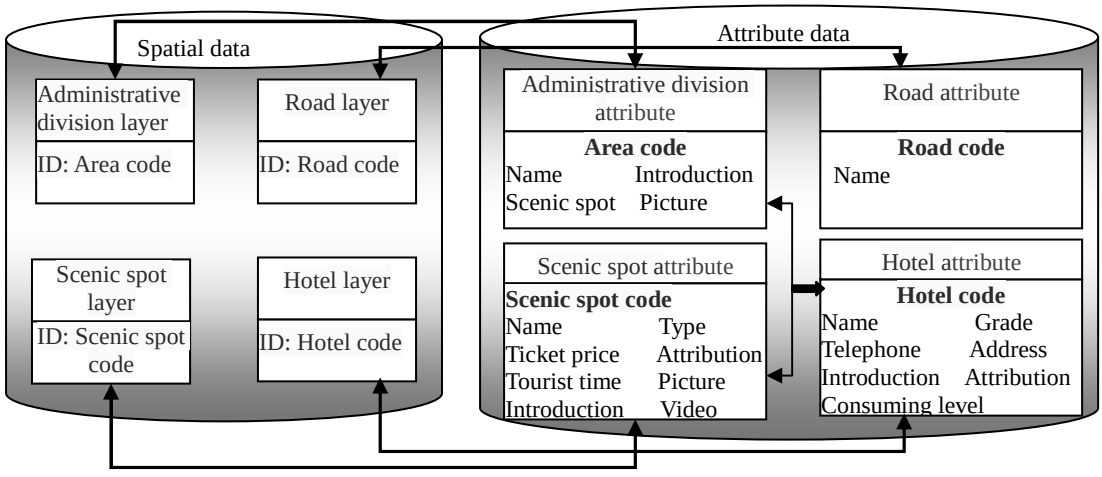

Fig. 6 The association between the spatial date and the attribute data

CONCLUSION

The function realization of the system module

The management and login interface for the user (Fig.7)

The main interface of the system consists of six parts including the menu bar(data management, map operation, common query, information query, spatial analysis, tracking query), toolbar (the choice, zooming, reset, distance measuring and other tools in a map), the map display window, the workspace window (providing the various functional modules), the eagle eye window on the lower left (rapid positioning to enlarge the map window),and the bottom bar(the current coordinates information and scale)

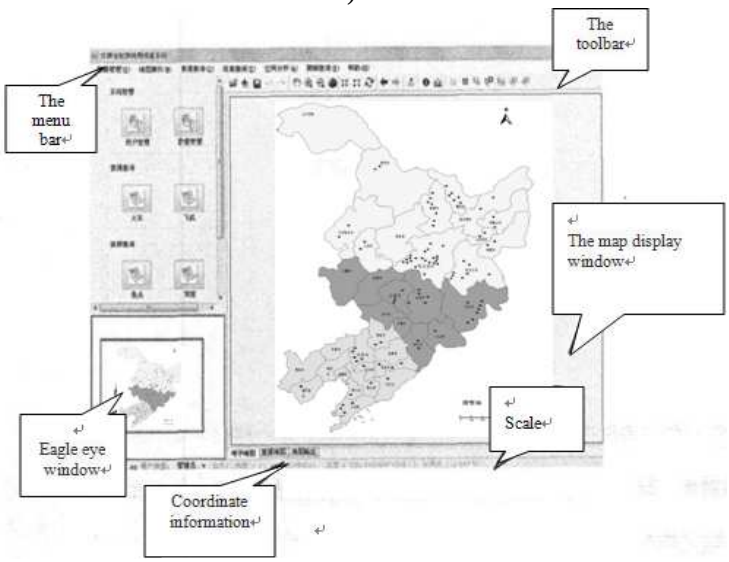

Fig. 7 The system main interface

The data management

The data maintenance includes the data backup, data update, data reduction. Because the data security is the premise of stability of the system, this module is not open for the average user. The option of the data management and maintenance is not available unless getting administrator privileges. If the user need operate and maintain the data, please use an identity as an administrator to go into the system. The functions of the system provide the data backup and restore. If there is new data, the system can also be updated.

The map operation

The display and operation of map are general map function for GIS platform. This project provides the following main functions, such as zoom in, zoom out, translation, full figure, the last view, the next view, refresh, measurement of distance, attribute query, and other functions. The functions can be realized by the button on the toolbar, and the standard buttons in the toolbar commonly used in the map operation are shown as follows.(Fig.8)

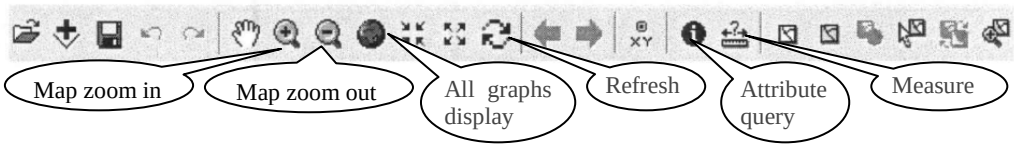

Fig. 8 The standard button in the toolbar

The layer management

The control of layer is to make the layer be visible or invisible. If displaying a certain layer, the user can check the box in front of it. The management function of the layer is available only for the system administrators.

The information query

This function is mainly implemented by attribute query and spatial query to inquire the tourist information which the tourists are interested in. The common attribute query module includes the queries of the timetable of buses, trains, airplanes. Because the plane ticket updates faster and has a discount, the system also provides online ticketing in

order to provide the latest information. The spatial query module mainly inquires the spatial location information by the bidirectional queries of the spatial and attributes data. This spatial information query in the system includes the attractions query and the hotel query. Those are involved in the specific location on the map. The query can display the location, the relevant attribute information, pictures, video, etc.

The eagle eye operation

Through the eagle eye operation, the system can view or position the information from a wide range. It can be operated by eagle eye to fast position the location which is called for.

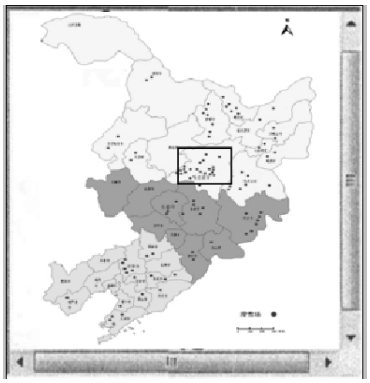

Fig. 9 Eagle eye operation window

The analysis function

The path analysis

The spatial analysis is based on the spatial route and node information, and provides the optimal path and the comprehensive analysis, etc. In this module, tourists can analyze and inquire all kinds of tourism information from the space concept, and get travel route decision support according to their needs.

The buffer analysis

The buffer analysis is one of the important functions for the system. After the analysis, the specific features in a certain range of the known objects around can be gotten. For example, if tourists are interested in the ice and snow attractions within 20 km in a city, or want to get the ice and snow attractions in 2 km along some way, they can solve the problem through the buffer analysis.

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