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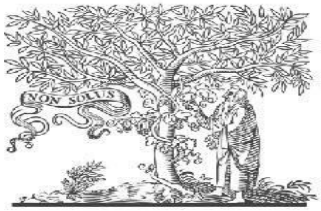

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Tourism Management System

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Abstract. Tourism is the industry with the most vitality and development potential. Today, it is the largest industry in the world. It is not only recognized by many developed countries, but also recognized as a priority industry by more and more developing countries and regions. Today, with the development of the knowledge economy, information has become the lifeblood of the tourism industry, and computerization has become an important factor in promoting overall economic development. And global society. This article mainly introduces the resources and management information of tourism service facilities based on the tourism management system GIS. In this article, we will study and discuss the application of GIS in tourism information systems, integrate the concept of autonomous tourism into the system, make the country a research field, and establish, verify and implement corresponding autonomous tourism information systems. The experimental results of this paper show that the construction of this system has improved the management level of map data in tourist destinations. The map data is continuously updated. The source of land is managed within a week, and the passenger flow in Sanhe area has increased by 15%. Sustainable development is a favorable guarantee.

Keywords: GIS, Tourism Management Information System, Fuzzy Comprehensive Evaluation Mathematical Model, Data Standardization Method

1. Introduction

1.1. Background and Significance

Tourism is the most dynamic and potential industry, and its scale has developed into the largest industry in the world today [1]. Not only in developed countries, but also in many developing countries and regions, it has become more and more valuable and has been included in the list of priority industries. The globalized digital information network is a form of production, management, distribution, education, scientific research, medical treatment, entertainment and other social, economic and cultural activities [2-3]. There are many tourism resources in our country, and the development and utilization of these resources provides a broad prospect for the development of tourism. With South Korea's accession to the WTO, South Korea's tourism industry will also face new opportunities and challenges. Take this opportunity to establish a complete tourism information system and use information technology to increase the availability and quantity of information in tourism facilities. Improving the quality and information of the tourism market and the world is a top priority [4].

Due to the increase in the number of individual tourists and the diversification of tourism demand, tourists have higher requirements for data. The traditional group travel method of travel agencies is very simple and the same. Tourists are no longer satisfied with standard standards, procedures and services. But please use personalized and flexible travel services instead. Therefore, more and more tourists choose to travel independently. They hope to receive more attractive content and information to increase the possibility of your independent choice. With the help of the tourist information system, information about tourism services can be displayed interactively to meet the needs of tourists for private travel [5]. Based on these facts, it is necessary to establish an automatic tourism information system based on GIS, which can facilitate private car tourists and promote the development of tourism.

1.2. Definition of GIS

The development and research of GIS-based tourism information system involves many fields such as component GIS technology, database technology and multimedia technology [6]. In this article, we study the following aspects by combining the design and implementation of a tourism information

system.

(1) This research should mainly determine the research direction by analyzing the development status of the tourism management information system in the Three River Source area and the research progress of domestic tourism development.

(2) Research on the construction of tourism management information system in Sanjiangyuan District. This chapter first classifies and describes tourism information, and then analyzes the functions of the GIS-based tourism management information system for the Three Rivers Source Area, and on this basis, conducts system construction research. Zhu R has carried out exploratory research on the development of GIS-based tourism information system, which has certain reference significance for tourism information construction, and provides comprehensive and accurate tourism information services for tourists[7]. It also provides a powerful force for the scientific management and decision-making of tourism resources. Technical support. However, the relationship between the space and attribute data in the database and the structure of the data table can be further optimized to make it more closely related to each other, thereby further improving the query, analysis and operation efficiency of the system.

1.3. Main Research Content and Innovations of This Article

(1) Analyze the development of domestic and foreign tourism information systems, and propose the necessity of establishing a GIS-based tourism information system;

(2) Introduced the related technology of the component, focusing on the characteristics of the component GS and the structure of the development platform

(3) Discuss the overall design ideas of the system, including the overall structure design, overall function design, database design, tourism resource evaluation model design, etc. of the system;

The innovation in this article is that the system is developed by integrating multiple technologies into fuzzy comprehensive mathematical evaluation models, which include GIS-based component technologies for tourism information systems, database technologies, multimedia technologies and data Standardization technology [8-9]. Integrate these technologies, build an integrated environment under GIS technology, develop a tourism database integrating multiple data resources, build anobject-oriented tourism data model, build a tourism information system, and help tourists travel by providing the latest comprehensive information Information goes. Tourists can use multimedia technology to enhance the content of tourism information and improve the expressiveness of tourism information [10].

2. Two Research Methods of Tourism Management System Based on GIS

2.1. Fuzzy Comprehensive Evaluation Mathematical Model Method

The evaluation of tourism resources includes many factors such as nature and society, and because tourism resources have ambiguities and uncertain factors, it is feasible in practice to use the same standard using conventional mathematical methods. It is more difficult to create a comprehensive evaluation model. Therefore, this article uses the fuzzy comprehensive evaluation mathematical model method.

Let the factor set $U=\{U_1, U_2,\ldots\ldots U_m\}$, the evaluation set $V=\{V_1,V_2\ldots V_m\}$ Let the single factor evaluation of the i-th factor U_i be $R=\{r_{i1},r_{i2},\ldots\ldots r_{im}\}$ which is The fuzzy subset on V, where rij represents the membership degree of the evaluation of the i-th factor to the j-th level. Thus, the first-level evaluation matrix R is formed, which is the fuzzy relationship matrix from U to V. The evaluation matrix R is:

$$R=\begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ r_{m1} & r_{m2} & \cdots & r_{mm} \end{pmatrix} \quad (1)$$

2.2. Data Standardization Method

Most of the indicator systems generated in this study are objective indicators, and the data are mainly

taken from the Qinghai Statistical Yearbook (2014). Qualitative indicators are used by professionals for evaluation, and relevant professionals and decision makers display corresponding indicator values based on their experience and preferences to achieve quantification. Before standardizing all the original size data, they must be quantified to the same level and then used for evaluation. There are several ways to standardize data. According to the research of Qiu Dong (1991), the restriction method records the required information without special requirements for sample size and original data distribution. Therefore, this article uses an extreme method to standardize the original data. The selected indicators are not only related to the development of tourism in Sangangyuan area, but also related to the degree of soundness, and different formulas are used to standardize the indicators for various correlations.

There are m objects to be evaluated and n evaluation indicators to form a matrix of original indicator data. $X=(X_{ij})m\times n$ can obtain standardized formulas for various indicators. The specific steps are as follows:

The first step is to process the evaluation indicators dimensionlessly, the formula is as follows:

Positive index:

$$r_{ij} = (x_{ij} - x_{min})/(x_{max} - x_{min}), (i = 1,2\cdots n;\ j = 1,2\cdots m) \quad (2)$$

Negative index:

$$r_{ij} = (x_{max} - x_{ij})/(x_{max} - x_{min}), (i = 1,2\cdots n;\ j = 1,2\cdots m) \quad (3)$$

Where: xij is the original value of the j-th index, rij is the standardized value of the j-th index, xmax is the maximum value of the j-th index, xmin is the minimum value of the j-th index, and the standardized matrix is $R = (r_{ij})_{m\times n}$

The second step is to perform coordinate translation on the standardized matrix. The formula used is as follows:

$$r_{ij}' = K + r_{ij} \quad (4)$$

Where: rij', is the value of rij after coordinate translation, and the standardized matrix obtained from this is: $R' = (r_{ij})_{m\times n}$

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3. GIS-based Tourism Management System Experiment

3.1. Fuzzy Comprehensive Evaluation System

Fuzzy comprehensive evaluation of tourist attractions in the Sanjiangyuan area is conducted systematically, and the scoring results of the fuzzy comprehensive evaluation mathematical model are shown in Table 1:

Table 1. Scoring results of a scenic spot

Factor	Level 1	Level 2	Level 3	Level 4	Level 5
Use value of viewing and recreation	0	2	3	4	1
History, science, culture and art value	0	0	5	3	2
Cherish the peculiarity	0	0	6	2	2
Scale abundance and degree	0	1	3	5	1
Completeness	0	0	2	7	1

That is, the fuzzy relationship matrix between the factor set U1 and the evaluation set V is:

$$R_1 = \begin{pmatrix} 0 & 0.2 & 0.3 & 0.4 & 0.1 \\ 0 & 0 & 0.5 & 0.3 & 0.2 \\ 0 & 0 & 0.6 & 0.2 & 0.2 \\ 0 & 0.1 & 0.3 & 0.5 & 0.1 \\ 0 & 0 & 0.2 & 0.7 & 0.1 \end{pmatrix} \quad (5)$$

In the same way, R2 can be obtained.

(2) Calculate the fuzzy comprehensive evaluation vector B

$$R = \begin{pmatrix} B_1 \\ B_2 \end{pmatrix}.$$

B1=A1R1={0,0.07,0.345,0.31,0.125},B2=A2R2,

Finally, the fuzzy comprehensive evaluation vector B can be obtained by B=AR. And judge the final evaluation result by the principle of maximum membership degree. The maximum value of B is b3, and the comment set V corresponding to b3 is V, then the fuzzy comprehensive evaluation result of tourism resources is three levels.

3.2. Value of Each Index after Standardization

According to the steps of the above data standardization method, the standardized data of each index is shown in Table 2.

Table 2. Values of various indicators after standardization

Index \ Sample	Huang Nanzhou	Hainan	Guoluo	Yushu
D1	1.80	1.00	1.60	2.00
D2	2.00	1.00	1.00	1.80
D3	1.75	1.00	1.58	2.00
D4	2.00	1.00	1.72	1.72
D5	2.00	1.00	1.42	1.71
D6	2.00	1.50	1.25	1.00
D7	2.00	1.85	1.14	1.00
D8	1.95	2.00	1.26	1.00
D9	1.61	2.00	1.09	1.00
D10	1.29	2.00	1.05	1.00
D11	1.16	2.00	1.00	1.03

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4. GIS-Based Tourism Management System Design Results

4.1. Internal Structure of the Target Layer

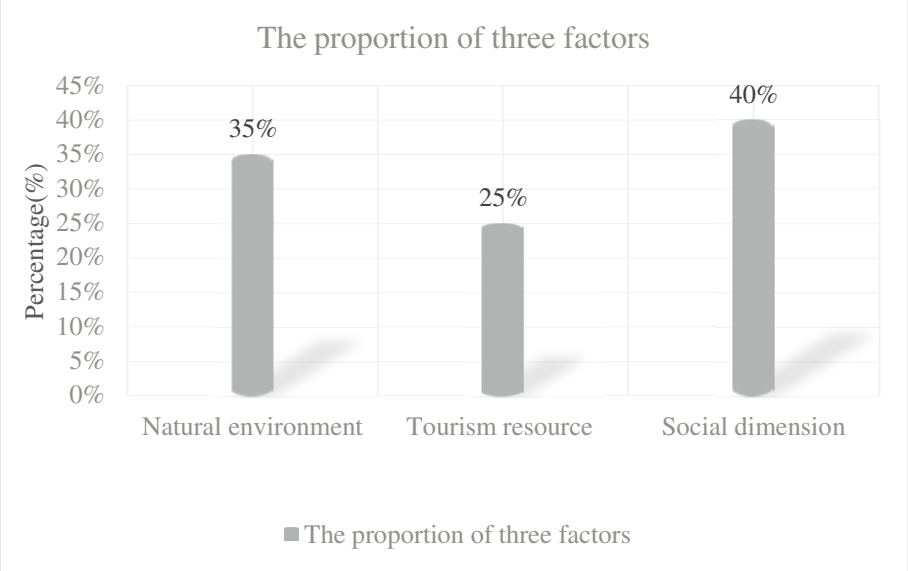

Figure 1. The proportion structure diagram of the three factors affecting tourism development

After calculating the weights of the various dimensions of the system layer, it can be seen that the three elements of the target layer affect the tourism development in the upper reaches of Sanchuan, as shown in Figure 1. In the structural diagram, social conditions have the greatest impact on tourism development, followed by the natural environment, and the richness of tourism resources has little effect.

4.2. Most Influential Dimensions of Social Conditions

As shown in Figure 2 for the weight of the social status indicators, we can see that the status of public transportation, the level of economic development in the area and the proportion of Internet broadband access users rank first. Therefore, the development of tourism in the region needs to make full use of the existing scale of infrastructure to provide better tourism services, rather than expanding the scale of existing urbanization.

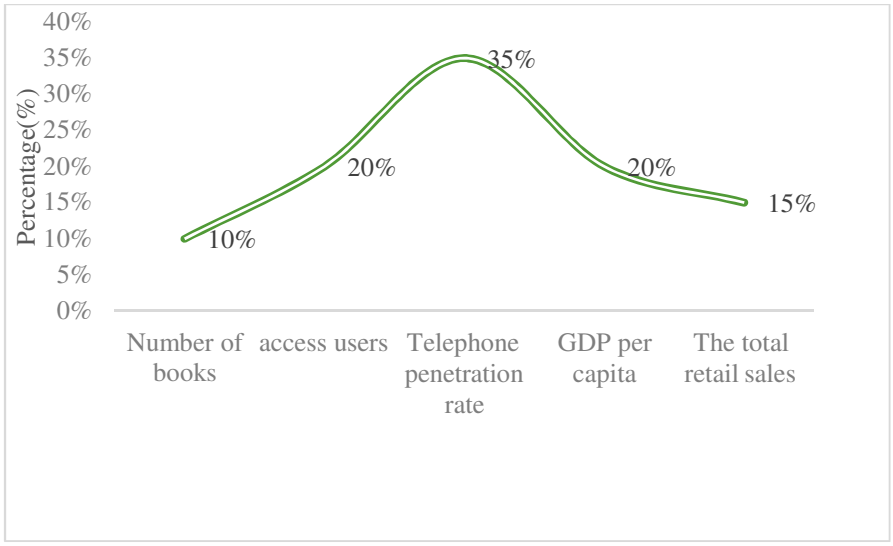

Figure 2. The five-factor proportion structure diagram of the social condition dimension

The data shows that the main conclusions are as follows:

(1) The restrictive factors of tourism development in the Three Rivers Source Area are mainly infrastructure conditions and natural environment

(2) The construction of the tourism management information system in the Three Rivers Source Region is necessary, and GIS information technology should be used in the construction of the system to "move" remote, inaccessible, and protective tourism resources to the Internet for tourism. Provide virtual display of tourism resources to ensure the inheritance and development of tourism resources.

The data shows that the design of the GIS-based tourism management system studied in this paper is of great help to the development of tourism in the region.

5. Conclusions

In the context of digital tourism and digital cities, providing tourism information has become the driving force for the sustainable development of tourism. The Sanjiangyuan Scenic Area is an important tourist attraction in Quanzhou, a famous historical and cultural city, so it is also a tourist attraction. However, the level of tourism information in today's beautiful regions is relatively low, and information technology is still weak. Tourism resource management still uses traditional methods and information technology. The construction delay has seriously affected the development of tourism in tourist destinations. According to the requirements of tourism information and tourism resource management in Qingyuan Mountain Scenic Area, using fuzzy comprehensive evaluation mathematical model and data standardization method, the scenic area tourism management information system is researched and designed. Compile a landscape tourism resource management information system. The system has been leased and operated. Its functions can meet the basic requirements of the design, and can meet the daily needs of tourism resource management in the beautiful area of Jiyuan Mountain. The research is still in its early stages. At the same time, due to limited time and energy, there are bound to be areas for improvement, which need to be further tested and improved in practice: Combine GIS, network, and middleware technology to establish a BS model tourism information system as soon as possible to provide a larger range of map services , The relationship between the space and attribute data in the database and the structure of the data table can be further optimized to make it more closely related to each other, thereby further improving the query, analysis and operation efficiency of the system.

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