Research on Quantitative Analysis of Tourism Resources Based on Fuzzy Evaluation Method of Computer Multilevel Model

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Abstract. In order to make a quantitative analysis of tourism resources, we need to consider the interaction of appreciation factors and the differences of different tourists' feelings. We can use the fuzzy mathematics class evaluation method under the computer technology to establish the multi-level fuzzy evaluation model. A scenic spot can be used as an example to show the specific process. According to the exhibition, we can get the final result of the comprehensive appreciation of the resource grade and quality of the tourism area. Finally, this paper also explains the specific measures to improve the development of tourism resources.

Keywords: Computer Multilevel Model, Fuzzy evaluation, Tourism resources, Quantitative analysis

1. Introduction
In order to develop the resources of a certain tourism area, scientific evaluation is necessary. Through scientific evaluation, developers can see the value of future development of tourism areas. Developers choose specific development methods according to the differences in the value of tourism development. Generally speaking, the evaluation methods of tourism resources include experience evaluation, technology appreciation and comprehensive analysis appreciation. In the early stage of the development of evaluation, people are more accustomed to qualitative appraisal.

With the gradual deepening of the research on Tourism Analysis and evaluation, people invented the way of computer quantitative analysis. Because there are many levels of specific contents in the comprehensive evaluation of tourism resources, people have not found a universal method for comprehensive evaluation of tourism. However, in recent years, many people have begun to use the fuzzy mathematics evaluation method under the computer technology to evaluate the tourism resources. According to the quality of the evaluation, the developer can choose a reasonable development form.

2. The concrete model of fuzzy evaluation of tourism resources based on computer

2.1. Basic principles
The basic principle is mainly the application of computer simulation technology. According to the
needs of simulation, we can set the following customization. First, we can set the mathematical letter \( U \) as the factor of the object. We can set \( V \) as the specific decision corresponding to each factor. Therefore, we can get two fuzzy sets. A set is a set of factors of a sign. Another set is called the set of fuzzy relations of factors and decisions, which can be expressed as concrete matrix \( R \). In fact, the essence of comprehensive evaluation is the calculation of fuzzy matrix \( R \). According to a fuzzy calculation method of two sets, we can get fuzzy subset \( B \). We can find the fuzzy weight vector \( a \) and fuzzy transformation parameters to get the specific value of fuzzy parameter \( R \).

\[
U = [u_1, u_2, \ldots, u_n]
\]
\[
V = [v_1, v_2, \ldots, v_n]
\]
\[
B = [b_1, b_2, \ldots, b_n]
\]
\[
A = [a_1, a_2, \ldots, a_n]
\]
\[
R = [r_{ij}]_{n^2}
\]  

2.2. Establishment of computer model based on mathematical thinking for comprehensive evaluation

First, we can divide the set \( U \) of factors into several groups. The elements of the second level factor set are subsets of the first level factor set. The fuzzy subsets calculated by subsets can be used as specific parameters of comprehensive evaluation. This kind of evaluation method can be called two-level comprehensive evaluation method. Similarly, we can get a three-level comprehensive evaluation method.

\[
U = \bigcup_{i=1}^{P} U_i
\]  

3. Multi-level quantitative evaluation of tourism resources

According to the theory of comprehensive quantitative analysis of tourism evaluation, we can decompose it into different levels. The specific evaluation factors of tourism resources can be roughly divided into four aspects. They include objective layer, comprehensive layer, project layer and causal layer. Different levels can form different networks of relationships. The collection of nodes in these networks has become three main development factors. They are respectively the attraction of tourism resources, the conditions for the development of tourism resources and the measures taken by the government. These three factors determine the specific value of tourism development.

3.1. Determination of evaluation grade

It is very simple to determine the evaluation level. According to the different needs of tourism development, we can divide the evaluation level of tourism development into five levels. They include: excellent, good, average, relatively poor and very poor.

3.2. The main way to determine the weight subset

The purpose of determining the weight subset is to explore the weight parameters of several levels of tourism area. We can use the combination of subjective judgment method and consultation method to determine the weight coefficient of elements. Through the expert's suggestion, we can compare any two indexes of multiple indexes. We can get the matrix of judgment. According to the calculation method of computer simulation, we can get the initial judgment of its matrix.

\[
E = [e_{ij}]_{m \times n}
\]  

Through the calculation of matrix normalization, we can get the set of weight parameters:

\[
F = (f_1, f_2, \ldots, f_n)^T
\]
\[
\sum_{i=1}^{n} f_i = 1
\]
According to the above calculation process and calculated company, we can get the weight of three levels of the evaluation index system.

\[
F(B) = (0.13, 0.15, 0.23) \\
F(C_1) = (0.62, 0.36) \\
F(C_2) = (0.15, 0.55, 0.12) \\
F(C_3) = (0.46, 0.35, 0.13) \\
F(D_1) = (0.13, 0.79) \\
F(D_2) = (0.46, 0.33) \\
F(D_3) = (0.26, 0.34, 0.11)
\]

3.3. Establishment of membership function

\[
\rho_i = \frac{1}{m} \sum_{j=1}^{m} P_{ij}(v) \quad (i = 1, 2 \ldots n; j = 1, 2 \ldots m)
\]

\(P_{ij}(v)\) represents the specific result of tourism evaluation. The letter n indicates the number of different levels of evaluation. The letter m indicates the number of experts. According to the establishment of membership function, we can get the evaluation decision matrix.

3.4. Single factor fuzzy evaluation analysis based on computer technology

We can use a scenic spot as an example to illustrate the membership function of its comprehensive appreciation.

| Level    | Environment | Resources | Source of tourists | Economics |
|----------|-------------|-----------|--------------------|-----------|
| Excellent| 0.69        | 0.66      | 0.71               | 0.20      |
| Good     | 0.11        | 0.18      | 0.12               | 0.20      |
| Commonly | 0.01        | 0.08      | 0.08               | 0.20      |
| Bad      | 0.09        | 0.04      | 0.09               | 0.20      |
| Very Bad | 0.10        | 0.04      | 0             | 0.20      |

3.5. Evaluation results of fuzzy synthesis at the first level

According to various factors of tourism evaluation, we can calculate the fuzzy evaluation results according to the decision matrix and weight matrix. According to the computer simulation, we can directly get the first level evaluation results of the region.

\[
U(B_1) = (0.6612, 0.2013, 0, 0, 0) \\
U(B_2) = (0.0722, 0.1276, 0.6601, 0.2019, 0.0149) \\
U(B_3) = (0.6901, 0.1045, 0.0980, 0.0420, 0)
\]

3.6. Fuzzy evaluation results of two levels

According to the results of the above fuzzy comprehensive evaluation and the calculation of the construction matrix, we can get the results of the second level fuzzy evaluation. According to the computer simulation, we can directly get the second level evaluation results of the region.

\[
R(A) = (0.6242, 0.1022, 0.2031, 0.0510, 0.001)
\]

3.7. The essence analysis of tourism quantitative analysis and evaluation based on computer

According to the results of the comprehensive evaluation of a certain tourism area under the above
computer technology, we can analyze its comprehensive essence. The comprehensive index of tourist attractions is excellent. The attraction of tourism resources is excellent. The property of the object is good. The environmental quality of tourist attractions is relatively good. The level of tourists' demand reaching the standard is relatively good. The capacity of the source market is also relatively good. However, the development conditions of the tourism area are general. Its development foundation is not good. According to the analysis of the economic background and facilities in the past, the development history of the development area is relatively early. According to the field investigation, the traffic conditions in the tourist area are relatively good. In addition, we can also find that the government's behavior measures, relevant policies, laws and regulations and the improvement of management level are relatively good.

4. Evaluation and analysis of grade quality of tourism area based on comprehensive computer evaluation method

According to the above results of the computer substantive analysis of a certain tourism area. We can find that the first-class tourist areas have very prominent tourism characteristics. It is more suitable for tourists with high taste. It has very good conditions for the development of tourism resources. First class tourist areas are highly irreplaceable. Second class scenic spots also have obvious tourism characteristics. It is suitable for tourists with high tourism taste. Second class scenic spots can be replaced. Third class scenic spots have no very superior development conditions. Therefore, developers are not recommended to develop third class scenic spots.

5. Conclusion

This paper analyzes the four levels of tourism resource evaluation factors by using computer simulation calculation methods and determines the important role of the weight matrix of evaluation factors. We can find that the method of multi-level fuzzy evaluation based on computer technology is more effective in quantitative analysis of tourism resources. On this basis, I suggest that the development of tourism resources must do three things. They include: the development of brand tourism resources, the development of service facilities and the development of traffic accessibility.

Acknowledgements

1. Sponsored by Sichuan Tourism Development Study Center: “The Study of Non-large Scale Tour site in Sichuan province –based on Dynamic game theory” (LY19-41)
2. Sponsored by Heritage Study Center of Tourism Department of Sichuan Government : “Study of Efficiency of World Tourism Heritage in Sichuan-based on data development analysis (19YL -04)

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