

Implementation and Application of Genetic Hybrid Neural Tourism

Algorithm

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Abstract: This paper calculates the value of tourism customers, collects and identifies the tourism interests of customers according to the estimated results, optimizes the processing method of customer interest samples based on hybrid neural genetic algorithm, and improves the steps of tourism customer loss prediction. The results show that the prediction method of tourism customer turnover based on the mixed neural genetic algorithm improves the prediction accuracy of customer turnover.

Keywords: Tourist Customers; Prediction of Customer Turnover

Introduction

The time series method can find the law of customer behavior changes from the customer historical data and mine the important information hidden behind the data, but it is a linear modeling method. For random customer data, it is difficult to establish a high-precision customer churn prediction model. Modern prediction models are mainly based on statistical theory, and belong to machine learning algorithms. They have self-learning ability and do not need the prior knowledge of the problem.

1. Customer churn prediction and retention scheme design

Customer identification is to process and analyze the data generated by customers' consumption in a certain tourism industry through some scientific and effective methods, fully understand the needs of customers, and accurately identify potential customers or types of customers in the tourism industry that can bring greater value to the tourism industry. Customer identification requires the tourism industry to fully understand what needs customers want through tourism, so as to quickly and accurately understand customers, provide targeted services or products for customers, and establish a good image of the tourism industry. Questionnaire surveys and data analysis are scientific and effective methods for the tourism industry to understand customer needs. Customer identification requires the tourism industry to identify potential customers. It is impossible to intuitively see the value of different groups. Because customer value evaluation is a comprehensive evaluation, the evaluation of the actual value of customers needs to comprehensively select indicators that reflect user loyalty, activity and consumption ability. This paper adopts the linear evaluation method, and the final evaluation linear algebraic formula is:

$$P = \lambda_i \zeta_i, \quad i = 1, 2, \dots, n$$

Among them λ_i represents the weight of the i th indicator of the comprehensive value of the indicator, ζ_i represents the i th index value, and further uses the entropy weight method to calculate the weight of each index. Entropy weight method is an objective evaluation method, which can be used to determine the weight of customer behavior indicators. Entropy can be used to express the dispersion degree of all indicators in the studied system, and the index weight can be determined according to the dispersion degree of indicators. The weight calculation results of each indicator are shown in Table 1:

Table 1 Index weight calculation results

Indicator type	Indicator name	Direct value	Coefficient of difference	weight
Activity	Length of time since the last order was placed within the year	0.987	0.013	0.024
	User conversion rate	0.983	0.022	0.012
loyalty	Order cancellation rate of users within one year	0.967	0.014	0.005
	Number of orders cancelled by users in one year	0.934	0.023	0.014
Consumption capacity	Average price of 24-hour browsing	0.912	0.019	0.017
	Preferred price	0.936	0.015	0.012
	Sensitivity index	0.955	0.017	0.013

According to the above analysis, the behavior of each value customer group has obvious differences. High value customer groups are outstanding in most indicators, with high activity, high conversion rate, high consumption capacity and other characteristics, but they have the risk of high order cancellation rate. The activity and conversion rate of the medium value customer group are between the high and low value customer groups, and the consumption capacity is close to that of the low value customer group, but it has the lowest order cancellation rate. The problem is that the order volume is insufficient, so it is not as good as the high value customer in terms of contribution. The consumption capacity and activity of low value customers are insufficient. Although its order volume is higher than that of medium value customers, it has a very high order cancellation rate.

Based on the above figure, formulate retention strategies for lost customers, determine the retention order of customers who need to be retained by analyzing the loss of customers, arrange customers in order according to the value or profit generated by various customers to the tourism industry, so as to determine the retention order of customers, determine the retention cost, calculate the cost spent by the tourism industry when retaining customers, and formulate retention strategies, Two principles should be followed when formulating retention strategies: first, different types of customers should be analyzed differently, and second, retention fees that do not exceed the upper limit.

2. Analysis of experimental results

In order to test the practical application effect of the prediction method of tourism customer turnover based on hybrid neurogenetics, a statistical investigation was carried out on the annual development of a scenic spot and the surrounding tourism industry, and the characteristic variables of customer tourism intention were recorded. See Table 2 for the specific information of all variables:

Table 2 Characteristic variables of customer travel intention

Statistical type	Name of characteristic index	Index Interpretation
Currently browsing scenic spots	commentnums	Evaluation quantity
	novoters	Number of raters
	Can celrate	Historical conversion rate
	Avgprice	Historical cancellation rate
	-	Average score
All scenic spots visited that day	-	Mean value of evaluation quantity
	-	Average number of historical visitors

Further statistics are made on the reservation and loss of tourists in the scenic spot, and the prediction results of this method are compared with the actual loss of customers for analysis.

Based on the above survey results, it is not difficult to find that the annual booking volume of the scenic spot is the highest in May and October, and the customer turnover is also relatively the highest, but the overall turnover is basically consistent with the trend

predicted in this paper, but there are still some differences in some months, which is due to the impact of special factors such as the general environment. In order to further investigate and analyze the reasons for the loss of customers, we extracted the customers' search for other keywords while searching .

In order to further verify the accuracy of the prediction method in this paper, the prediction effects of the traditional prediction clustering analysis method and the method in this paper are further compared based on the graph data.

3. Analysis of customer churn factors and Countermeasures

According to the above data descriptive analysis, customer value and customer churn prediction analysis, this paper summarizes the key factors affecting customer churn. For example, in the order information submitted by customers, the visit date and check-in date involved in the order submitted by customers, and whether to fill in the order information are important characteristics affecting customer churn. If there is a big difference between the time when the customer submits the order and the final check-in time, it means that the customer may change the plan at any time, and the possibility of canceling the order in the later stage is also relatively large. In terms of the characteristics of the customer itself, first, the active process of the customer.

4. Conclusion

Customer churn prediction is an important research content in the field of tourism. Because the influencing factors of customer churn are complex, its changes have both definite regularity and randomness. Because the prediction accuracy of customer churn obtained by traditional clustering method is low, based on the combinatorial optimization theory, aiming at the regularity and randomness of customer churn, this paper uses grey neural network modeling, adopts the nonlinear fitting ability of Hybrid Neural Genetics, and carries out nonlinear weighting on their prediction results. The application results show that this method can comprehensively describe the changing characteristics of customer churn and improve the prediction accuracy of customer churn. Although the model in this paper is used for the modeling and prediction of customer churn, its modeling idea can also be applied to other fields and has a wide range of applications.

References

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