Research on The Product Strategy of Online Short-term Rental Platform

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Abstract—With the rapid development of the Internet economy, online short-term rent has become more and more people's first choice for travel. However, the online short-term rental industry has a short history of development and lacks normative service standards. It is faced with a series of problems such as legality, security and service guarantee. Therefore, it is an urgent problem to provide customers with more human interest and personalized accommodation experience and to improve customer satisfaction. Through the crawler technology, the establishment of Bayesian network model to explore the main factors leading to low customer satisfaction. The research found that the problems existing in the online short-term rental platform homestay products, including old homestay houses, unreasonable room layout, and so on. This paper will aim at the above problems and put forward the product strategy optimization suggestions.

Keywords-online short-term rent; product strategy; customer satisfaction; text mining

1 INTRODUCTION

In the context of the sharing economy, with the increase of idle houses and the booming tourism industry, more and more people have begun to pay attention to online short-term rental. Online short-term rent is a kind of short-term rent mode in which landlords rent out their spare individual rooms or whole houses through the Internet platform. So, they will gain profits in this way. It can provide a warm, comfortable, human and personalized accommodation space for tenants [1-2]. This online short-term rental method, on the one hand, improves the utilization rate of B&B (bed and breakfast) and increases the income of landlords [3]; On the other hand, it provides convenience for tourists who are away from home. They can book a room through the online platform and choose a house style that is cost-effective and in line with their preference [4]. According to the China Online Short-rent Development Report 2020 released by the Shared Economy Research Center of the State Information Center, China's online short-term rent industry continued to develop rapidly in 2019. The market turnover in 2019 reached ¥16.5 billion, up 37.5% from 2018. The number of participants increased to 83.45 million, and the number of service providers exceeded 4 million. In 2019, there were 3.5 million listings on the online short-term rental platform, an increase of 16.7 percent compared with 2018, and its future prospects are limitless. At the same time, the competition between various online short-term

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rental platforms is becoming increasingly fierce. With the continuous improvement of consumption level and the expansion of the demand for high-end life services, consumers' demand for shared accommodation has shifted from the early economic consumption to the quality and comfort consumption. Therefore, customer satisfaction is very important for each online short-term rental platform to improve its competitiveness [5-6].

Compared with a single standard room in a traditional hotel, online short-term rental can provide customers with more diversified choices. Customers can choose their own satisfactory accommodation and environment according to their own preferences, to meet the personalized needs of customers [7]. However, as an emerging industry, the development mechanism of online short-term rental is not yet mature, and it is faced with problems such as legality, safety, health and service guarantee [6-7]. Therefore, to the online short - term rent industry has brought more opportunities and challenges.

In the past, many literatures have analyzed a certain aspect of online short-term rental business model, regulatory legal issues, service standards, etc., but there is still a lack of comprehensive and in-depth discussion. With high popularity of Internet, consumers are keen to use online reviews to express their subjective feelings after experiencing tourism accommodation products. These review texts are expression of tourists' real emotions. By analyzing network ratings and review data, we can find out customers' concerns, so as to optimize product strategies and improve customer satisfaction.

Therefore, this study takes X online short-term rent platform. Because it is a relatively successful short-term rent platform in China's online short-term rent industry, as the research object, and uses Python program to get users' rating and comment data on B&B products on X online short-term rent platform [8]. Through text sentiment analysis, word frequency analysis and discrete processing of the review data, a Bayesian network model is built on the basis of data analysis to explore the factors leading to low customer satisfaction [8]. Based on this, we will optimize the product strategy of X online short-term rent platform, improve customer experience and customer satisfaction, and provide theoretical reference for the product optimization of similar online short-term rent enterprises.

The rest of this paper is as follows: The second part is the literature review, the third part is the method, the fourth part is the data analysis and results; The fifth part will discuss the results and make suggestions based on the problems, as well as discuss the limitations and future prospects of this paper.

2 LITERATURE REVIEW

Short Online Rental. Online short-term rental is a model of the sharing economy, which is regarded as a way for the landlord to rent out his vacant house or room through the Internet trading platform to provide accommodation services for the tenants in need of accommodation [4-5]. Previous literature divides online short-term rent operation mode into three types: C2C; B2C; C2B2C. Among them, C2C model is represented by Airbnb, Xiaozhu short-term rent, Muniao short-term rent, etc. The characteristics of this model are that the landlord can directly connect with the tenant, reduce the transaction transmission link, and help to reduce the time cost. B2C way home as the main representative, the characteristics of the model is able to rely

on industry chain upstream of the developers with the housing, obtain the mass housing, adopts unified management, to lodging facilities and check-in process specification standards. In C2B2C mode, represented by Ziru, this mode is characterized by the fact that the owner rents the house resources to the intermediary company, which will carry out comprehensive transformation, sales and decoration of the house resources. Therefore, the platform intervenes in the housing quality and credit system, making it easier to facilitate transactions.

Product Strategy. Product strategy is mainly based on the needs of customers, to develop strategies to improve products and services, what customers need, what is produced. Through reading the previous literature, it is found that the product strategy is mainly divided into: (1) product portfolio strategy: adjust and optimize the product portfolio to make a proper proportion between various products to optimize the product line or product projects. (2) Product differentiation strategy; The products provided can be distinguished from other competitive products in terms of products, services, channels and images. (3) Service strategy: improve the competitiveness of enterprises by providing high-quality services, including what services to provide to customers, in what form to provide services and what level of services to be provided. (4) New product development strategy: through the development of new products to meet customer needs to improve product competitiveness, quickly occupy the market.

Customer Satisfaction. Existing studies mainly discuss the concept of customer satisfaction from two perspectives. On the one hand, researchers view customer satisfaction as the evaluation after a specific consumption behavior [3]. On the other hand, they regard it as the overall consumption behavior evaluation after a period of time [2]. Consumers generally pay attention to hardware facilities, cost performance, service quality, security, catering features and so on.

3 METHDOLOGY

As shown in Figure 1, a large amount of online review data in the X online short-term rent platform, all of which are tenants' real experience after check-in, including specific evaluation indexes, quantity, words and pictures, which meet the data requirements of this study.

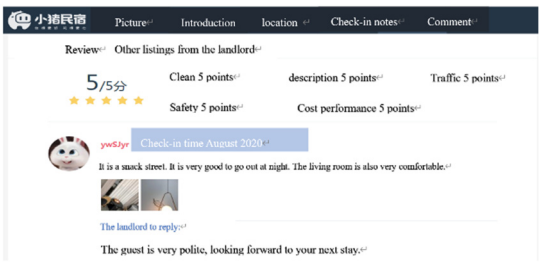

FIGURE 1. THE REVIEW INTERFACE OF X ONLINE SHORT-TERM RENTAL PLATFORM.

In terms of function, crawler is generally divided into three parts: collection, processing and storage. Its working principle is shown in the figure 2. Firstly, one or more initial URL scraping

of the page code, through search or content matching method to get the useful data in web pages. Secondly, accessing to a new URL for the next round of grab and recycling the whole process of fetching, until system stop condition is satisfied. These are fetching data, deposited in the database. Finally, according to the needs of users, the corresponding data extracted from the database.

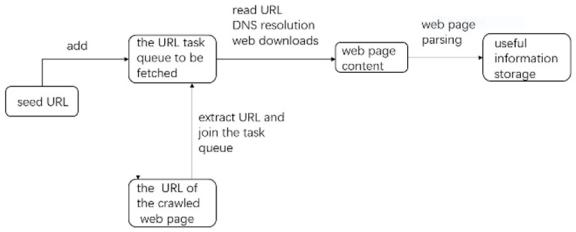

FIGURE 2. WEB CRAWLER WORK FLOW CHART.

This paper crawls 2611 homestay houses of X online short-term rental platform through the Python language crawler technology, a total of 40,433 pieces of data and saving the crawling results in Excel format for subsequent text analysis.

4 RESULT

4.1 Word Frequency Analysis

Due to the large number of comments and the wide range of comments, this paper uses the Python word frequency analysis model to conduct semantic analysis, calculate and count the word frequency, and form 25,572 words. For example, the word "room" is mentioned 19,508 times. For the convenience of analysis, this paper takes cleanliness and hygiene, consistent description, traffic location, safety degree and cost performance ratio as the first-level dimensions. According to the vocabulary attributes of the first-level dimension, the word frequency in the comments is summarized, and 16 second-level dimensions are refined under the five first-level dimensions, as shown in Table 1.

TABLE 1. DIMENSION TABLE OF INFLUENCING FACTORS

First level dimension	*Second level dimension*
Clean and tidy	*Clean*
	Tidy
Consistent description	*Decoration style*
	Sound insulation effect
	Housing area

	Sense of wholeness
	Kitchen and bathroom bath
	Residential facilities
	Butler service
Traffic location	*Traffic situation*
	Parking situation
	Peripheral facilities
Safety level	*Room security*
	Perimeter security
Cost performance	*Cost performance relation with hotel*
	Product price ratio

4.2 Bayesian Network Model Evaluation

In order to assess the effect of Bayesian networks, general testing of sample data sets to test and assess, 20% of the data were selected as the sample of this study. According to the 523users evaluation situation of home products, forecast the home stay facility product comprehensive rating. The accuracy index is often used to measure the classification performance of the classification model. The comprehensive scoring level in the Bayesian network in this paper is divided into 0, 1 and 2 categories. The accuracy index is the ratio of the number of correctly classified samples to the number of total test sets.

Accurate rate, by definition, to distinguish between different categories, with 0 and 1 binary classification, for example, the 0 class as a class,), 1 class as Negative class, when 0 is the correct judgment of 0, are recorded as TP, when the class is the right judgment for 1 class, are recorded as TN, when 0 class was wrong judgment for 1 class, are recorded as FN, when type 1 error to 0 class, are recorded as FP. Precision is concerned with the accuracy of the Positive class, that is, Precision is concerned with how many Positive samples are correct among those predicted to be Positive in the model.

Bayesian network was established to predict 523 test data of the test set. According to the above evaluation index of the model, the accuracy rate of 523 samples was 91.78%. The evaluation index results are shown in Figure 3, and the classification report of Bayesian network is shown in Table 2.

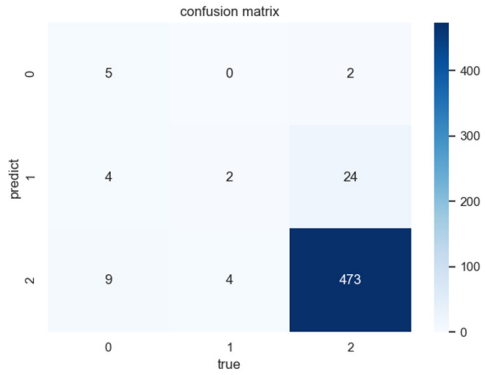

FIGURE 3. CONFUSION MATRIX DIAGRAM.

TABLE 2. CLASSIFICATION REPORT OF BAYESIAN NETWORKS.

	precision	*recall*	*fl-score*	*support*
class0	*0.71*	*0.28*	*0.40*	*18*
class1	*0.07*	*0.33*	*0.11*	*6*
class2	*0.97*	*0.95*	*0.96*	*499*
weighted avg/total	*0.92*	*0.90*	*0.90*	*523*

After the evaluation by the model, the accuracy rate is nearly 92%, which indicates that the classification performance is good. Based on confusion matrix and Bayesian classification report, in 523 test data. In general, the final F1 value of the model is 0.90, indicating that the overall accuracy and recall rate of the data are relatively high and balanced. The Bayesian network model established in this paper has a good prediction result with the accuracy of 91.78% and F1 value of 0.9 for the predicted data, and the probability result in Bayesian inference has a good promotion value.

4.3 Result Analysis

Crawl through the above data, text sentiment analysis, frequency analysis, the original data of five score index refinement into sixteen factors, after discretization processing integrated assessment, Bayesian network independence inspection, after establishing the model of Bayesian network and Bayesian networks after verification probability analysis, the final evaluation of the effect of the Bayesian network model. Lead to the home stay facility is obtained by data analysis, low product grading factors, and according to the influence degree from high to low order as: overall impressions, health situation, living facilities, decorate a style, butler service, hutch defends bath, traffic conditions, the sound insulation effect, the product

price, safe and cost-effective, surrounding facilities, hotel rooms (the same as the surrounding facilities impact), housing, perimeter security, parking area, clean and tidy condition.

5 DISCUSSION

5.1 Conclusion

Through the above analysis, the problems that have a high influence on the home stay products of X online short-term rental platform are as follows: old home stay houses, unreasonable room layout and so on. This paper tries to put forward the product strategy from the following aspects.

Firstly, define the core interests and optimize the accommodation functions. In view of the old and unreasonable layout of the house on X online short-term rental platform reported by customers, the main reasons are the low entry threshold of the platform, the lax quality control of the house on the online short-term rental platform, and the lack of relevant standards for online short-term rental. The platform can add standards on the old and new degree of housing resources to ensure the quality of housing resources and provide customers with a warm and comfortable accommodation environment like home. If the house does not meet the promised standards of products and services, customers can complain to the X online short-term rental platform. For the house that has been complained to a certain extent, the platform can remove the house and downgrade its credit rating through a third-party credit investigation agency.

Secondly, short for air quality problems, X online rental platform can be through the air quality test of housing authority, the operator of home stay facility can order by X short online rental platform APP a key, X short rent online platform to send staff to your door, simply with formaldehyde detector within the home stay facility houses on formaldehyde testing, to evaluate the air quality, the formaldehyde exceeds the supply of homes for offline processing. With the properties of partition room, X short rent online platform field considerations should be, should be considered for the design of partition room door model structure, partition materials used by security and the sound insulation effect should be considered, such as ecological sound insulation board, wood plastic eyed sound insulation board and aluminum honeycomb sound insulation board, etc.

Finally, product differentiation is formed to enhance product competitiveness. X online platform can provide free training for landlords, and improve the service level of landlords by establishing the service incentive mechanism of landlords. Perfect the credit security guarantee system, such as the installation of intelligent door locks, to ensure the safety of tenants; Multiple characteristic projects are launched to create personalized products. For example, the cultural experience projects launched by X online short-term rent platform currently include "City Lights" and "Rural Beauty Stay", which bring a sense of freshness to customers and attract more customers, thus enhancing the competitiveness of X online short-term rent platform's home stay products.

5.2 Limitations

On the one hand, this paper selects the comments on the 10 popular cities of X online short-term rental platform. Considering the data of the total housing supply of X online short-term rental platform exceeds 800,000 sets, the sample size is relatively small. Future research scope, the number of sample cities can be expanded.

On the other hand, the B&B housing resources of X online short-term rental platform studied in this paper actually have many subdivided types of housing, such as ordinary folk houses, villas, serviced apartments, etc., and customer satisfaction for different types of B&B is different. In the future research, the products of home stay can be classified into different types.

It is hoped that the above limitations can be improved in the future research, and more detailed analysis can be carried out on home stay products. Meanwhile, it is hoped that various types of accommodation products can be designed to meet the needs of customers according to their needs, so as to provide good experience for customers and enhance the competitiveness of X online short-term rental platform.

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