Research on Consumer Perception of Intelligent Service in Catering Industry Based on Text Mining

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Abstract: This paper classifies the emotion of the selected comment text and extracts the LDA theme, and interprets the results. The research shows that consumers have a high overall favorable rate of intelligent services in the catering industry, but there are also a small number of negative perceptions, which are reflected in the lack of human feelings of intelligent services, the lack of technology and the simple appearance of the machines that provide services. This suggests that catering businesses should pay attention to the application scope of intelligent services and improve consumer perception experience.

Keywords: Consumer Perception; Intelligent Services; Catering; Text Mining

Introduction

With the rapid development of the new generation of information technology such as artificial intelligence, 5G and the Internet, intellectualization and networking are the inevitable trend of the development of the future service industry. In 2018, the first intelligent restaurant in Haidilao was officially launched, which can provide intelligent services throughout the whole process and greatly reduce the use of human resources. Affected by the epidemic in 2020, "contactless service" has become a rigid demand of the catering industry, accelerating the speed of digital and intelligent transformation and upgrading of the catering industry, and a large number of smart restaurants have emerged. However, unfortunately, at present, most of the relevant research on intelligent services in the catering industry only stays at the application end, and forward-looking discussions on consumer satisfaction and feelings after experiencing intelligent services are rare.

1. Content

1.1 Literature review

At present, the research on intelligent services mainly focuses on the connotation, impact and role of intelligent services. Intelligent service is a bridge between the physical world and the digital world, and a new service mode to improve value creation and economic operation efficiency [1]. The technology and industrialization level of intelligent services is one of the important indicators to measure a country's scientific and technological innovation and the basic technology of artificial intelligence, and is a new driving force for the high-quality development of China's economy .It can also accurately meet the needs of consumers and meet the needs of consumers more efficiently and conveniently [2].

However, the role of consumers in smart service-related literature has not been well studied in depth as expected . Therefore, this paper introduces the concept of consumer perception to study the intelligent service of catering industry. Consumer perception was first introduced into the study of service management by Gronroos[3]. He believed that consumer perception is a psychological process reflected by consumers by collecting and understanding external information after receiving the stimulation of external products or

services.Zeiyhaml[4]believes that customer perceived value includes the perception of the acquisition and payment of consumer behavior. With the in-depth study of perceived value, scholars believe that perceived value is a multi-dimensional concept, which can be divided into practical value, pleasure value and social value[5][6].

The LDA topic model method is currently the most commonly used in the research related to consumer perception.Wang Heyong et al. applied the LDA theme model to deal with consumer online review data, and discovered that consumers' concerns about the service quality of online merchants mainly include: food, environment and publicity. Dong Shuang et al.used the LDA model to identify the theme of the perception dimension of online comments of tourists in China's mining park scenic spots, and found that the functional object is the main concern dimension of consumers.

1.2 Data collection

This paper takes online reviews as the research object, and selects the top five restaurants that provide relevant intelligent services in popular cities to obtain reviews. The time range is controlled from 2020 to 2022. Clean the collected data, eliminate invalid data such as duplicate comments, and sort out 4688 data.

1.3 Consumer perception analysis

1.3.1 The construction of emotion dictionary

The first is to establish a dictionary of basic emotional words. Emotional tendencies can be divided into positive emotional tendencies and negative emotional tendencies.

Secondly, the construction of attributive dictionary. This paper sums up some common negative words and assigns them appropriately.

The last is the construction of the degree adverb dictionary. In this paper, the degree adverbs of different intensities are assigned a value.

1.3.2 Calculation and analysis of emotional value

The emotional score of each comment is calculated one by one with reference to the dictionary assignment. See Appendix I for the specific calculation process.

The emotional score of each comment was calculated uniformly, and a total of 4688 comments were obtained. Overall,79.7% of consumers have positive comments on the intelligent services in the catering industry, 9.9% of consumers have a neutral attitude, and10.4%of consumers have negative comments. At present, most consumers are satisfied with the intelligent services provided by the catering industry, but a few consumers question the intelligent service mode and hold negative comments. Therefore, what are the specific influencing factors of consumers' perception bias towards intelligent services in the catering industry.

1.3.3 Topic extraction based on LDA topic model

In this paper, LDA topic model is used to extract and analyze the topic of consumer online reviews, so as to mine the potential topic information in consumer reviews.

According to the feature word extraction results of potential topics in consumers' positive comments on smart services, consumers' attention on smart services mainly focuses on three topics: consumers' perceived pleasure, perceived functionality and perceived intelligence. Among them, the theme of consumer perceived pleasure accounted for 36%, and the words "cute, interesting, like, and interesting" appeared frequently, indicating that consumers experienced the interest of intelligent services during the meal process and improved their experience satisfaction. The frequency of words such as "convenience, self-help, saving, fast, and manpower" in the theme of the functional attributes of intelligent services (34%) is high, which indicates that consumers feel that intelligent services can not only save consumers a lot of time, but also save some of the labor costs of the restaurant department and improve work efficiency. The theme of consumer perception intelligence accounts for 30%, among which the words with high

frequency include "intelligence, high technology, accuracy, advanced", etc., reflecting the full sense of science and technology that consumers feel when they experience the intelligent service provided by the restaurant, and the intelligence of fully automatic service.

According to the extraction results of the feature words of potential topics in the negative comments of consumers on smart services, consumers' attention to smart services is mainly focused on three aspects, namely, consumers' perception of intelligence, perception of interactivity and appearance. The theme of perceptual intelligence accounts for 38.1%, among which the words "intelligence, code scanning, fault, convenience, and stuck" appear more frequently, reflecting that the machines providing services are not intelligent enough, and problems such as stuck and fault often occur. The words "service, interaction, enthusiasm, and human touch" in the perceived interactive theme (37.6%) reflect the lack of enthusiasm of the intelligent services provided, and consumers do not perceive the humanized services, which is also the main reason why consumers give negative comments. The theme of appearance image accounts for 24.3%, and the frequent high-frequency words such as "appearance, general, appearance, shelf, simple" indicate that consumers are not satisfied with the appearance features of the existing intelligent machines that provide services, and think that the design of the machine appearance is too simple, which gives consumers a poor perception of the perspective.

Epilogue

Food and beverage enterprises should pay more attention to the improvement of interest in the process of intelligent services, improve the pleasure and perceived satisfaction of consumers, and also continuously improve the functional attributes of intelligent services, improve the efficiency of intelligent services, and actively promote the intelligent upgrading of traditional catering industry.

Intelligent service catering enterprises should pay attention to timely adjusting the proportion of intelligent service and manual service in different situations, arranging different service modes according to different situations, and ensuring the optimization of service quality. At the same time, they should pay attention to service details, pay attention to the personal needs of consumers, provide personalized services for consumers, and increase the restaurant's human flavor and interaction with consumers.

References

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Appendix I: Calculation process of emotional value

Use the constructed emotion dictionary to extract the part of speech of the corresponding emotion words in the online comments of consumers, and assign the value. The calculation formula is shown in (1):

$$\text{Score}_{\text{emo}-\text{word}} = \begin{cases} +1, & \text{If emo} - \text{word} \epsilon \text{Positive emotions} \\ -1, & \text{If emo} - \text{word} \epsilon \text{Negative emotions} \end{cases} \qquad (1)$$

The calculation formula of degree adverbs is shown in (2):

$$Score_{deg-word} = \begin{cases} 2.0 & deg-word\epsilon 2.0 Strength\ adverb\ set \\ 1.5 & deg-word\epsilon 1.5 Strength\ adverb\ set \\ 1.25 & deg-word\epsilon 1.25 Strength\ adverb\ set \\ 0.5 & deg-word\epsilon 0.5 Strength\ adverb\ set \end{cases} \tag{2}$$

If the score of a single negative word is - 1 and the number of negative words is n, the score of negative words is as follows (3):

$$Score_{neg-word} = (-1)^n \tag{3}$$

Each clause is expressed as S1, S2... Sn, and the calculation formula is as follows (4):

$$Score_{Si} = Score_{emo-word} \times Score_{deg-word} \times Score_{neg-word} \tag{4}$$

The emotional value of the comment, Scoredj, is the sum of the emotional values of all the sentence comments, as shown in formula (5):

$$Score_{dj} = \sum_{i=1}^{n} Score_{Si} \tag{5}$$

If the emotional value of the comment text dj is greater than 0, the comment is positive; If the emotional value is equal to 0, the comment is neutral; If the emotional value is less than 0, the comment is negative.

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