

Research on Spatial Distribution of Hefei Catering Business Based on Big Data

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Abstract: China's urban economy and science and technology are developing at a rapid pace. While changing people's lifestyles, it has also caused tremendous changes in the spatial organization within the city. The organization space of catering facilities is an important part of urban space. According to the statistics of China Internet Network Information Center, 78.9% of netizens will search for relevant commodity evaluation before purchasing goods. The evaluation module has formed a huge word-of-mouth database that can influence the decision of catering consumption, which affects the customer's purchasing behavior. Based on the central place theory, the spatial distribution of Hefei catering businesses are studied, using the crawler technology, obtain Meituan and Dianping on the data, and analyze the data. According to the results of data analysis, the rankings of business reputation are ranked. Therefore, it can effectively guide the adjustment and optimization of the layout of urban catering industry, and it also has certain practical guiding significance for the choice of consumers and the location of merchants.

1. Introduction

With the rapid development of urban economy and science and technology in our country, the spatial organization within cities has undergone great changes. Consumers cannot directly judge the overall situation of the restaurant before purchasing, so it is necessary to rely on price, brand, reputation and other factors to determine whether to purchase. According to the China Internet Network Information Center, 78.9% of netizens will search for relevant product evaluations before purchasing goods. More than 90% of netizens will post comments on the website after purchasing goods. The evaluation module has formed a huge word-of-mouth database that can influence the decision of catering consumption, which affects the customer's purchasing behavior.

At present, the academic research on the spatial distribution pattern of urban catering industry is to verify and deepen the central place theory, and to study the spatial distribution characteristics of urban catering merchants. There are many researches on the spatial distribution characteristics of urban catering merchants, and the research results are relatively mature. However, the research data and methods are relatively single, and the research on the service quality and spatial distribution pattern of catering industry is not enough. With the popularization of network information technology, e-commerce is gradually changing the traditional commercial marketing model, and online word-of-mouth has gradually become an important factor for consumers and catering merchants to make decisions. Therefore, using Internet word-of-mouth data to study the service quality of the catering industry and simulating the spatial distribution pattern of the urban catering industry, this method can help solve the problem that the merchants in the traditional catering industry are difficult to measure and difficult to obtain data, and the layout and planning of the urban catering industry, the location and type of storefronts for catering merchants, and the consumption of customers provide more effective guidance.

2. Overview of research methods

2.1 Theoretical Basis

The theoretical basis of this paper is the central place theory, which is built on the "ideal surface". Under the assumption of the introduction of neoclassical economics, every point in the city has the

same opportunity to accept a central place. The relative accessibility of any point to any other point is only proportional to the distance, regardless of the direction, there is a unified traffic surface. The service area of the center is a regular hexagon in space and the center place is in the center.

2.2 Data acquisition and processing

In the two days of 2018.4.23-4.24, this paper used crawlers to capture the information of catering merchants registered on Meituan and Dianping, including merchant name, address, star rating, environment, service, taste score, minimum consumption, comment number and other data, a total of 1,477 valid data. Due to the upgrade of anti-crawling technology of Dianping, it crawls the longitude and latitude information of merchants on Meituan and establishes the spatial location database of merchants based on their detailed addresses and Google maps.

2.3 Establishment of evaluation index system

The existing “overall evaluation star rating” of the website does not completely reflect the service quality of the catering merchants. It is necessary to integrate various information and establish an evaluation index system to effectively measure the reputation of the merchants. According to the principles of relevance, comparability, hierarchy and systematization, the index system is constructed from six aspects of environmental quality, service quality, dish quality, grade evaluation, scale and grade, and comment popularity respectively by classifying and screening the acquired data (Table 1).

Table 1 Evaluation Index System of Reputation of Catering Merchants in Hefei City

| Primary indicator | Secondary indicators |
|-------------------------|--|
| A Environmental Quality | A1 environmental quality evaluation score A2 total environmental quality evaluation |
| B service quality | B1 Service quality evaluation B2 Total number of service quality evaluations |
| C Food quality | C1 taste overall rating C2 recommended dishes total times |
| D Rating | D1 overall rating star rating |
| E Scale | E1 consumption quota E2 Number of branches in the survey |
| F Comment | F1 views F2 reviews |

2.4 Comprehensive Assessment

2.4.1. Principal component analysis

According to the evaluation data of 1477 merchants in the word-of-mouth evaluation index system, the data were subjected to KMO and spherical Bartlett test. The results showed that the KMO value was 0.717, and the Bartlett test was 0.000, that is, the correlation coefficient matrix was significantly different from the unit matrix. At the same time, in order to more clearly explain the degree of interpretation of each principal component, the variance of the initial factor load matrix is maximized and orthogonally rotated, and the cumulative variance contribution rate of the three principal component eigenvalues reaches 78.813%. It is explained that the three main components after rotation can better explain the word-of-mouth situation of Hefei catering merchants. Three of the main components are C food quality, D grade evaluation, and B service quality.

From the above main components, the food quality, grade evaluation, and service quality of the merchants are closely related to their comprehensive word-of-mouth, while the environment, the number of reviews, and the average price are not related to their comprehensive word-of-mouth.

2.4.2. Cluster analysis

K-means cluster analysis was carried out on the comprehensive scores of catering merchants in

Hefei City, and the clusters were classified into 4 categories. The merchant's word-of-mouth was divided into 4 levels. The first level includes 310 catering users, the word-of-mouth value is between 0.782094 and 0.607942; the second level includes 521 merchants, the word-of-mouth value is 0.607942-0.521401; the third level includes 381 catering users, and the word-of-mouth value is 0.521401-0.424296; The four grades include 126 catering users, with a word-of-mouth value between 0.424296 and 0.148088. Through the analysis of fig.1 data, except for some higher and lower merchants, the remaining curves are relatively smooth, and there is no obvious inflection point, indicating that the distribution of food and beverage in Hefei City is homogeneous.

According to the comprehensive analysis, the distribution structure of Hefei catering merchants is olive-shaped, and most of the business reputation is in the middle. On the one hand, it can be seen that the overall catering of Hefei is relatively balanced, but the overall level is general; On the other hand, it also shows that the standards for measuring the modern catering industry have become more and more comprehensive indicators, and other non-flavor factors such as the service level of the catering industry are becoming more and more important.

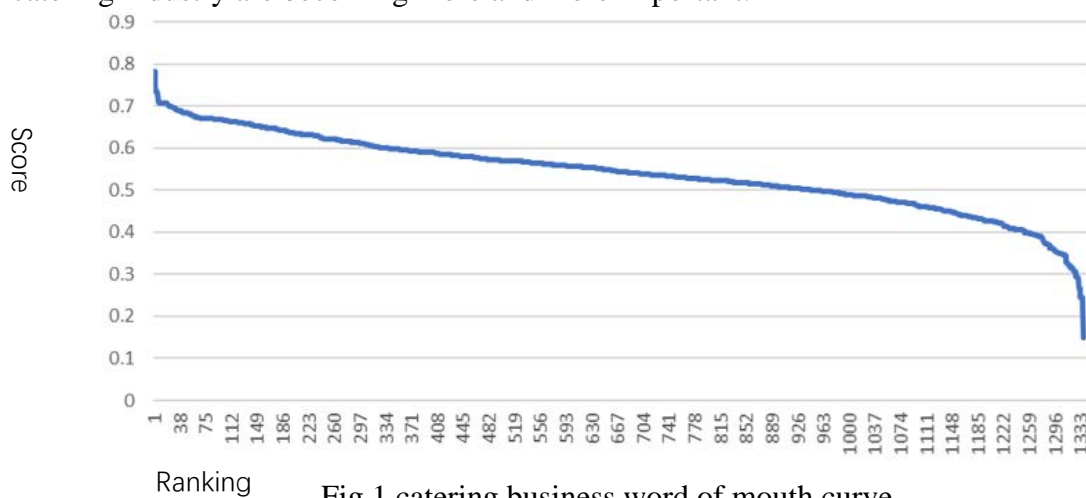


Fig.1 catering business word of mouth curve

3. Word of mouth data analysis

3.1 General characteristics of word-of-mouth distribution

The distribution of word-of-mouth performance of catering merchants is generally consistent with the density distribution, showing a “two-core and multi-hearted” situation. The figure takes the comprehensive score of each merchant's word of mouth as the calculation condition, and simulates the spatial distribution of the reputation of the catering merchants in Hefei City.

In the figure, the word-of-mouth value reached the highest score in the Huaihe Road, Zhixin Cheng, Baohe Wanda, the old city business district, including Changjiang West Road, Feixi Road, Sanlitun, etc.; The peaks and concentration of word-of-mouth in the business districts of Swan Lake and 1912 are the second. Qijie Street and Binhu Century City also have a certain range of high-selling merchants, but the scale is not large. Other high-mouth areas are also concentrated around the Luxi Road and Huizhou Avenue. Although there are a large number of merchants in the vicinity of the university town as opposed to the merchant nuclear density map, there are not many high-selling merchants. It can be seen that the difference in the main structure of the service population will also affect the reputation of the business to a certain extent.

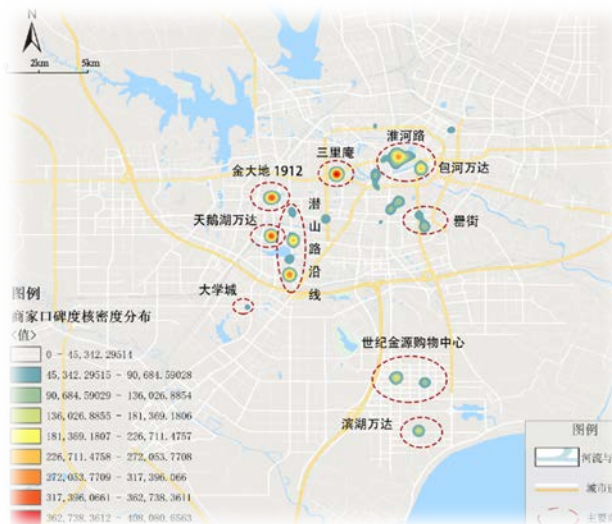


Figure 2 Business reputation density distribution

In general, the distribution of service quality of urban catering merchants has a rule of declining circle and diffusion along the traffic axis, and is greatly influenced by the size and grade of the urban commercial circle.

3.2 Different types of food and beverage reputation distribution characteristics

Due to different consumer groups, different types of catering merchants have different degrees of participation in online word-of-mouth reviews, so the spatial distribution characteristics of word-of-mouth degree will be different. According to the business type of Dianping website, the catering merchants in Hefei are divided into two categories: traditional merchants and leisure merchants. A total of 1476 merchants were counted in the Dianping website, including 619 traditional merchants and 857 casual merchants.

(1) Traditional merchants have fewer high-value word-of-mouth centers, mainly distributed in Golden Land 1912. The number of traditional catering merchants' word-of-mouth high-value centers is less than that of Hefei's overall merchants' word-of-mouth high-value centers, but the overall distribution is not much different, and the Golden Land 1912 area is a high-value area in both categories. One of the reasons is foreign vegetable merchants are mainly located in the 1912 block, and their positioning is a relatively high-end brand, so the evaluation is more concentrated. In addition, some high-selling merchants have gathered along Wanda Plaza and Qianshan Road to coordinate with the Golden Land 1912.

(2) The high value center of leisure catering merchants is distributed in Sanlitun, which is consistent with the nuclear density distribution of merchants in Hefei city, and the highest nuclear density is the same, but the leisure merchants are more distributed than all statistical merchants, and the word-of-mouth value is high. The area is small and cannot form a large area. In addition to Sanlitun, the merchants in other areas have low word-of-mouth values. As the main street in Hefei, there is no high-value word-of-mouth merchants.

4. Evaluation of Spatial Distribution Pattern of Hefei Catering Industry

The distribution of the service center in Hefei City is divided into four levels: the distribution density of catering merchants, the overall reputation of catering merchants, and the reputation of traditional and casual catering merchants (Figure 3).

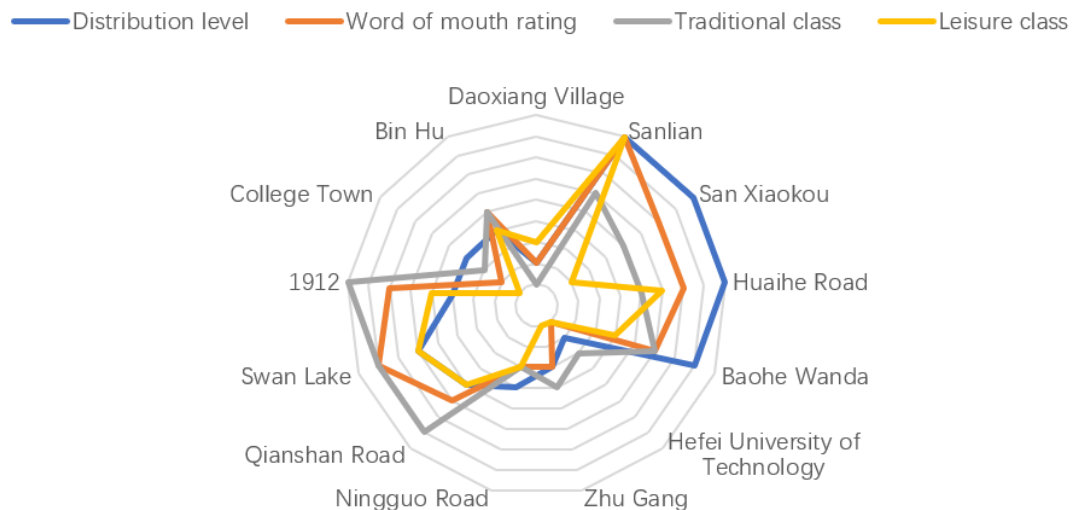


Figure 3 Statistics of the development level of the catering industry in each business district

From the perspective of the development of the food and beverage industry in the service center, there are differences between the centers and the development of the center. It can be seen from Figure 3:

① The old towns such as Sanlian, Sanxiaokou and Huaihe Road are the best areas for the development of the catering industry in Hefei, which is directly related to the important economic status of the old city's trade and finance.

② The administrative districts such as 1912, Swan Lake and Qianshan Road are second to the catering industry development center in the old city. The comprehensive service level is high, and the traditional catering industry is developing faster than the leisure category. It is still the key area for the development of the future catering industry in Hefei City.

③ Although the Binhu area is the core area for future development, the development level is higher than that of the National University of Technology and the University City. However, compared with the traditional two core areas, the development level of the catering industry is still lacking at this stage.

④ The four variables have higher compatibility in different regions, but there are also small differences: the traditional catering level in the administrative district is higher, the old catering level is higher in the old city; The traditional catering establishments near Gongda and Ningguo Road Zhugang are better; although the university towns are more distributed, the traditional and leisure grades are very low, and the level of catering development is not high.

5. Conclusion

The combination of network data and urban geospatial information not only changes the paradigm of traditional urban space research to a certain extent, but also has become a new method or new direction of urban geography and urban planning research. Based on the analysis of consumer use evaluation perspective, it can better reflect the residents' perception and difference of catering, and can effectively guide the adjustment and optimization of urban catering industry layout. It also has certain practical guiding significance for the travel of consumers and the location selection of merchants.

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