


Analysis of Mianshan Network Attention based on Big Data

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Abstract: Network attention is a precursor phenomenon of tourists' tourism behavior. The analysis of network attention is conducive to the targeted marketing and publicity of the scenic spot and attract more tourists. This study takes Mianshan scenic spot in Jiexiu, Shanxi Province as an example, crawls the network attention information through python, analyzes the temporal and spatial characteristics of Mianshan network attention by using the coefficient of variation, seasonal concentration index and geographical concentration index, and finds that due to historical and cultural factors, the network attention of Mianshan scenic spot shows a peak before and after the Qing Dynasty. It also puts forward the measures to realize the sustainable development of tourism in Mianshan scenic spot.

1 INTRODUCTION

With the rapid development of economy and the popularization of network technology, people are more and more used to using search engines to obtain the information of tourist attractions. According to the 45th statistical report on China's Internet development, by March 2020, China had 904 million Internet users, and the Internet penetration rate was 64.5%; the number of mobile Internet users is 897 million. When making travel decisions, tourists usually use Internet big data to obtain destination information to help them make correct decisions and prepare for travel in advance. Baidu is a typical representative of big data. As the world's largest Chinese search engine, baidu is a common tool for people to obtain tourism information and make tourism decisions. Based on big data search, Baidu Index summarizes the search times of Baidu netizens for a keyword every day to measure users' network attention to specific objects.

As one of the applications of big data, Baidu Index's application in tourism mainly focuses on three aspects. First, research on the temporal and spatial characteristics of network attention of tourism destinations or scenic spots (Ruan 2019, Du 2020). Second, predict the number of tourists to tourist destinations or scenic spots through network attention (Huang 2013, Qin 2019). Third, other studies such as


income prediction using Baidu Index (Zhang 2015, Zou 2015).

Mianshan scenic spot (hereinafter referred to as Mianshan), located in Jiexiu, Jinzhong, Shanxi Province, with the highest altitude of 2561 meters, is a branch of Taiyue Mountain. Mianshan is the birthplace of China's Qingming Festival (cold food festival). In 2013, it was rated as a national AAAAA tourist attraction. Mianshan is famous for Jie Zitui's seclusion with his mother in the spring and Autumn period.

2 MATERIALS AND METHODS

The following formulas are used in this study: (1) calculate the coefficient of variation (CV), (2) calculate the seasonal concentration index (S), and (3) calculate the geographical concentration index (G).

$$CV = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}} / \bar{x} \quad (1)$$

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$$S = \sqrt{\sum_{i=1}^{12} (x_i - 8.33)^2 / 12} \quad (2)$$

$$G = 100 \sqrt{\sum_{j=1}^n (P_j / P)^2} \quad (3)$$

The data used in this study are from big data search platform, covering 31 provinces, autonomous regions and municipalities directly under the central government. When obtaining data, this study selects "Mianshan" as the search keyword, and the earliest year of data is 2011. However, due to the lack of data in some months in a few western regions, such as Xinjiang and Tibet, and the fact that Mianshan scenic spot was rated as a national 5A scenic spot in 2013, this event has improved its popularity and network attention. Therefore, this time point in 2013 is

selected as the starting year; At the same time, due to the impact of COVID-19 on Tourism in 2020, data is not universally referenced, so the data are closed to 2019. In order to further clarify the changes in the scenic spot's network attention, python was used to crawl the network attention in 2013, 2016 and 2019.

3 RESULTS & DISCUSSION

3.1 Annual Variation Characteristics of Network Attention in Mianshan Scenic Spot

The annual total amount of Mianshan network attention in 2013, 2016 and 2019 was obtained on the big data search platform, and the growth rate, coefficient of variation and seasonal concentration index were calculated. The specific results are shown in Table 1.

Table 1: Annual change of Mianshan network attention.

| year | Total attention | growth rate | Coefficient of variation | Seasonal concentration index |
|------|-----------------|-------------|--------------------------|------------------------------|
| 2013 | 704247 | — | 0.55 | 4.59 |
| 2016 | 889768 | 26.34% | 0.30 | 2.53 |
| 2019 | 753132 | 15.36% | 0.28 | 2.32 |

As can be seen from table 1, the annual change of Mianshan network attention has the following characteristics:

From 2013 to 2016, Mianshan's network attention was in an increasing trend, rising from 704247 in 2013 to 889768 in 2016. The growth of attention was inseparable from the fact that the scenic spot was awarded 5A scenic spot; From 2016 to 2019, the attention of Mianshan network was in a downward trend, with a negative growth rate.

The coefficient of variation shows a downward trend as a whole, indicating that from the perspective of time, the degree of time concentration gradually weakens and the difference becomes smaller and smaller from 2013 to 2019.

The characteristics are roughly consistent with the coefficient of variation, and have been showing a downward trend. The annual seasonal concentration index is greater than 1, indicating that the off-season and peak season of Mianshan network attention are more obvious, which is particularly prominent in 2013.

Combining the coefficient of variation, seasonal concentration index and the annual total amount of network attention, it can be found that the annual total amount of network attention in Mianshan increased from 2013 to 2016, the coefficient of variation and seasonal concentration index showed a downward trend, and the popularity aggregation in Mianshan gradually appeared in off-season and peak season. From 2016 to 2019, the annual total amount

of online attention decreased, and the coefficient of variation and seasonal concentration index also decreased, indicating that with the improvement of Mianshan's popularity, the attention in the whole year gradually became average.

3.2 Monthly Variation Characteristics of Network Attention in Mianshan Scenic Spot

Obtain the network attention of Mianshan in 2013, 2016 and 2019 on the big data retrieval platform, and draw a broken line statistical chart (Figure 1).

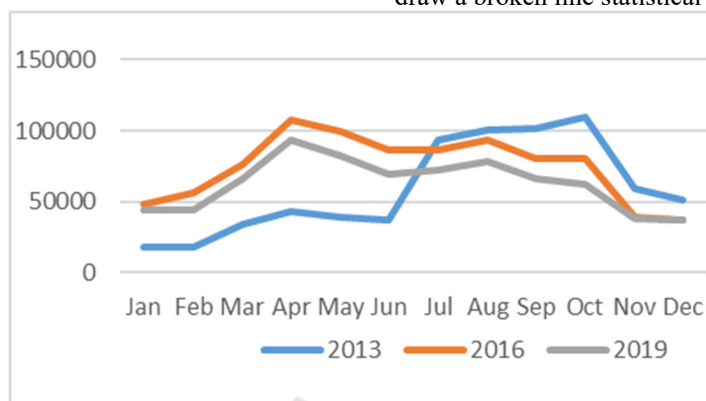


Figure 1: Monthly change of network attention in Mianshan.

As can be seen from Figure 1, the monthly change of network attention in Mianshan has the following characteristics: a) in 2013, the monthly network attention in Mianshan basically increased month by month from January to October, and decreased in November and December; In 2013, the three peaks of network attention appeared in April, July and October, which were affected by Qingming Festival, summer vacation and golden week respectively. b) The growth trend of online attention is roughly the same in each month of 2016 and 2019. The broken line chart shows the characteristics of three peaks. The three peaks appear in April, August and October respectively. On the one hand, they are basically consistent with the time of "Qingming", summer vacation and golden week, indicating that a large number of tourists choose to pay attention to Mianshan during these three holidays; On the other hand, it shows that the climate of Mianshan is suitable in spring, summer and autumn, tourists' willingness to travel is relatively strong, and they pay strong attention to Mianshan. c) At the end of the year and the beginning of the year, tourists pay less attention to the network of Mianshan, which is related to the type of scenic spot of Mianshan scenic spot. Mianshan is a natural and cultural scenic spot. At the end of the year and the beginning of the year, affected by the climate, Mianshan scenic spot belongs to temperate monsoon climate. It is cold and dry in winter, with fallen vegetation leaves and heavy snow coverage, which affects the viewing effect.

Therefore, from November to February of the next year, there are few tourists and less network attention.

3.3 Distribution Characteristics of Mianshan Network Attention among Provincial Administrative Regions

Obtain the annual total amount of attention of Mianshan network in provincial administrative regions in 2013, 2016 and 2019 on the big data retrieval platform. It can be seen from table 2: a) from 2013 to 2019, the network attention of Mianshan in provincial administrative regions increased first and then decreased, but overall, the attention to Mianshan scenic spot increased greatly; b) There are great differences in the network attention of Mianshan in various regions. Although the network attention of most regions has increased, the network attention of some regions such as Xinjiang, Qinghai, Tibet and Hainan in 2019 is still lower than that of Mianshan in 2013. The figures in brackets indicate the ranking of Mianshan's network attention and total annual attention in this year. Although there are individual jumps in the attention of Mianshan network in various regions, on the whole, the exponential order shows a light microwave dynamic potential.

Table 2: Annual total amount of network attention of each province.

| | 2013 | 2016 | 2019 |
|----------------|------------|------------|------------|
| Shanghai | 26240 (12) | 33653 (11) | 30073 (11) |
| Yunnan | 9955 (25) | 7538 (25) | 9120 (25) |
| Inner Mongolia | 29346 (9) | 40871 (7) | 34249 (10) |
| Beijing | 45209 (2) | 59023 (3) | 51530 (2) |
| Jilin | 16164 (19) | 13396 (21) | 10716 (20) |
| Sichuan | 24046 (13) | 31270 (12) | 29204 (12) |
| Tianjin | 35670 (5) | 43504 (6) | 34944 (8) |
| Ningxia | 14087 (21) | 18254 (16) | 15533 (16) |
| Anhui | 16759 (17) | 15048 (19) | 15440 (17) |
| Shandong | 29960 (8) | 37028 (9) | 35994 (6) |
| Shanxi | 93683 (1) | 186551 (1) | 126452 (1) |
| Guangdong | 30792 (7) | 40281 (8) | 35380 (7) |
| Guangxi | 12566 (23) | 6465 (26) | 7444 (26) |
| Xinjiang | 7393 (28) | 4877 (27) | 4766 (28) |
| Jiangsu | 28089 (10) | 35526 (10) | 34588 (9) |
| Jiangxi | 12654 (22) | 10357 (23) | 9769 (24) |
| Hebei | 42142 (3) | 59198 (2) | 48094 (3) |
| Henan | 35225 (6) | 45450 (5) | 39264 (5) |
| Zhejiang | 27061 (11) | 28630 (13) | 27249 (13) |
| Hainan | 4486 (29) | 2466 (30) | 2293 (29) |
| Hubei | 20989 (15) | 21267 (15) | 18641 (15) |
| Hunan | 16590 (18) | 15816 (18) | 14697 (18) |
| Gansu | 8646 (27) | 8900 (24) | 10220 (23) |
| Fujian | 19599 (16) | 16654 (17) | 13276 (19) |
| Tibet | 685 (31) | 456 (31) | 285 (31) |
| Guizhou | 8917 (26) | 3666 (29) | 5187 (27) |
| Liaoning | 21879 (14) | 24973 (14) | 23758 (14) |
| Chongqing | 12193 (24) | 11427 (22) | 10667 (21) |
| Shaanxi | 36855 (4) | 49941 (4) | 42327 (4) |
| Qinghai | 1831 (30) | 3860 (28) | 1610 (30) |
| Heilongjiang | 14536 (20) | 13422 (20) | 10362 (22) |

3.4 Change Characteristics of Network Attention in Mianshan Scenic Spot

On the big data retrieval platform, obtain the daily average of Mianshan network attention in each provincial administrative region in 2013, 2016 and 2019, and calculate the geographic concentration index of each year (Table 3)

Table 3: Geographic concentration index of Mianshan network attention.

| year | 2013 | 2016 | 2019 |
|--------------------------------|-------|-------|-------|
| Geographic concentration index | 22.58 | 27.55 | 25.00 |

It can be seen from table 3 that from 2013 to 2016, the geographical concentration index increased, the concentration of network attention in various regions increased, the spatial imbalance increased, and the bipolar phenomenon of attention in various provinces was obvious; From 2016 to 2019, the geographical concentration index decreased, the concentration of regional network attention weakened, and the spatial attention gradually developed towards a balanced trend.

4 CONCLUSIONS

Through the above analysis, we can draw the following conclusions:

a) From the perspective of interannual changes, Mianshan's network attention increased from 2013 to 2016, and decreased from 2016 to 2019;

b) Mianshan's network attention is divided into off-season and peak season, which is the most obvious in 2013; from the perspective of inter month changes, the year's attention level presents the characteristics of three peaks, which appear around April, July, October and October respectively, which is basically consistent with the time of Qingming Festival, summer vacation and the golden week;

c) From a regional perspective, the network attention of 31 provincial administrative regions to Mianshan increased first and then decreased; the geographic concentration index of Mianshan network attention first increases and then decreases, the distribution of regional attention is becoming more and more balanced, and the geographic concentration degree decreases.

In order to promote the sustainable development of Mianshan tourism, we can start from the following aspects:

a) Balance the passenger flow in off-season and peak season. In view of the low passenger flow of Mianshan scenic spot in the off-season (November to February of the next year), the scenic spot can focus on different ice and snow features of the scenic spot in winter, which can be used as a highlight of winter publicity and marketing.

b) Deepen the integration of culture and tourism, promote tourism with culture and highlight culture with tourism. The scenic spot should integrate the internal culture of "loyalty, righteousness and filial piety" with the scenic spot tourism resources, deeply explore its own cultural connotation, create a unique cultural IP and cultural tourism integration, and attract tourists and attention with unique scenic spot characteristics.

c) Improve the quality of employees and standardize service management. The staff of Mianshan scenic spot mainly includes tourism management personnel and tourism service personnel. Different recruitment and training measures should be taken for different personnel to effectively improve the comprehensive quality of employees and improve the service level of employees in the scenic spot.

d) Carry out marketing plan according to local conditions. The number of tourists in Mianshan is affected by geographical distance. Therefore, in the marketing process, the characteristics of the scenic spot should be highlighted for the provinces with close geographical distance.

e) Broaden the access road to the mountain and standardize the supporting facilities. In order to make the entrance and exit of tourists more unobstructed, Mianshan scenic spot should further broaden the road into the mountain and improve the connectivity and road conditions from the scenic spot to the trunk road; At the same time, feasible measures shall be taken to alleviate the contradiction between coal and tourism on the transportation trunk line, and realize the effective consideration of tourism passenger transport while ensuring coal transportation.

f) Enrich tourism products and diversify tourism commodities. Mianshan scenic spot should, in accordance with the principles of resource classification, product classification, market stratification and service classification, and in combination with the change of market demand, give full play to its regional advantages and climate characteristics, accelerate the development of emerging products such as eco-tourism, leisure and

health tourism, and build a compound tourism destination.

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