Research on Image Perception Measurement of Air Tourism Based on Network Text Mining

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Abstract: Perceptual measurement research plays an important role in the image of air tourism, but there is a problem of inaccurate perception. The traditional data mining algorithm cannot solve the measurement perception problem in the image of air tourism, and the effect is not satisfactory. In the wave of informatization, the tourism industry is ushering in unprecedented changes. As an important part of air tourism, its image perception directly affects consumers' choice and satisfaction. How to accurately grasp this image has become the focus of attention in the industry. As an important tool for big data analysis, online text mining is gradually revealing its great potential in this field.

1 INTRODUCTION

Web text mining refers to the process of extracting valuable information and knowledge from a large number of web texts through computer technology. In the field of air travel (Zhang and Xue, et al. 2020), this means that the public's perception of different airlines and their services can be understood by analyzing online reviews, social media posts, blog posts, and more (Wang and Ye, et al. 2021). This collection of perceptions constitutes the public's image perception of air tourism (Ao and Li, et al. 2020).

2 RELATED CONCEPTS

2.1 Mathematical Description of Network Text Mining

By digging deeper into this textual data, we can not only identify consumers' general perceptions of aviation services, but also uncover trends and patterns hidden behind the data (Wang and Wang, 2018). For example, an airline may be considered to have a high quality of service because it frequently appears in positive reviews, while another company may be flagged for improvement because of the constant flow of negative information.

$$\lim_{x \to \infty}(y_i \cdot t_{ij}) = y_{ij} \geq \max(t_{ij} \div 2) \quad (1)$$

Among them, the judgment of outliers is shown in Equation (2).

$$\max(t_{ij}) = \partial(t_{ij}^2 + 2 \cdot t_{ij}) \succ mean(\sum t_{ij} + 4)\mathsf{M} \quad (2)$$

Therefore, for practitioners in the travel industry, embracing online text mining is embracing a valuable opportunity to gain insight into consumer psychology, optimize service experience, and stay ahead in the fierce market competition (Zhang and Xue, et al. 2020).

$$F(d_i) = \Box \prod \sum t_i \bigcap \xi \cdot \sqrt{2} \to \|y_i \cdot 7 \quad (3)$$

2.2 Selection of Perceptual Measure Study Protocols

Hypothesis II The perceptual measure study function is $g(t_i)$, and the weight coefficient is w_i^l, then the

441

perceptual measure study requires the unqualified perceptual measure study as shown in Equation (4).

$$g(t_i) = \ddot{x} \cdot z_i \prod F(d_i) \frac{dy}{dx} - w_i \tag{4}$$

For example, if data shows that consumer interest in a destination is increasing, airlines can increase the number of flights to that destination (Wang and Lin, et al. 2021). Similarly, if a certain type of complaint starts to rise, companies can quickly take steps to resolve the issue to avoid reputational damage.

$$\lim_{x \to \infty} g(t_i) + F(d_i) \leq \bigcap \max(t_{ij}) \tag{5}$$

To improve the effectiveness of perceptual measure studies, all data needs to be standardized and the results is shown in Equation (6).

$$\overline{g(t_i)} + F(d_i) \leftrightarrow mean(\sum t_{ij} + 4) \tag{6}$$

2.3 Analysis of perceptual measure study protocols

The advantage of online text mining is its ability to process massive amounts of data and to continuously monitor changes in public sentiment. This is crucial for air travel companies, as they can adjust their strategies in real-time in response to market changes (Zhang and Wang, 2015).

$$No(t_i) = \frac{\overline{g(t_i)} + F(d_i)}{mean(\sum t_{ij} + 4)} \sqrt{b^2 - 4ac} \tag{7}$$

Among them, it is $\dfrac{\overline{g(t_i)} + F(d_i)}{mean(\sum t_{ij} + 4)} \leq 1$ stated that the scheme needs to be proposed, otherwise the scheme integration is $Zh(t_i)$ required, and the result is shown in Equation (8).

$$Zh(t_i) = \bigcap \left[\sum \overline{g(t_i)} + F(d_i) \right] \tag{8}$$

However, web text mining is not a panacea. Its accuracy and validity depend on a variety of factors, including the quality of the data, the choice of analytical method, and the ability to interpret the results (Shan and Wang, et al. 2019). Therefore, while online text mining provides us with a powerful tool for understanding air travel image perception, it also needs to be combined with other market research methods to ensure that the conclusions drawn are comprehensive and reliable (Yang, 2021).

$$accur(t_i) = \frac{\min[\sum \overline{g(t_i)} + F(d_i)]}{\sum \overline{g(t_i)} + F(d_i)} \times 100\% \tag{9}$$

In addition, web text mining can also be used to predict market trends. By analyzing past data and building models, it is possible to predict possible changes in consumer behavior in the future (Zhi and Wang, et al. 2023). This is essential for air travel companies to stay ahead of the curve in a competitive market.

$$accur(t_i) = \frac{\min[\sum \overline{g(t_i)} + F(d_i)]}{\sum \overline{g(t_i)} + F(d_i)} + randon(t_i) \tag{10}$$

Today, with the rapid development of information technology, the competition in the tourism industry is not only limited to the quality of service and the uniqueness of scenic spots (Kang and Xie, et al. 2023). How to shape and maintain a positive and attractive tourism destination image in the sea of information has become a challenge that local governments and tourism boards must face.

3 OPTIMIZATION STRATEGIES FOR PERCEPTUAL MEASURE STUDIES

In conclusion, online text mining provides a unique perspective for the air travel industry, allowing it to better understand and shape the public's image perception of air tourism. With the continuous advancement of technology and the increasing maturity of data analysis methods, we have reason to believe that online text mining will play an increasingly important role in the future of air travel market research. For air travel companies, mastering this technology means holding the key to winning the market.

3.1 Introduction to Perceptual Measure Research

At this time, online text mining technology came into being, which has become an important tool to measure and analyze the public's perception of the image of a specific tourist destination.

Table 1: Perceptual measurement study requirements

Scope of application	Grade	Accuracy	Perceptual measure studies
Airline	I	85.00	78.86
	II	81.97	78.45
Tourism agencies	I	83.81	81.31
	II	83.34	78.19
Government agencies	I	79.56	81.99
	II	79.10	80.11

The perceptual measure study process in Table 1. is shown in Figure 1.
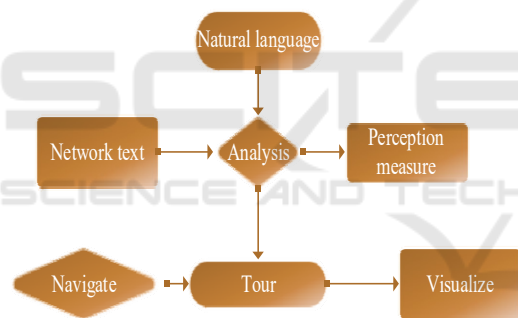

Figure 1: The analytical process of perceptual measure studies

Web text mining, in short, is the process of extracting useful information from a large amount of online text materials using computer programming techniques. This includes social media posts, blog posts, comments, and forum discussions, among others. By analyzing these texts quantitatively and qualitatively, researchers can gain insight into the real experience of visitors and understand what factors influence their satisfaction and willingness to return to visit.

3.2 Perceptual Measurement Research

For example, sentiment analysis can be used to determine the overall sentiment of visitors about their accommodation from hotel reviews, and topic modeling can be used to identify the most discussed attractions or service issues among tourists. In addition, keyword frequency analysis helps us understand which featured words or phrases are closely associated with a particular travel destination, and in turn, evaluate the visibility and attractiveness of the destination's brand image.

Table 2: Perceptual measures study protocol as a whole

Category	Random data	Reliability	Analysis rate
Airline	85.32	85.90	83.95
Tourism agencies	86.36	82.51	84.29
Government agencies	84.16	84.92	83.68
Mean	86.84	84.85	84.40
X6	83.04	86.03	84.32
		P=1.249	

3.3 Perceptual Measure Studies and Stability

But the applications of text mining on the web are much more than that. It is also able to predict travel trends and provide data support for marketing. For example, by tracking how much discussion a destination is on the web, it is possible to predict future visitor flows.
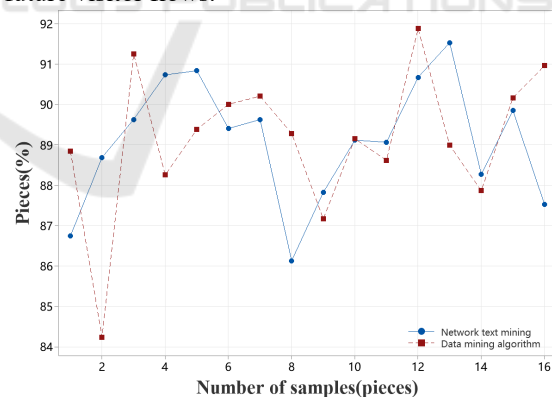

Figure 2: Study on perception measurement of different algorithms

Looking to the future, with the continuous advancement of artificial intelligence and machine learning technology, online text mining will play an increasingly important role in the field of tourism image perception measurement. This not only helps destination managers better understand and shape their brand image, but also provides a richer and more

authentic source of information for potential travelers. Eventually, network text mining will promote the development of tourism in a more personalized and intelligent direction, and realize the effective allocation of resources and the accurate docking of the market.

Table 3: Comparison of perceptual measures of study accuracy by different methods

Algorithm	Survey data	Perceptual measure studies	Magnitude of change	Error
Network text mining	85.33	85.15	82.88	84.95
Data mining algorithms	85.20	83.41	86.01	85.75
P	87.17	87.62	84.48	86.97

It's worth mentioning that web text mining is not without its challenges. The sheer volume and diversity of data brings with it the problem of noise and inaccurate information. At the same time, the limitations of natural language processing technology can also lead to misunderstandings of tourists' true intentions. Therefore, a combination of accurate data cleaning, efficient algorithm design, and manual verification is the key to ensure the accuracy of the results.
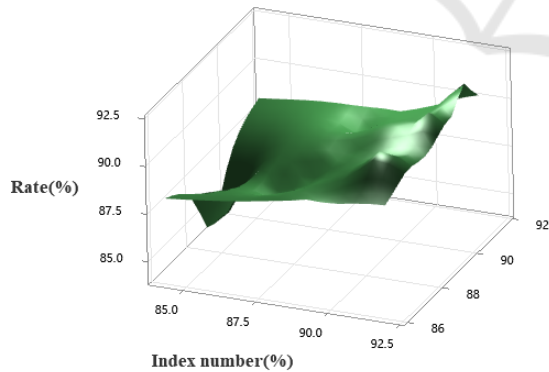

Figure 3: Research on perceptual measurement of network text mining

Network data is as vast and deep as an ocean. There is tremendous value in this data, especially for the travel industry, where understanding and analysing tourists' online comments, discussions, and behaviour patterns has become an important means of understanding the image and perception of tourism.

And online text mining technology is the key to unlocking this treasure trove of data.

3.4 The Rationality of Perceptual Measure Studies

At the same time, combined with time series analysis and geotagging data, we can also observe how specific holidays or seasonal events affect visitors' perception of the place.

In short, as an emerging data analysis method, online text mining is gradually changing our understanding and evaluation methods of tourist destination image. It not only provides us with a new perspective to observe and measure public perception, but also opens up new ways to optimize and enhance the brand impact of tourism destinations. With the in-depth application of this technology, the construction of tourism image in the future will be more scientific and data-driven, so as to better meet the needs of tourists and promote the sustainable prosperity of the global tourism industry.
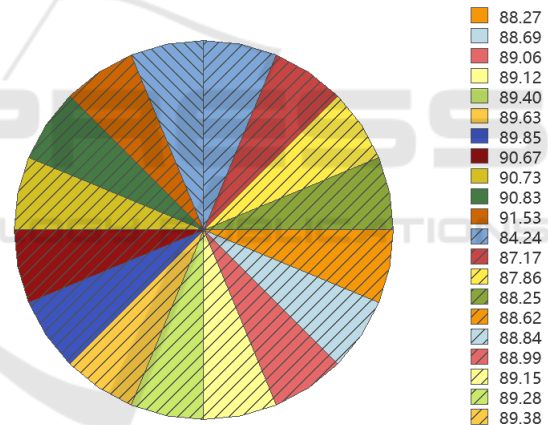

Figure 4: Perceptual measures of different algorithms

3.5 Effectiveness of Perceptual Measure Studies

Web Text Mining refers to the process of using data mining techniques and algorithms to discover valuable information from text on the Internet. In the travel sector, this means that the vast amount of user-generated content (UGC) from social media, blogs, forums and review sites can be systematically analysed to get real feedback about a destination or service.
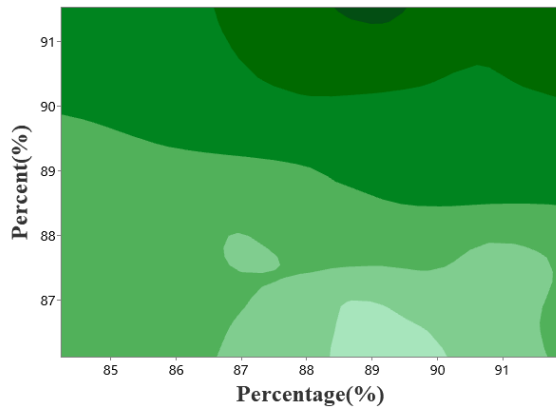
Figure 5: Perceptual measures of different algorithms

Imagine that by analyzing the reviews of a tourist destination on the Internet, we can clearly see how satisfied tourists are with the environment, culture, facilities, etc., and even find out which factors are most important to them. This is not only an affirmation or denial of existing services, but also a guide for future development. For example, if the majority of visitors are unhappy with the congestion level of a tourist attraction, the administrator may be justified in adjusting crowd control measures to improve the overall visitor experience.

Table 4: Comparison of the effectiveness of perceptual measures of different methods

Algorithm	Survey data	Perceptual measure studies	Magnitude of change	Error
Network text mining	82.21	85.92	84.59	82.85
Data mining algorithms	83.73	84.23	84.41	83.55
P	84.20	87.39	84.76	83.90

In addition, the topic model is also an indispensable tool in online text mining. It helps us identify themes and keywords that recur in many texts, providing travel planners with valuable information about current popular travel activities, common concerns among travelers, and even predicting trends that may emerge in the future.
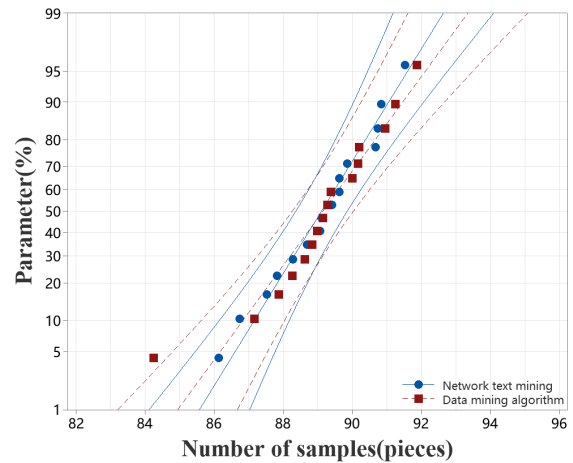

Figure 6: Research on Perceptual Measures of Network Text Mining

Another powerful aspect of web text mining lies in sentiment analysis. By judging the sentimental tendencies of online reviews, we can not only quantify the proportion of positive and negative reviews, but also track the trend of sentiment over time, which is essential for evaluating the effectiveness of marketing campaigns or monitoring the response to crisis events.

4 CONCLUSIONS

Of course, web text mining is not without its challenges. The sheer volume and diversity of data requires sophisticated algorithms to clean, classify, and parse text, and to obtain accurate and reliable results, models need to be continuously optimized to adapt to changing web languages and expressions. Online text mining provides us with a new perspective to observe and understand the image of tourism and the perception of tourists. It not only helps us capture details that were difficult to reach with traditional survey methods in the past, but also responds to changes in the market and consumers in real time. In the future, with the continuous progress and innovation of technology, online text mining will play an increasingly important role in tourism image shaping and management.

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