RESEARCH ARTICLE

Image Construction of Xi'an City Based on Sentiment Analysis Technology: Problems and Strategies

Xiaomei Shi[1] **and Jing Li**[2,*]

[1] School of Japanese Culture and Economics, Xi'an International Studies University, Xi'an 710128, China
[2] Zhongrui Hotel Management School, Shaanxi Radio and Television University, Xi'an 710075, China

Abstract

Based on sentiment analysis technology, this paper analyzes the feedback of foreign tourists visiting Xi'an. The study shows that about 85 percent of tourists have a positive and satisfactory attitude toward Xi'an tourism, and about 8.6 percent of tourists have a negative attitude. The critical comments or suggestions of foreign tourists are reflected in the following aspects: unsavoury food, poor location of hotel, improper itinerary, taking more time to walking, and not good experience in scenic spots. In response to the criticism and suggestions of foreign tourists, some strategies are proposed: at the micro level, activating existing resources and providing quality services; at the macro level, actively learning from foreign advanced experience to improve service.

Keywords: sentiment analysis technology, Xi'an, international city, feedback.

1 Introduction

At present, the construction of Xi'an city image has become an important strategy of Xi'an, which is one of the key ways for Xi'an to develop into an international city fast. In recent years, some researches have explored the strategy of constructing Xi'an city image from different perspectives. Xue [1] analyzed the image of Xi'an constructed by TikTok platform and the effect of cross-cultural communication based on the theory of cross-cultural communication, and proposed strategies for cross-cultural communication of Xi'an city image in the context of new media. Wei et al. [2] proposed that Xi'an should build a new highland of China's inland based on the context of the construction of the Silk Road Economic Belt, and then become an innovation source, cultural intersection and information dissemination center of the Silk Road Economic Belt. Niu [3] summarized the significance of the National Games for the image communication of Xi'an and proposed corresponding measures to build Xi'an image. From the perspective of cultural consciousness, Liang [4] proposed the difficulties and problems in building Xi'an city image, and countermeasures. These studies have explored the connotation, construction methods and communication strategies of Xi'an city image, which have certain positive significance for the image building of Xi'an city, but lack practical operation

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***Corresponding author:**
✉ Jing Li
1606366625@qq.com

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value.

Sentiment analysis is a natural language processing technique to explore the emotional attitude or viewpoint of a certain text. This study intends to use emotion analysis technology to analyze the relevant information filled out by foreign tourists in the tourist satisfaction questionnaire of Xi'an, quantify the emotional attitude of the information, analyze the image of Xi'an in the eyes of tourists, analyze the problems existing in the process of constructing the image of Xi'an as an international city, and put forward new ideas for the image shaping of Xi'an as an international city.

2 Application of sentiment analysis technology in information dissemination

Sentiment analysis is a natural language processing technology which is used to dig out various kinds of emotional attitudes or opinions in text. Researchers have applied sentiment analysis technology mainly to product review analysis, public opinion analysis and information prediction, and have obtained valuable research results. In terms of product review analysis, Zhang [5] compared and analyzed Western readers' acceptance of the two versions of Chinese literature The Three-Body Problem based on Python sentiment analysis, and pointed out the advantages and disadvantages of the two versions. In terms of public opinion analysis, Zhang et al. [6] studied the application of sentiment analysis technology in detecting and predicting public opinion of ethnic relations and its trend through sentiment analysis of information related to ethnic relations on the Internet, and believed that sentiment analysis technology could help relevant organizations formulate strategies to cope with changes in ethnic relations. In terms of information prediction, Kim et al. [7] collected and analyzed the comments on election prediction in the United States and built a Crystal system using the support vector machine model. The system could predict the election result according to people's comments before the election, with an accuracy rate of 81.68%.

By investigating and analyzing the emotional attitude of foreign tourists visiting Xi'an, we can objectively understand the image of Xi'an in the eyes of foreign tourists, objectively analyze the problems existing in the process of constructing the image of Xi'an as an international city, and put forward new ideas on shaping the image of Xi'an city.

3 Research Design

3.1 Research Methods

This study takes the information collected from the tourist feedback form by travel agencies as the research object, quantifies the emotional attitude contained in the collected effective information through the emotion polarity analysis function of TextBlob. Then, we select positive and negative comments by quantitative analysis, analyzing the negative comments, and put forward the suggestion on shaping the international image of Xi'an.

3.2 Research Tools

The auxiliary tool used in this study is TextBlob, a third-party program library developed by Steven Loria and his team based on Python language. It integrates Pattern and NLTK toolkit in the library, which can complete some common natural language processing (NLP) tasks, including word speech tagging, text classification, noun phrase extraction, sentiment analysis and so on. Among them, sentiment analysis, also known as opinion mining, refers to the computer information technology that can calculate and analyze text views, emotions and subjectivity. As an important way of natural language processing, the sentiment analysis can be used to complete corresponding natural language processing tasks in different texts [8]. The application of sentiment analysis technology can identify and understand the opinions and attitudes of others, so that people can actively respond to the opportunities and challenges brought by network information resources [9].

3.3 Data processing and analysis steps

1) Corpus is collected and pre-processed. In general, travel agencies require tour guides to fill up the feedback forms to visiting and return them to travel agencies in order to understand the satisfaction of tourists with travel services. We collected 500 tourist feedback forms from five travel agencies (Xi'an International Travel Service, China Comfort Travel Service, Xi'an International Travel Service, Shaanxi International Travel Service, Xi'an Spring and Autumn International Travel Service) from 2018 to 2023, from which 638 comments on Xi'an tourism were collected. We eliminated reviews that contained only one or two words (e.g., Good, Too bad) and looked for 313 valid reviews that contained at least one specific piece of information. We manually input 313 valid comments into a computer and save them individually as files. In order to ensure the accuracy and reliability of the final

data analysis results, we checked the valid comments three times.

2) TextBlob sentiment analysis. Load the TextBlob library from Python and call its sentiment analysis functionality. Because TextBlob integrates the Pattern and NLTK toolkits, it has two different sentiment analyzers, PatternAnalyzer (Lexicon-based Sentiment Analyzer) based on sentiment dictionary and NaiveBayesAnalyzer (Machine Learning-based sentiment Analyzer) based on Machine Learning Sentiment Analyzer). TextBlob's developer team mentioned in the usage notes that NaiveBayesAnalyzer, a machine learn-based sentiment analyzer, was trained by the movie reviews corpus [10].

In previous studies, Ma et al. [11]used the sentiment analyzer based on sentiment dictionary in text processing software ROST EA to analyze the emotional tendency of Chinese reviews of Douban movies. Wen et al. [12] used the sentiment analyzer Syuzhet and sentiment based on sentiment dictionary to analyze the text emotional tendency of a large number of English academic paper abstracts (with an average of 140 words per abstract). Zhang [5] used NaiveBayesAnalyzer, an emotion analyzer based on machine learning, to analyze the emotional tendency of English readers' comments. The two types of sentiment analyzer have their own applicability. The sentiment analyzer based on sentiment dictionary is suitable for analyzing all kinds of text, and the analysis results will not be affected by the differences in the types of text under test, while the sentiment analyzer based on machine learning is usually only suitable for analyzing the same type of text as the training text. Its versatility is even lower [12].

By comparing the above research, it can be found that the length and type of tourist comments discussed in this study are unique (on average, each tourist comment is 16 words). Therefore, this study is also carried out, based on the sentiment dictionary's PatternAnalyzer. As shown in Table 1, the valid tourist comment data collected from five travel agencies reveals that the average length of each comment is 16 words, which is unique for the analysis conducted in this study.

The range of emotion polarity values that can be obtained by PatternAnalyzer is between -1 and 1. 1 and -1 are the upper and lower limits of emotion values, which are absolute positive emotion and absolute negative emotion, respectively. Comments are considered positive/positive when the polarity value is between 0 and 1. When the polarity value is between -1 and 0, the comment is considered a negative/negative comment. When the polarity value is 0, the comment is considered neutral. For negative comments with polarity values close to 0, artificial judgment will be made in the later stage to ensure a clear emotional attitude.

Table 1. Valid tourist comment data in the feedback form of five travel agencies.

Travel agency	Total words in Tourist comments	Tourist comment items	Average words in each comment item
Xi'an International Travel Service	2047	89	23
China Comfort Travel Service	2060	103	20
China International Travel Service, Xi'an	672	56	12
Shaanxi International Travel Service	368	46	8
Xi'an Spring and Autumn International Travel Service	323	19	17
Total	5470	313	16

3) Analyze the research data and put forward the enlightenment for building Xi'an image.

4 Results and analysis

4.1 Overview and analysis of tourists' comments

After analyzing the emotional polarity of the 313 foreign tourists' comments collected, the data in Table 2 can be obtained statistically.

Table 2. The number and proportion of different types of comments by foreign tourists.

Comment types	Positive	Neutral	Negative
Quantity	269	17	27
Proportion	85.9%	5.4%	8.6%

Among all the comments, there were 269 positive emotion comments, accounting for 85.9%. There were 17 neutral emotion comments, accounting for 5.4%. There were 27 negative comments, accounting for 8.6%. It can be seen that the overall feeling of foreign tourists on Xi'an tourism is good, most of them hold positive comments on their Xi'an tourism, but about 10% of tourists still hold negative comments on Xi'an tourism.

Table 3. Category and proportion of negative comments in foreign tourists' comments.

Category of negative comments	Proportion	Frequency
The food is not tasty.	29.6%	8
The location of the hotel is not good.	22.2%	6
The travel itinerary is not fitful.	11.1%	3
The walking time is too long.	22.2%	6
The experience in scenic spot is not satisfactory.	14.8%	4

4.2 Tourists' negative comments and analysis

Negative comments from foreign visitors are mainly reflected in the Complaints and Suggestions sections of the feedback form. Through reading 27 negative comments from tourists, we found that the specific criticism of tourists can be divided into four categories that the food is not tasty, the location of the hotel is not good, the travel itinerary is not fitful, the walking time is too long, and the experience in scenic spot is not satisfactory. Table 3 presents statistics of negative comments by tourists.

4.2.1 Unsavoury food

In the suggestion column, the foreign tourists put forward that "food is not good enough", the specific expressions including: some dishes are too spicy, some dishes are too salty, some dishes (mainly pasta) are too much. We also asked some of the guides, who said that foreign tourists generally do not complain about the food problems, if you talk to them carefully, they will honestly give some suggestions. As one tourist said, "Tourists enjoy trying different local foods, but if I had to give some advice, I think it is important to consider the main differences between the local food and the food enjoyed by most people in the world." It would be better if the distinctive features of local cuisine were slightly more like those enjoyed by most people around the world. Another tourist said, "In fact, it is not difficult to improve. Xi'an local food is spicy, salty, you just make it not too spicy, not too salty, it is OK."

4.2.2 Poor location of the hotel

Foreign tourists complain that the location of the hotel is not good, mainly referring to that the hotel is too far away from the tourist destination. Some foreign tourists pointed out that the hotel is very remote and that they can not see the bustling street.

4.2.3 Improper schedule

Some tourists think Xi'an's schedule is too tight. Most tourists only have one day in Xi'an, and tourists can only visit the scenic spots in Xi'an, and they can't learn more about Xi'an from more aspects.

4.2.4 Taking more time to walking

Foreign visitors feel that it wake them more time to walk in three cases. First, the distance from the exit of the railway station and high-speed railway station to the parking lot is too far, so the tourists have to walk for more than 20 minutes with their luggage. Second, the tour bus do not stop at the door of some hotels located in downtown areas, so tourists have to pull luggage to walk about 10 minutes to reach the tour bus stop. Third, the distance between the parking station of the tourist attraction and the core area of the scenic spot is too long, so tourists have to walk more than 20 minutes. For example, when visiting the Terracotta Warriors scenic spot, tourists have to spend even more than 30 minutes walking from the parking lot to the core area of the scenic spot.

4.2.5 Discomfort experience in scenic spot

First of all, there are too many people in the scenic spot and there is a lack of reasonable guidance mechanism. Some tourists suggested that the museum of Terracotta Warriors and Horses can add several duty posts to guide tourists to visit in an orderly manner. They said they could learn from the experience of the British Museum and the Louvre Palace Museum by adding several duty posts and urging visitors to line up and move forward, and not to stay in a certain position for too long. Secondly, some tourists complained that the exhibition halls of the Shaanxi History Museum and the Xi'an Museum did not have air conditioning. Third, some elderly tourists complain that many scenic spots do not have wheelchair services or wheelchair services are too few.

5 Strategies for shaping Xi'an city image

5.1 At the micro level, activating existing resources and providing quality services

Tourism, in essence, is to provide a service to tourists. Tourism services are specific forms of expression presented by tourism practitioners through various facilities, equipment, methods, and means. The specific measures should be able to meet their physical

and psychological material and spiritual needs, and create some atmosphere, so that tourists can produce some spiritual psychological effects, so as to touch tourists' emotions and arouse tourists' psychological resonance. Good tourism services can make tourists feel comfortable and happy, and then they are willing to communicate, and consume. Various facilities, equipment, methods, means and approaches of tourist destinations can present specific services.

In view of the negative comments of foreign tourists on Xi'an tourism, we need to combine the specific manifestations of Xi'an's various tourism facilities, equipment, methods, means and approaches, optimizing the current resources, and promoting the output of quality services.

At the micro level, we can improve services that it is easy to operate. For example, in response to tourists' negative comments on the spicy, salty and large quantity of Xi'an food, we can easily give improvement strategies. For another example, in view of the tourists' lack of demand for wheelchairs in scenic spots, we can configure some wheelchairs, and give relevant service descriptions in prominent places of scenic spots for tourists to choose to use. Moreover, the details of wheelchair services can be colorful, such as providing both wheelchair services pushed by people and wheelchair services pushed by relatives and friends of tourists.

5.2 At the macro level, actively learning from foreign advanced experience to improve service quality

On the one hand, we need to listen to the reasonable suggestions of foreign tourists, and consider the location of the hotel, the tour route of the tourist attraction, and the service facilities of the station from a macro perspective. We need to consider whether there is room for improvement of existing resources in order to provide visitors with convenient, fast and orderly services.

On the other hand, we need to listen to the reasonable suggestions of foreign tourists, and carefully understand the advanced experience of foreign countries, and gradually follow suit, and then explore the operation method to meet the actual needs. For example, the Museum of Terracotta Warriors and Horses, the British Museum and the Louvre Palace Museum are all hot tourist spots, and they all have the problem of large flow of people. Then, the museum of Terracotta Warriors and Horses can learn from the advanced experience of the British Museum and the Louvre Palace Museum to solve the problem of large flow of people in the scenic spot.

6 Conclusion

This study shows that the feedback of foreign tourists after sentiment analysis shows that the overall satisfaction of foreign tourists to Xi'an is that about 85% of tourists have a positive and satisfactory attitude towards Xi'an tourism, and about 8.6% of tourists have a negative attitude. The critical comments or suggestions of foreign tourists to Xi'an are reflected in the following aspects: unsavoury food, poor location of hotel, improper itinerary, taking more time to walking, and not good experience in scenic spots. In response to the criticism and suggestions of foreign tourists, we can improve from two aspects: at the micro level, activating existing resources and providing quality services; at the macro level, actively learning from foreign advanced experience to improve service quality.

Data Availability Statement

Data will be made available on request.

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Conflicts of Interest

The authors declare no conflicts of interest.

Ethical Approval and Consent to Participate

Not applicable.

References

[1] Xue, Q. (2020). Study on cross-cultural communication effect of Xi'an international city image in the context of new media. *Science and Technology Communication*, (21), 66–68.

[2] Wei, L., & Dai, J. (2015). Path selection of Xi'an to become an international city under the background of Silk Road Economic Belt. *Journal of Northwest University (Philosophy and Social Sciences Edition)*, 45(4), 28–36.

[3] Niu, W. (2019). Analysis on image communication of Xi'an international metropolis during the 14th National Games. *World of Sports (Academic Edition)*, (6), 37–38.

[4] Liang, H. (2015). Positioning and shaping of Xi'an's urban image under the background of international

metropolis: An analysis from the perspective of "cultural consciousness". *Journal of Weinan Normal University*, (21), 25–28.

[5] Zhang, L. (2019). Western readers' acceptance and criticism of Chinese translated literature from the perspective of Python sentiment analysis: A case study of the Three-Body Problem. *Foreign Language Research*, (4), 80–86.

[6] Zhang, J., Huang, H., & Zhang, F. (2019). Research on ethnic relations monitoring and early warning based on network public opinion emotion analysis. *Qinghai Social Sciences*, (4), 21–28.

[7] Kim, S. M., & Hovy, E. (2007). Analyzing predictive opinions on the web. In *Proceedings of the 2007 Joint Conference on Empirical Methods in Natural Language Processing and Computational Natural Language Learning* (*EMNLP-CoNLL*) (pp. 1056–1064). [CrossRef]

[8] Pang, B., & Lee, L. (2004). A sentimental education: Sentiment analysis using subjectivity summarization based on minimum cuts. In *Proceedings of the 42nd Annual Meeting of the Association for Computational Linguistics* (pp. 271–278). [CrossRef]

[9] Pang, B., & Lee, L. (2008). Opinion mining and sentiment analysis. *Foundations and Trends in Information Retrieval*, 2(1–2), 1–135. [CrossRef]

[10] Loria, S. (2020). *Textblob documentation, release 0.16.0*. Retrieved from https://textblob.readthedocs.io/_/downloads/en/dev/pdf/

[11] Ma, S. Y., & Xu, X. (2016). Research on online user evaluation based on comment sentiment analysis: A case study of Douban.com movies. *Library and Information Work*, (10), 95–102.

[12] Wen, J. U., & Lei, L. (2022). Linguistic positivity bias in academic writing: A large-scale diachronic study in life sciences across 50 years. *Applied Linguistics, 43*(2), 340-364. [CrossRef]

Xiaomei Shi , an associate professor, School of Japanese Cultural Economics, Xi'an International Studies University. Her research interests include translation theory and practice, comparison between Chinese and foreign cultures. (Email: scr2009@aliyun.com)

Jing Li , an associate professor at Zhongrui Hotel Management School, Shaanxi Radio and Television University. Her research interests include translation theory and practice. (Email: 1606366625@qq.com)