

Research on International Communication of Chinese Ceramic Culture Based on Sentiment Analysis

Xin Liu¹, Xinyao Qiu¹, Ziheng An²

¹School of International Culture and Communication, Jingdezhen Ceramic University, Jingdezhen, China;

²School of Information Engineering, Jingdezhen Ceramic University, Jingdezhen, China

ABSTRACT

Chinese ceramic culture, which is playing a crucial role in interpreting Chinese culture and history, has a profound impact on global civilization. This paper focuses on audiences' sentiment evaluation of the international communication of Chinese ceramic culture. It employs sentiment analysis techniques to study differences in emotional attitudes among audiences from different countries, influential communication contents, and reasons for negative evaluations. The research finds that factors like product quality, cultural misunderstandings, and communication methods play crucial roles in shaping audiences' sentiment. By analyzing text data from various sources, the paper provides strategies to enhance the international communication of Chinese ceramic culture. These findings not only offer data support but also hold practical value for promoting quantitative research in this field.

KEYWORDS

Ceramic Culture; Sentiment Analysis; International Communication

1 Introduction

The research object of this work is audiences' sentiment evaluation of the international communication of Chinese ceramic culture. This research aims to understand the emotional attitudes of international audiences towards Chinese ceramic culture by means of empirical data and sentiment analysis technology. The research team studied key issues in the international communication of Chinese ceramic culture, such as differences in emotional attitudes of audiences in different countries and regions, the influence of communication channels and content, and the reasons for negative evaluations, so as to provide accurate optimization strategies for its international communication.

2 Sentiment Analysis

Sentiment analysis refers to the use of natural language processing, text mining, and computational linguistics methods to systematically identify, extract, quantify, and study the subjective sentiment information of text.

2.1 Applications of Sentiment Analysis

Common applications of sentiment analysis include social media monitoring, customer feedback analysis, product review analysis, movie and book review analysis, public opinion analysis, and other fields. Martin J.R. and White P.R.R. (2005) proposed in *The Language of Evaluation: Appraisal in English* that showing emotional states (affect), making judgments on others (judgment), and expressing aesthetic viewpoints (appreciation) constitute an important way for us to convey emotions and viewpoints, and these are exactly the research objects of sentiment analysis^[1]. Initially, sentiment analysis research mainly focused on movie reviews, book reviews, and product consumer reviews (Turney 2002, Kennedy & Inkpen 2006)^[2-3]. The research findings of sentiment analysis can be applied in search engines, product brands, policies and guidelines, and other aspects. For example, companies of search engines use natural language processing algorithms to conduct sentiment analysis on a large number of movie review contents in order to identify keywords, phrases, and sentence patterns expressing emotional tendencies. According to the automatic classification results, search engines can provide users with more targeted search result displays. Sentiment analysis is of great significance for both merchants and consumers. For consumers, by viewing the evaluations of products or services by other consumers, they can understand the advantages and disadvantages of products or services and choose products or services more wisely. For merchants, by tracking consumer feedback on products or services, they can continuously improve the quality of products or services; they can also know the evaluations of competitors' products or services and develop better marketing strategies to enhance their market competitiveness. In terms of policy formulation, opinion pollsters can identify the sentiment of online discussion texts through sentiment analysis technology and understand the public's views and opinions on policies, which is more flexible and efficient than traditional questionnaire surveys (Mullen & Malouf 2006, Bakliwal et al. 2013)^[4-5].

Chinese ceramic culture, carrying thousands of years of civilization and interpreting Chinese history, not only enriches China's cultural life but also has a profound impact on global civilization. Therefore, we should attach importance to the role of Chinese ceramic culture in international communication and make it an important messenger to show China's charm and promote cultural exchanges. Data mining and data analysis are commonly used research methods in international communication. Through sentiment analysis, topic modeling, time series analysis, logistic regression analysis, social network analysis, one-way analysis of variance, and Pearson correlation analysis, hot news topics can be discovered, the changes of public opinion over time can be observed, the trends of public opinion can be predicted, the information dissemination path can be found, and the influencing factors of communication effects can be determined. With the widespread popularity of the Internet, it is more and more convenient for people to express their views online. Social media, forums, blogs and other online platforms have become important channels for people to express their views, share experiences and insights. During the past twenty years or so, scholars have begun to pay attention to the way that netizens express their views online, thus opening up the interdisciplinary research field of computational linguistics and computer science — sentiment analysis, also known as opinion mining in the field of data mining and big data research.

2.2 Approaches of Sentiment Analysis

At present, there are mainly two methods for sentiment analysis: machine learning method and dictionary-based method. The machine learning method uses a large amount of text data with labeled sentiment tendencies for training, allowing the computer to automatically learn the relationship between text features and sentiment tendencies. For example, a large number of review texts with positive, negative, or neutral labels can be collected. Through algorithms, these texts are analyzed to extract features such as vocabulary, grammatical structure, and semantic relations. Then, these features are used to train a classification model such as Support Vector Machine or Naive Bayes classifier. When there is new text that needs sentiment analysis, this trained model can determine its sentiment tendency based on the features extracted from the new text. Ian H. Witten and Eibe Frank developed an open source machine learning and data mining software WEKA (Waikato Environment for Knowledge Analysis) in 2005. In the field of sentiment analysis, WEKA can be used to build classifiers to determine the sentiment polarity of text (Witten & Frank, 2005)^[6]. However, machine learning method has weak applicability and needs to be trained on specific data, and it is usually difficult to apply it to new text sources. The Stanford Deep Learning for Sentiment Analysis Model can avoid the disadvantage of weak applicability because it labels not documents or sentences but phrases and their parsing information. While the classifier learns grammatical information, it also learns to recognize the sentiment polarity of individual words.

The dictionary-based method uses a pre-built sentiment dictionary. When conducting sentiment analysis, the words in the text are matched with the sentiment dictionary, and the sentiment of the entire text is determined according to the sentiment polarity of the matched words. Compared to machine learning method, dictionary-based method has strong applicability and can be applied to different new text sources (Taboada et al. 2011)^[7]. Adjectives, nouns, verbs, adverbs, and phrases containing these words in texts can convey text sentiment information. The dictionaries used for sentiment analysis not only contain the sentiment polarity of words but also include the intensity information of sentiment polarity.

3 International Communication of Chinese Ceramic Culture

Most studies on the international communication of Chinese ceramic culture are conducted from perspectives such as historical culture, artistic aesthetics, economic trade, cross-cultural communication, and communication modes. Wang Min and Zhou Zhenzhen (2019) proved the view that ceramic culture is a breakthrough in constructing Jiangxi's international media image through communication text analysis and historical process analysis^[8]. Ceramic culture conforms to the psychological selective contact, selective understanding, and halo effect of communication audiences, and ceramic culture is closely related to a country's image. Deng Hongchun and Ma Yuehua (2023) took Jingdezhen's latest city promotional video "This is Jingdezhen in China" as an example and discussed the success of its narrative strategy from four aspects: accurate city positioning, taking ceramic culture as the core, an audio-visual entertainment feast, and making good use of opinion leaders^[9]. The number of research papers on the international communication of Chinese ceramic culture is relatively scarce. At present, data mining and data analysis are mainly applied in ceramic material research and ceramic industry research. However, there is a lack of research on the international communication of Chinese ceramic culture based on data mining and data analysis.

3.1 Sentiment Differences of Different Countries

Due to differences in cultural backgrounds, historical traditions, aesthetic concepts, and other aspects, audiences from

different countries and regions may have significantly different emotional attitudes towards Chinese ceramic culture. Through an in-depth analysis of the differences in emotional attitudes of audiences from different countries and regions, it is possible to provide accurate strategic guidance for the international communication of Chinese ceramic culture, meet the needs of different audience groups, and further enhance the international influence of Chinese ceramic culture. The research team widely collected data such as social media comments, online forum discussions, and comments on e-commerce platforms from different countries and regions. We used tools such as web crawlers to obtain text data related to Chinese ceramic culture from international mainstream social media platforms, such as Facebook, Twitter, Instagram, etc., well-known art and culture forums, and major global e-commerce platforms. A dictionary-based text sentiment analysis method was adopted to judge the sentiment tendency of the collected data and determine whether the sentiment expressed in the text is positive, negative, or neutral. For audience data from different countries and regions, we calculated the proportions of positive sentiment, negative sentiment, and neutral sentiment respectively to quantify the emotional attitudes of the audience. Through understanding the differences in their performance in terms of liking degree, cognitive depth, and value recognition of Chinese ceramic culture, and analyzing the reasons for the differences, we can adjust international communication strategies in a targeted manner and meet the needs of different audience groups.

3.2 Influential Communication Contents

By comparing the audience feedback triggered by the content of Chinese ceramic culture disseminated through different communication channels, such as social media platforms, online forums, e-commerce platforms, etc., we can determine which channels and specific communication contents, such as explanations of ceramic history, displays of ceramic craftsmanship, ceramic innovation designs, etc., can more effectively attract audience attention and stimulate positive emotional attitudes, so as to optimize the allocation of communication resources. The research team analyzed the topic discussions, comments, and likes related to Chinese ceramic culture on social media platforms and online forums, as well as data such as the views, comments, and bullet screens of videos related to Chinese ceramic culture on video websites. In text sentiment analysis, in addition to lexical expressions, emoticons and punctuation marks can also convey people's various emotions and emotional intensities. Feature extraction is an important link in text sentiment analysis, which involves extracting valuable information from text data. We used word frequency statistics, part-of-speech tagging, and Bag of Words (BoW) feature extraction methods for evaluating text feature extraction. By counting the frequency of occurrence of each word in the text, we can understand which words are more common when describing Chinese ceramic culture. Part-of-speech tagging can help us better understand the grammatical structure and semantic information of the text. When analyzing texts about Chinese ceramic culture, words of different parts of speech often convey different emotional tendencies. For example, adjectives are usually used to describe the appearance and quality characteristics of ceramics, such as "beautiful ceramics" and "exquisite craftsmanship"; verbs may reflect the ceramic production process or people's behaviors towards ceramics, such as "appreciate ceramics" and "make ceramics"; nouns cover aspects such as the types, styles, and historical periods of ceramics, such as "blue and white porcelain" and "ceramics of the Song Dynasty". The bag-of-words method regards text as a set composed of words, ignoring the order and grammatical relationship of words. By constructing a bag-of-words model, text can be transformed into vector representation, which is convenient for subsequent sentiment analysis and classification.

3.3 Reason Analysis of Negative Sentiment

The research team thoroughly studied the negative evaluations in the network comment data and analyzed whether they are caused by product quality issues, cultural misunderstanding, improper communication methods, or other factors, so as to take corresponding measures for improvement and enhance the overall effect and reputation of the international communication of Chinese ceramic culture. For negative evaluations, through keyword extraction and topic analysis, we can find out the frequently occurring problem keywords. For example, keywords such as "fragile" and "wrong color" appear frequently, it may indicate that there are product quality issues; if there are more keywords such as "don't understand the meaning of patterns" and "don't like the style", it may be caused by cultural misunderstanding. A comparative analysis of negative evaluations was conducted under different communication channels. We analyzed which aspects the negative evaluations on social media mainly focus on and what are the characteristics of the negative evaluations on e-commerce platforms, so as to determine the possible problems in different channels. On e-commerce platforms, negative evaluations mainly center around product quality, shipping issues, and customer service. Delayed shipping, damaged products during transit, and unresponsive customer service can all lead to negative reviews. To address these issues and enhance the overall effect and reputation of the international communication of Chinese ceramic culture, the following measures can be taken. For product quality issues, manufacturers should implement stricter quality control measures and ensure that products meet international standards. In terms of cultural

misunderstandings, efforts should be made to provide more detailed explanations and context about the cultural significance of ceramic patterns and styles through various communication channels. This could include educational videos, blog posts, and interactive exhibits. For improper communication methods, market research should be conducted to understand the preferences and communication styles of different target audiences, and communication strategies should be adjusted accordingly.

4 Conclusion

The research results based on data mining and data analysis can expand the application fields of data mining and data analysis technologies, provide data support for government departments and cultural institutions when formulating international communication strategies for Chinese ceramic culture. The findings can help communicators of Chinese ceramic culture optimize communication strategies, such as improving the quality of communication content, enhancing the interactivity of communication methods, and improving the evaluability of communication effects. The application of data mining and data analysis in the international communication research of Chinese ceramic culture shows the practical value of these methods in the field of international communication by processing big data through data mining technology, and helps to promote the application of quantitative research methods in international communication research.

Funding

2024 Undergraduate Innovation and Entrepreneurship Training Program, National-level Project of Jingdezhen Ceramic University, "Investigation and Research on the Current Situation of International Communication of Chinese Ceramic Culture on Social Media", Project No.202410408016; 2024 Humanities and Social Sciences Research Project in Colleges and Universities in Jiangxi Province, "Research on Audience Reviews of Chinese Ceramic Culture International Communication Based on Text Sentiment Analysis", Project No. XW24204; Jingdezhen Association for Science and Technology Innovation Project, "Research on the Innovation of the International Communication Model of Jingdezhen Ceramic Culture Empowered by Digital Technology"; Jingdezhen Ceramic University Teaching Reform Research Project, "Research on the Teaching Practice of Telling Ceramic Stories Well in Language Courses under the Background of Building a Culturally Strong Country", Project No. TDJG-24-YY02.

References

- [1] James Robert Martin, Peter Robert Rupert White. *The Language of Evaluation: Appraisal in English* [M]. London: Palgrave Macmillan, 2005.
- [2] Peter David Turney. Thumbs up or thumbs down? Semantic orientation applied to unsupervised classification of reviews [C]. *Proceedings of the 40th Annual Meeting of the Association for Computational Linguistics*. 2002, Philadelphia, Pennsylvania, 417-424.
- [3] Alistair Kennedy, Diana Inkpen. Sentiment classification of movie reviews using contextual valence shifters [J]. *Computational Intelligence*. 2006, Volume 22, Issue 2, 110-125.
- [4] Tony Mullen, Robert Malouf. A Preliminary Investigation into Sentiment Analysis of Informal Political Discourse [C]. *AAAI Spring Symposium: Computational Approaches to Analyzing Weblogs*. 2006, 159-162.
- [5] Bakliwal Akshat, et al. Sentiment analysis of political tweets: towards an accurate classifier [J]. *Proceedings of the NAACL Workshop on Language Analysis in Social Media*. 2013, Association for Computational Linguistics, Atlanta, Georgia, 49-58.
- [6] Ian Hugh Witten, Eibe Frank. *Data Mining: Practical Machine Learning Tools and Techniques* [M]. Burlington: Morgan Kaufmann, 2005.
- [7] Maite Taboada, et al. Lexicon-based methods for sentiment analysis [J]. *Computational Linguistics*. 2011, Volume 37, Issue 2, 267-307.
- [8] Wang Min, Zhou Zhenzhen. Opportunities for Constructing Jiangxi Province's International Media Image: Ceramic Culture and Communication under the Background of "the Belt and Road" [J]. *Research on Transmission Competence*. 2019, Volume 3, Issue 34, 16-17.
- [9] Deng Hongchun, Ma Yuehua. City promotional videos help build the international communication capacity of Jingdezhen ceramic culture [J]. *Ceramics Science & Art*. 2023, Volume 57, Issue 10, 20-21.