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中国经济型酒店在线客人评论的细粒度情绪分析

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A fine-grained sentiment analysis of online guest reviews of economy hotels in China

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ABSTRACT

This study aims to investigate the experiences of Chinese economy hotel guests by applying deep learning fine-grained sentiment analysis on 363,723 Chinese-text online reviews. Findings reveal that location is the domain that most of the positive sentiments are associated, followed by facilities, service, price, image, and reservation experience. Prominent features with negative sentiments include sound insulation, air conditioning, beddings, windows, toilets, TV sets, WiFi signals, towels, elevators, hair dryers, slippers, toilet bowls, return cash, invoices. Positive and negative sentiments are compared. This research offers an alternative approach and a more comprehensive understanding of the experiences and sentiments of Chinese economy hotel guests. Theoretical contributions and practical implications regarding economy hotel management are discussed.

本研究旨在运用深度学习精细情感分析的方法，对网上的363,723条中文评论进行调查，以了解中国经济型酒店客人的体验。研究结果显示，最受好评的是地点，其次是设施、服务、价格、形象和预订体验。负面情绪的主要特征包括隔音、空调、床上用品、窗户、厕所、电视机、WiFi信号、毛巾、电梯、吹风机、拖鞋、抽水马桶、退换现金、发票。比较正面情绪和负面情绪。本研究为中国经济型酒店客人的体验和感受提供了另一种方法和更全面的理解。讨论了经济型酒店管理的理论贡献和实践意义。

KEYWORDS

economy hotel; online reviews; guest experience; fine-grained sentiment analysis; deep learning; China

Introduction

Economy hotels, often called as limited service hotels or budget hotels, have been identified as an important and distinctive segment in the travel and hospitality industry since the mid-1990 s (Fiorentino, 1995). In general, an economy hotel provides simple and comfortable accommodation at a modest price, and operates on the principles of economies of scale and standardization (Lei et al., 2019). With a unique market position of offering good service quality and value for money, the economy hotel sector has successfully captured a varied customer segment and is rapidly growing across the world. Since 2000, economy hotels in China have rapidly developed in high demand driven by the rise of affluent Chinese households and the rapid development of infrastructure in the country (Gu et al., 2012). With an overall increase in disposable income among Chinese citizens, the economy hotel

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中国经济型酒店在线客人评论的细粒度情绪分析

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摘要

本研究旨在通过对363723篇中文在线评论进行深度学习细粒度情绪分析，调查中国经济型酒店客人的体验。调查结果显示，大多数积极情绪都与地点有关，其次是设施、服务、价格、形象和预订体验。负面情绪的突出特征包括隔音、空调、床上用品、窗户、卫生间、电视机、WiFi信号、毛巾、电梯、吹风机、拖鞋、马桶、退换现金、发票。比较积极情绪和消极情绪。本研究为中国经济型酒店客人的体验和情感提供了一种替代方法和更全面的理解。讨论了经济型酒店管理的理论贡献和实践意义。

本研究旨在运用深度学习精细情感分析的方法，对网上的363,723条中文评论进行调查，以了解中国经济型酒店客人的体验。研究结果显示，最受好评的是地点，其次是设施、服务、价格、形象和预订体验。负面情绪的主要特征包括隔音、空调、床上用品、窗户、厕所、电视机、WiFi信号、毛巾、电梯、吹风机、拖鞋、抽水马桶、退换现金、发票。比较正面情绪和负面情绪。本研究为中国经济型酒店客人的体验和感受提供了另一种方法和更全面的理解。讨论了经济型酒店管理的理论贡献和实践意义。

关键词

经济型酒店；在线评论；客人体验；细粒度情绪分析；深度学习；中国

简介

经济型酒店，通常被称为有限服务酒店或经济型酒店，自20世纪90年代中期以来一直被认为是旅游和酒店业中一个重要而独特的细分市场（佛罗伦萨，1995年）。一般来说，经济型酒店以适中的价格提供简单舒适的住宿，并按照规模经济和标准化原则运营（Lei等人，2019年）。凭借提供优质服务 and 物有所值的独特市场地位，经济型酒店行业成功地抓住了各种各样的客户群体，并在全球迅速增长。自2000年以来，在中国富裕家庭的崛起和基础设施的快速发展的推动下，中国的经济型酒店在高需求中快速发展（Gu等人，2012）。随着中国公民可支配收入的全面增加，经济型酒店

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sector in the country has a high potential for continuous growth in companies, brands, quantities, and social effects (J. Peng et al., 2015). China is not the same as the American and British markets, since the population is huge. Also, Chinese culture is rather unique and there is an extremely uneven divide between the poor and the rich (X. R. Li et al., 2011). Identifying and understanding the operational characteristics and customer expectations is critical for the success of economy hotels in China.

The nature of the economy hotel determines the challenges that have to be addressed for the sector to survive and further develop while competing with luxury or full-service hotels. Economy hotels need to focus on the utility of hotel stay and refine their service packages to satisfy customers' critical needs within a price limit because the consumption value of a night's stay should be increased to balance the room rate (H. Q. Zhang et al., 2013). Thus, customer experience is a fundamental concept in service-dominated hotel management and is the new engine of economic growth for hotel chains (Pine & Gilmore, 2011). Changing customer expectations and increasing market competition in the economy hotel category have drawn managers' attention to the importance of customer experience, in which competitive advantages can be fostered for this hotel sector. However, traditional hospitality studies have mostly focused on customer experience in upper-scale or luxury hotels, and relatively little research attention has been paid to economy hotels.

Online platforms provide excellent tools for tourists to express their satisfaction level with the hotel stay experience, or even relieve their dissatisfactory criticisms (García-Pablos et al., 2016). For economy hotel brands, online travel agents (OTAs), booking platforms or social media are critical marketing tools due to the low monetary cost and high benefits in advancing consumers' emotional or hedonic experience with the brand (Su et al., 2015). Potential customers of economy hotels spend much time reading other people's online reviews to assist in making their own decisions (Schuckert et al., 2015). Online reviews related to services and customer satisfaction play a vital role in online sales of economy hotels. Therefore, studying online guest reviews proves to be an effective approach to understanding customer experience with economy hotels.

Sentiment analysis refers to natural language processing and text analysis to identify and extract evidence of subjective and emotional evaluations from the sources (Pang & Lee, 2005). Most of the current approaches for sentiment analysis in the tourism field have focused on rough analysis. As opinion mining and sentiment analysis research has evolved in both technique sophistication and analysis depth, fine-grained sentiment analysis takes into phrase-level and word-level topics and features associated with sentiment polarity and intensity consideration. It is timing to understand customer experience using this advanced sentimental analysis method (J. Li et al., 2018).

Furthermore, sentiment analysis of hotel guests' online reviews in English has undergone major developments in recent years. However, sentiment analysis research on Chinese tourism has not evolved significantly despite the exponential growth of emerging consumer markets in China. Thus, we used deep and advanced learning technologies to analyze online reviews of economy hotels in China. The purpose of the study is to analyze the experience of Chinese consumers with respect to economy hotels through deep and fine-grained learning sentiment analysis. The four main objectives of this study are: 1) to understand the general sentiments of guests at economy hotels by analyzing online reviews; 2) to identify the satisfactory features and the positive sentiments related to these features; 3) to identify the

中国的行业在公司、品牌、数量和社会影响方面具有持续增长的高潜力 (J. Peng等人, 2015年)。中国与英国和美国市场不同, 因为中国人口众多。此外, 中国文化相当独特, 贫富差距极不平衡 (李克强等人, 2011年)。识别和理解经济型酒店的运营特点和客户期望对经济型酒店在中国的成功至关重要。

经济型酒店的性质决定了该行业在与豪华酒店或全方位服务酒店竞争的同时, 为了生存和进一步发展, 必须应对的挑战。经济型酒店需要关注酒店住宿的效用, 并完善其服务包, 以在价格限制内满足客户的关键需求, 因为一晚住宿的消费价值应该增加, 以平衡房价 (H. Q. Zhang et al., 2013)。因此, 顾客体验是服务主导型酒店管理的一个基本概念, 也是连锁酒店经济增长的新引擎 (Pine & Gilmore, 2011)。经济型酒店类别中不断变化的客户期望和日益激烈的市场竞争已经引起了管理者对客户体验重要性的关注, 在这一点上, 可以为该酒店行业培育竞争优势。然而, 传统的酒店业研究大多集中在高档酒店或豪华酒店的顾客体验上, 对经济型酒店的研究相对较少。

在线平台为游客提供了极好的工具, 可以表达他们对酒店住宿体验的满意程度, 甚至重新体验他们不满意的批评者 (García-Pablos等人, 2016年)。对于经济型酒店品牌而言, 在线旅行社 (OTA)、预订平台或社交媒体是关键的营销工具, 因为在提升消费者对该品牌的情感或享乐体验方面, 它们的货币成本低, 收益高 (Su等人, 2015年)。经济型酒店的潜在客户花费大量时间阅读他人的在线评论, 以帮助他们做出自己的决定 (Schuckert等人, 2015年)。与服务和客户满意度相关的在线评论在经济型酒店的在线销售中起着至关重要的作用。因此, 研究在线客人评论被证明是了解经济型酒店客户体验的有效方法。

情感分析指的是自然语言处理和文本分析, 以识别并从来源中提取主观和情感评价的证据 (Pang & Lee, 2005)。目前旅游领域的情绪分析方法大多侧重于粗略分析。随着观点挖掘和情绪分析研究在技术成熟度和分析深度方面的发展, 细粒度情绪分析考虑了短语级和词级主题以及与情绪极性和强度考虑相关的特征。现在正是使用这种高级情感分析方法了解客户体验的时机 (J. Li等人, 2018年)。

此外, 近年来, 酒店客人在线评论的英语情绪分析也取得了重大进展。然而, 尽管中国新兴消费市场呈指数级增长, 但对中国旅游业的情绪分析研究尚未取得显著进展。因此, 我们使用深度和先进的学习技术来分析中国经济型酒店的在线评论。本研究旨在通过深入细致的学习情绪分析, 分析中国消费者对经济型酒店的体验。本研究的四个主要目标是: 1) 通过分析在线评论, 了解经济型酒店客人的总体情绪; 2) 确定令人满意的特征以及与这些特征相关的积极情绪; 3) 确定

dissatisfactory features and the negative sentiments related to these features; and, 4) to compare positive sentiments and negative sentiments.

This study distinguishes itself by adopting an advanced sentiment extraction method to probe into the subtle experiences of economy hotel customers. By introducing deep learning to extract opinion from reviews, this research intends to improve the accuracy and effectiveness of analyzing online reviews about economy hotels and ensures that the voice of the customer is understood correctly and effectively (Rouliez et al., 2019).

The rest of this paper is structured as follows. Section 2 reviews existing literature on economy hotels, hotel guest experience, and customer sentiments and emotions in the service context. Section 3 introduces the research design of fine-grained sentiment analysis. The results of guests' positive and negative sentiments are presented in section 4. Section 5 discusses and compares the findings with past studies. Contributions are summarized in Section 6. Last but not least, Section 7 concludes this paper with limitations and future research directions.

Literature review

Studies on economy hotels

While the operation of economy hotels across countries might vary slightly, the main difference between economy hotels and upscale hotels is the price and the scope of services offered (Brotherton, 2004). Economy hotels have a relatively lower tariff structure and the range of facilities and services available are minimal. The existing findings can be largely divided into two different segments. First, some studies offer a supply-side perspective of the operation of economy hotels. This group of research views economy hotels as a part of the industrial sector. The researchers explore management principles and business models for operational success. Researches have explored the critical success factors that have an impact on the performance of economy hotels (Brotherton, 2004; H. Q. Zhang et al., 2013). In terms of distribution channels, economy hotel customers in China prefer making reservations through offline channels as they share a close relationship with traditional travel agencies (Lei et al., 2019). Yan et al. (2015) found that lease rentals and human resources are overvalued, while franchise fee and refurbishment cost are undervalued in the control costs of economy hotel sector. In China, it is observed that domestic private economy hotels benefit the most from managerial ties and also use a mixture of business ties to acquire intangible resources at different growth stages (Hsu et al., 2012, 2015). To understand human resource management, Shen and Huang (2012) investigated job burnout and life satisfaction among domestic migrant workers, who account for a large portion of the staff in these hotels.

With the availability of online data, several earlier studies focused on monitoring and managing consumers' electronic word of mouth (WOM) about economy hotels (Su et al., 2015). L. Li et al. (2017) found that consumers have a favorable image of economy hotel chains in China. In terms of e-marketing, Kuo et al. (2015) stated that misleading hotel website photos result in negative brand trust for these hotels. Guo et al. (2017) identified several important non-price dimensions including bathroom and checking in and out that are taken into consideration by customers while rating to two and three star hotels.

不满意的特征以及与这些特征相关的负面情绪；4) 比较积极情绪和消极情绪。

本研究采用了一种先进的情绪提取方法，对经济型酒店顾客的微妙体验进行了探索。通过引入深度学习从评论中提取意见，本研究旨在提高分析经济型酒店在线评论的准确性和有效性，并确保正确有效地理解客户的声音 (Rouliez等人, 2019)。

本文的其余部分结构如下。第2. 回顾了关于经济型酒店、酒店客人体验以及服务环境中的客户情绪和情感的现有文献。第三部分介绍了细粒度情感分析的研究设计。第4. 介绍了客人积极和消极情绪的结果。第5. 讨论了这些发现，并将其与过去的研究进行了比较。第6. 概述了贡献。最后，第7. 总结了本文的局限性和未来的研究方向。

文献综述

经济型酒店研究

虽然各国经济型酒店的运营可能略有不同，但经济型酒店和高档酒店之间的主要区别在于价格和提供的服务范围 (Brotherton, 2004)。经济型酒店的收费结构相对较低，可用的设施和服务范围很小。现有的研究结果大体上可以分为两个不同的部分。首先，一些研究提供了经济型酒店运营的供给侧视角。这组研究将经济型酒店视为工业部门的一部分。研究人员探索了经营成功的管理原则和商业模式。研究探索了影响经济型酒店绩效的关键成功因素 (Brotherton, 2004; H. Q. Zhang等人, 2013)。在分销渠道方面，中国的经济型酒店客户更喜欢通过线下渠道预订，因为他们与传统旅行社有着密切的关系 (Lei等人, 2019年)。Yan等人 (2015) 发现，在经济型酒店行业的控制成本中，租赁租金和人力资源被高估，而特许经营费和翻新成本被低估。在中国，据观察，国内民营经济酒店从管理层关系中受益最多，并且在不同的增长阶段混合使用商业关系来获取无形资源 (Hsu et al., 2012, 2015)。为了了解人力资源管理，沈和黄 (2012) 调查了家政民工的工作倦怠和生活满意度，他们占这些酒店员工的很大一部分。

随着在线数据的可用性，几项早期的研究集中在监测和监测管理消费者关于经济型酒店的电子口碑 (WOM) (Su等人, 2015年)。L. Li等人 (2017) 发现，消费者对中国的经济型连锁酒店有着良好的形象。在网络营销方面，Kuo等人 (2015) 指出，误导性的酒店网站照片会导致这些酒店的负面品牌信任。郭等人 (2017年) 确定了一些重要的非价格维度，包括浴室和入住和退房，客户在对二星级和三星级酒店进行评级时会考虑这些维度。

However, very few studies have investigated the experience of economy hotel guests by analyzing large volume of user-generated content (UGC) data.

The second stream of studies are customer service oriented. These studies look at economy hotel development from the perspective of demand to understand the practical problems faced in service management (J. Peng et al., 2015). H. Li et al. (2013) found that customers who stay in economy hotels have a lower overall satisfaction level than those who stay in luxury hotels. Regardless of the changes in the expectations of customers and services in economy hotels, the customers are more interested in core products and a comfortable stay than in customized products and services (Rahimi & Kozak, 2017). X. Li et al. (2014) stated that competence and sincerity are the two essential dimensions of economy hotels that help to establish reliable and responsible service. However, few studies fully reflect the customer's experience and perception in detail (Chan & Ni, 2011). Thus, advanced data mining techniques can be adopted by researchers to understand the opinion, appraisal, attitude, and emotions of consumers with respect to economy hotels.

Hotel guest experience

Researchers have stated that over time, the economy has transformed into an experience economy (Pine & Gilmore, 1998). The term "experience" is often used to refer to product offerings in service settings that involve hedonic consumption, for example, in travel, restaurants, hotels, and arts (Levy, 2010). Studies define customer experience in different ways: the internal and subjective response of customers, all points of contact, overall experience of customers, and guests emotional evaluation of their consumption experience (Brunner-Sperdin et al., 2012; J. Peng et al., 2015). Even though guest experiences at hotels have been extensively studied in literature related to hospitality and tourism management, most researchers pay attention to luxury hotels, food service, casinos, and theme parks (Cetin & Walls, 2016; Walls et al., 2011). Economy hotel customers are perceived differently from those who select full-service and upscale hotel accommodations as they have different lifestyles and consumption attitudes (Fiorentino, 1995). However, existing knowledge mostly revolves around full-service hotels. For this reason, limited empirical evidence is available to understand the experience of customers who opt for economy hotels, which now represent a huge and expanding market segment. More in-depth studies are required to comprehensively examine consumer experiences in the economy hotel segment.

Researchers have studied economy hotel customer experiences to understand service quality and satisfaction (Huang et al., 2014; Ren et al., 2016, p. 13). Economy hotel customers evaluate service quality based on their expectations against their actual experience (Lo et al., 2015). Service quality, as a consumers' judgment of the service contact with employees, was cognitively bundled into the hotel consumption experience (Rauch et al., 2015). However, previous research has not reached a consensus on the critical factors of service excellence in economy hotels.

Xu and Li (2016) discussed dissatisfaction or unpleasant experiences in limited-service hotels. Influencing factors like, "tangible experience," "staff experience," and "aesthetic perception" were ranked positively (in order of significance) in influencing economy hotel guests satisfaction (Ren et al., 2016, p. 13). Scholars have also attempted to understand the dimensions of experience from the perspective of physical environment (Luo & Yang, 2016) or human interaction (Rahimi & Kozak, 2017). Researchers found that room amenities,

然而,很少有研究通过分析大量用户生成内容(UGC)数据来调查经济型酒店客人的体验。

第二类研究以客户服务为导向。这些研究从需求的角度审视经济型酒店的发展,以了解服务管理面临的实际问题(J. Peng等人, 2015)。H. Li等人(2013)发现,入住经济型酒店的顾客总体满意度低于入住豪华酒店的顾客。尽管经济型酒店的顾客期望和服务发生了变化,但顾客对核心产品和舒适的住宿比定制产品和服务更感兴趣(Rahimi & Kozak, 2017)。X. Li等人(2014)指出,能力和真诚是经济型酒店的两个基本维度,有助于建立可靠和负责任的服务。然而,很少有研究能详细反映顾客的体验和感知(Chan & Ni, 2011)。因此,研究人员可以采用先进的数据挖掘技术来了解消费者对经济型酒店的意见、评价、态度和情绪。

酒店宾客体验

研究人员表示,随着时间的推移,经济已经转变为体验经济(Pine & Gilmore, 1998)。“体验”一词通常指的是涉及享乐消费的服务环境中的产品,例如在旅行、餐馆、酒店和艺术中(Levy, 2010)。研究以不同的方式定义顾客体验:顾客的内部和主观反应、所有接触点、顾客的整体体验,以及顾客对其消费体验的情感评价(Brunner Sperdin等人, 2012年; J. Peng等人, 2015年)。尽管在与酒店和旅游管理相关的文献中,对酒店客人体验进行了广泛研究,但大多数研究人员都关注豪华酒店、餐饮服务、赌场和主题公园(Cetin & Walls, 2016; Walls等人, 2011)。经济型酒店的顾客与那些选择全方位服务和高档酒店住宿的顾客有不同的看法,因为他们有不同的生活方式和消费态度(佛罗伦萨, 1995年)。然而,现有的知识大多围绕着全方位服务的酒店。因此,现有的经验证据有限,无法理解选择经济型酒店的客户的体验,经济型酒店现在代表着一个巨大且不断扩大的细分市场。需要进行更深入的研究,以全面审视经济型酒店细分市场的消费者体验。

研究人员通过研究经济型酒店的顾客体验来了解服务质量和满意度(Huang等人, 2014; Ren等人, 2016,第13页)。经济型酒店客户根据他们的期望和实际体验来评估服务质量(Lo等人, 2015年)。服务质量,作为消费者对与员工的服务接触的判断,被认知地捆绑到酒店消费体验中(Rauch et al., 2015)。然而,以往的研究尚未就经济型酒店卓越服务的关键因素达成共识。

Xu和Li(2016)讨论了有限服务酒店的不满或不愉快经历。在影响经济型酒店客人满意度方面,“有形体验”、“员工体验”和“美感”等影响因素(按显著性排序)排名为正(Ren等人, 2016年,第13页)。学者们还试图从物理环境(Roo & Yang, 2016)或人类互动(Rahimi & Kozak, 2017)的角度来理解体验的维度。研究人员发现,房间设施,

staff, and accessibility are important attributes that influence guest experience (Rauch et al., 2015). Attributes that influence hotel selection include price, physical features (such as size, facilities, design, space, and room features), services, hotel brand and image, and location (Tanford et al., 2012). Customers select economy hotels based on price or value for money, hotel image, security and services, location, room, and the availability of food and beverages (Ruetz & Marvel, 2011).

Furthermore, existing studies mainly focus on identifying concepts at the macro level without paying sufficient attention to the nuanced aspects of the economy hotel experience, such as the specific elements that are a part of the factors like “facility” or “location” (Hua et al., 2009; Ren et al., 2018). These can be ambiguous for researchers and practitioners while developing coherent knowledge to conceptualize ideal accommodation experience and formulate relevant strategies.

Also, conventional methods usually rely on a set of predefined hypotheses that are justified using the existing body of knowledge, and attempts are made to either accept or reject such hypotheses. This method is often not reliable because of poor sample quality and low response rates and leads to vague assessments of the guest experiences. However, through the analytical process of big data, we allow the data to reveal patterns that are reflective of consumers evaluative judgments and affective responses (Xiang et al., 2015).

We also found that there is lack of tourism research in Chinese language. Chinese sentiment classification has certain characteristics that differ from English sentiment classification as there is a lack of inter-word spacing in Chinese and Chinese words often consist of the combination of more than one character (H. Peng et al., 2017).

Customer sentiments and emotions in the service context

In the service context, sentiment analysis has attracted significant attention in recent years. Customer sentiment in most cases of online sentiment analysis refers to the emotions expressed by customers through text reviews (Geetha et al., 2017). While emotions refer to specific human feelings such as joy, sadness, anger, fear and surprise, sentiments take into consideration topics and features associated with sentiment polarity (positive, neutral, negative) and intensity (Kirilenko et al., 2018).

Tourism researchers have typically used two types of online content for their sentiment analysis: data obtained from professional websites and data from social media posts (Guo et al., 2017). It is noted that most of the datasets used in the literature relate to hotel accommodation and a small number of studies focus on restaurants and airlines (Kwok et al., 2017).

Deep learning models were employed for sentiment analysis in the tourism field as an automated process of examining semantic relationships and meanings in reviews. As part of machine learning, deep learning is largely motivated by the field of artificial intelligence (AI) and has the general goal of emulating the human brain's ability to analyze, especially for complex problems. After decades of development, deep learning has experienced phenomenal success in a wide range of AI applications in tourism and hospitality that range from forecasting tourist arrivals (Sun et al., 2019) and demands (Law et al., 2019), evaluating hotel locations (Y. Yang et al., 2015), to analyzing online reviews (Ma et al., 2018) and images (Deng & Li, 2018). With these successful applications, it is clear that there has been growing awareness and development of deep learning techniques in tourism marketing and consumer behavior studies.

员工和可及性是影响客人体验的重要因素 (Rauch等人, 2015)。影响酒店选择的属性包括价格、物理特征 (如大小、设施、设计、空间和房间特征)、服务、酒店品牌和形象以及位置 (Tanford et al., 2012)。客户选择经济型酒店是基于价格或性价比、酒店形象、安全和服务、位置、房间以及食物和饮料的供应情况 (Ruetz & Marvel, 2011)。

此外, 现有研究主要侧重于在宏观层面上识别概念, 而没有充分关注经济型酒店体验的细微方面, 例如作为“设施”或“位置”等因素一部分的具体元素 (华等人, 2009年; 任等人, 2018年)。对于研究人员和从业者来说, 这些可能是模棱两可的, 同时开发连贯的知识来概念化理想的住宿体验并制定相关策略。

此外, 传统方法通常依赖于一组预定义的假设, 这些假设是使用现有的知识体系来证明的, 并试图接受或拒绝此类假设。这种方法通常不可靠, 因为样本质量差, 响应率低, 导致对客人体验的评估模糊。然而, 通过大数据分析过程, 我们允许数据揭示反映消费者评价判断和情感反应的模式 (Xiang等人, 2015)。

我们还发现, 缺乏汉语旅游研究。汉语情感分类具有不同于英语情感分类的某些特征, 因为汉语中缺乏词间间距, 而且汉语单词通常由多个字符组成 (H. Peng等人, 2017)。

服务环境中的顾客情绪

在服务领域, 情绪分析近年来引起了广泛关注。在线情绪分析的大多数情况下, 客户情绪指的是客户通过文本评论表达的情绪 (Geetha et al., 2017)。情绪指的是特定的人类情感, 如喜悦、悲伤、愤怒、恐惧和惊讶, 情绪则考虑与情绪极性 (积极、中性、消极) 和强度相关的主题和特征 (Kirilenko等人, 2018年)。

旅游研究人员通常使用两种类型的在线内容进行情绪分析: 从专业网站获得的数据和从社交媒体帖子获得的数据 (郭等人, 2017年)。值得注意的是, 文献中使用的大多数数据集与酒店住宿有关, 少数研究集中在餐厅和航空公司 (郭等人, 2017年)。

深度学习模型被用于旅游领域的情感分析, 作为检查评论中语义关系和意义的自动化过程。作为机器学习的一部分, 深度学习在很大程度上受到人工智能 (AI) 领域的推动, 其总体目标是模拟人脑的分析能力, 尤其是对复杂问题的分析能力。经过几十年的发展, Deep learning在旅游业和酒店业的各种人工智能应用中取得了惊人的成功, 包括预测游客人数 (Sun等人, 2019年) 和需求 (Law等人, 2019年), 评估酒店位置 (Y. Yang等人, 2015年), 分析在线评论 (马等人, 2018年) 和图片 (邓和李, 2018年)。通过这些成功的应用, 很明显, 在旅游营销和消费者行为研究中, 人们对深度学习技术的认识和开发越来越多。

Both lexicon-based and machine-learning sentiment analysis approaches were used in the tourism literature. Lexical approach uses a dictionary of sentiment-related terms, oftentimes together with estimates of their strength. However, existing lexicon-based sentiment analysis performs poorly on hotel reviews for two reasons. First, many words and expressions in hotel reviews are not included in traditional sentiment lexicons. Second, some data-driven sentiment lexicon construction methods fail to provide rigorous sentiment scores (Calheiros et al., 2017). The machine learning approach, which was adopted in our study, outperforms the lexicon-based approach concerning total accuracy (Xiang et al., 2017). What is more, most studies have focused on analysis through easily available online software and thus lacked applications of inherently generated algorithms. Our study aims to address these issues by applying an advanced sentiment analysis in identifying the sentiment valence in economy hotel service experience.

In tourism studies, some researchers have applied the text analytical approach by using a large quantity of consumer reviews from on-line booking websites to understand guest satisfaction and experiences (Berezina et al., 2016; Xiang et al., 2015). However, existing research mostly presents the overall sentiment score for each review, overlooking a great deal of details in the review (Wang et al., 2017). Although some reviewers give identical overall ratings, their feelings about different aspects of experience can differ (Schuckert et al., 2015). Most existing studies propose sentiment summary at sentence level and very few studies have been conducted to identify the fine-grained aspect level contextual preferences and their significance in generating accurate predictions for users. Potential customers are often not only interested in the reviewers' general sentiment about a certain hotel, but also in their opinions about specific experiential features (Sparks et al., 2016). Hence, for a further detailed analysis, it is necessary to get more information regarding the sub-features that may better explain customers' satisfaction and dissatisfaction.

Furthermore, sentiment analysis algorithms tend to be language-specific, we found that there is lack of tourism sentiment analysis research in Chinese. In hotel review analysis, word segmentation is a big challenge since existing Chinese word segmentation tools usually work well on formal texts but informal Internet contexts may have opposite meanings against their original meanings. Accordingly, sentiment analysis schemes for Chinese hotel reviews are encouraged to advance practical and theoretical developments.

Research design

In this study, we adopted deep learning approach to extract fine-grained sentiments expressed in unstructured online reviews of hotels about certain features based on the subjectivity and the linguistic characteristics of Chinese. Deep learning produces state-of-the-art prediction results of sentiment analysis (Ma et al., 2018). Sentiment analysis is typically conducted at different levels varying from coarse to fine. The fine level sentiment analysis, which is called aspect level or feature-based sentiment analysis (Medhat et al., 2014), conducted accurate analysis on reviews containing mixed opinions. The fine-grained aggregation method presents a summary of the features discussed in the reviews considering their hierarchical relationships with each other (Sparks et al., 2016). Compared with the traditional method, fine-grained sentiment analysis can identify the underlying sentiment of each aspect. Therefore, it can better resolve the research problem we set up in this study in the economy hotel sector.

基于词汇和机器学习的情感分析方法都被用于旅游文献中。词汇法使用与情绪相关的词汇词典，通常还包括对其强度的估计。然而，现有的基于词典的情绪分析在酒店评论方面表现不佳，原因有二。首先，酒店评论中的许多词汇和表达不包括在传统的情感词汇中。其次，一些数据驱动的情绪词典构建方法无法提供严格的情绪评分 (Calheiros等人, 2017)。我们研究中采用的机器学习方法在总体准确性方面优于基于词典的方法 (Xiang等人, 2017)。更重要的是，大多数研究都侧重于通过易于获得的在线软件进行分析，因此缺乏对固有算法的应用。我们的研究旨在通过应用高级情绪分析来识别经济型酒店服务体验中的情绪配价来解决这些问题。

在旅游研究中，一些研究人员通过使用在线预订网站上的大量消费者评论来应用文本分析方法，以了解游客满意度和体验 (Berezina等人, 2016年; Xiang等人, 2015年)。然而，现有研究大多给出了每一篇评论的总体情绪评分，忽略了评论中的大量细节 (Wang等人, 2017年)。尽管一些评论者给出了相同的总体评分，但他们对体验不同方面的感受可能会有所不同 (Schuckert等人, 2015)。大多数现有研究提出在句子层面进行情绪总结，很少有研究确定细粒度方面层面的上下文偏好及其在为用户生成准确预测方面的意义。潜在客户通常不仅对评论者对某家酒店的总体看法感兴趣，还对他们对特定体验特征的看法感兴趣 (Sparks等人, 2016)。因此，为了进行更详细的分析，有必要获得更多有关子功能的信息，这些子功能可以更好地解释客户的满意度和不满。

此外，情绪分析算法往往是特定于语言的，我们发现国内缺乏旅游情感分析研究。在酒店评论分析中，分词是一个巨大的挑战，因为现有的中文分词工具通常能很好地处理正式文本，但非正式的互联网上下文可能会有与其原始含义相反的含义。因此，中国酒店评论的情绪分析计划被鼓励推进实践和理论发展。

研究设计

在本研究中，我们采用深度学习的方法，基于汉语的主观性和语言特征，提取酒店非结构化在线评论中表达的关于某些特征的细粒度情感。深度学习产生最先进的情绪分析预测结果 (马等人, 2018年)。情绪分析通常在从粗到细的不同层次上进行。精细层次的情绪分析被称为方面层次或基于特征的情绪分析 (Medhat et al., 2014)，它对包含混合观点的评论进行了准确分析。细粒度聚合方法总结了评论中讨论的特征，并考虑了它们之间的层次关系 (Sparks等人, 2016)。与传统方法相比，细粒度情绪分析可以识别出各个方面的潜在情绪。因此，它可以更好地解决我们在经济型酒店领域的研究问题。

Our fine-grained sentiment analysis process can be divided into five principal steps: hotel review collection, review preprocessing, manual annotation and auditing, deep learning model training, and predicting review with deep learning models.

Online review collection and processing

Hotel reviews were collected from eLong.com, one of the largest online hotel booking platform in China. Web crawlers in Python were used to collect data for this study in August and September 2018. The screening criteria for search were set as, “economy hotel.” The search results included all the economy hotels in Beijing and Shanghai and the numbers of reviews for each hotel. After data cleaning, the final dataset contains 363,723 reviews (175,394 from Beijing and 187,329 from Shanghai).

The process of data preprocessing includes word segmentation and manual tagging. The tool for word segmentation used in this study is Jieba, a source code that assists Python to segment words in Chinese (<https://github.com/fxsjy/jieba>). We used Word2Vec to calculate the similarity and the term frequency between words.

Manual annotation

Two types of expressions, hotel features and sentiment of hotel features, are to be identified from online reviews. As noted, these expressions can be words or a sequence of words. A basic fine-grained task is to extract a feature in a text and identify its sentimental polarity (Zhao et al., 2014). Thus, the reviews had to be manually annotated.

As no relevant Chinese lexicon in the field of tourism and hospitality could be found, we developed a specific annotation scheme (Table 1) based on Ren et al. (2016) and Huang et al. (2014).

The conventional BIO encoding for tag representation is utilized to label each sentence. B, I, and O denote the beginning, intermediate, and outside entities of aspect terms. Entity means objects discussed in the text, while attribute means characteristics of one aspect of these entities. Sentiment polarity was also considered in the annotation, where P implies positive sentiment and N implies negative. In the sentence, “The room quality is good,” we can extract “room quality” as the attribute and label “positive” as the polarity tag.

Table 1. Annotation scheme.

Code	Meaning	Label	Examples
E	Entity	B-E, I-E	Hotel, Service, Room
A	Attribute		
AF	Attribute Facilities	B-AF I-AF	Bed, Windows, TV
AR	Attribute Reservations	B-AR I-AR	e-long, booking
AL	Attribute Location	B-AL I-AL	metro station, fast food
AI	Attribute Image	B-AI I-AI	Chain, brand
AV	Attribute Value	B-AV I-AV	Price, deposit
AS	Attribute Service	B-AS I-AS	Front desk, waiter
O	Others	O	Other reviews except above

我们的细粒度情绪分析过程可分为五个主要步骤：酒店评论收集、评论预处理、手动注释和审核、深度学习模型培训，以及使用深度学习模型预测评论。

在线评论收集和处理

酒店评论来自艺龙.com，中国最大的在线酒店预订平台之一。2018. 8. 和9.，使用Python中的网络爬虫为本研究收集数据。搜索的筛选标准设定为“经济型酒店”搜索结果包括北京和上海的所有经济型酒店，以及每家酒店的评论数量。数据清理后，最终数据集包含363723. 评论（北京175394.，上海187329.）。

数据预处理过程包括分词和人工标注。本研究中使用分词工具是Jieba,这是一个源代码，可以帮助Python在中文中分词(<https://github.com/fxsjy/jieba>).我们使用Word2Vec计算单词之间的相似度和词频。

手工注释

两种表达方式，酒店特色和酒店特色的情感，将从在线评论中识别出来。如前所述，这些表达式可以是单词或一系列单词。一项基本的细粒度任务是提取文本中的特征，并识别其情感极性（Zhao et al., 2014）。因此，审查必须手动注释。

由于在旅游和酒店领域找不到相关的汉语词汇，我们在任等人（2016）和黄等人（2014）的基础上开发了一个特定的注释方案（表1）。

标签表示的传统生物编码用于标记每个句子。B、I和O表示方面术语的开始、中间和外部实体。实体是指文本中讨论的对象，而属性是指这些实体的一个方面的特征。注释中还考虑了情绪极性，其中P表示积极情绪，N表示消极情绪。在“房间质量良好”这句话中，我们可以提取“房间质量”作为属性，并将“正极”标记为极性标记。

表1. 注释方案。

代码	含义	标签	示例
E	实体	B-E, I-E	旅馆、服务、房间
A	属性		
AF	属性设施	B-AF I-AF	床、窗户、电视
AR	属性保留	B-AR I-AR	e-long, 预订
AL	属性位置	B-AL I-AL	地铁站，快餐店
AI	属性图像	B-AI I-AI	连锁、品牌
AV	属性值	B-AV I-AV	价格、定金
AS	属性服务	B-AS I-AS	前台，服务员
O	其他	O	除上述之外的其他评论

During the process of manual annotation, 14,000 reviews that were randomly selected from all the reviews have been annotated by eleven undergraduate students using the open-source code software Notepad++. After manual annotation, the data were divided into a training set of 75% reviews and a testing set of 25% reviews.

Experiments and model training

The annotated reviews were changed into one-hot word vector by Word2vec which was developed by Google (Mikolov et al., 2013). Under the deep learning framework, Bidirectional Long Short-Term Memory (BiLSTM) – conditional random field (CRF) model was used to train and predict the data. BiLSTM is an advanced deep neural network sequence model to extract expressions in opinionated sentences (Luo et al., 2018). The model contains text layer, part of speech layer, connection layer, and output layer, where the output layer uses CRF for data output and model training using the training set. The training set is used to evaluate the trained model, and best experimental results on an average, reach 84% accuracy. We applied the above effective model to predict the remaining unlabeled reviews and got the corpus for the follow-up sentiment analysis.

Data analysis

Our findings integrated sentiment polarity (that is, negative and positive sentiments) with the traditional word frequency-based guest experience evaluation. All the reviews are divided into six domains based on the annotation scheme. Feature words of each domain were identified and computed. Categorizing feature words helped us to determine the writer's attitude toward a particular issue. Identifying and categorizing the positive or negative sentiment of each feature reveals the evaluative judgments and attitude of customers toward a particular feature.

Adverbs play an important role in determining the strength of sentiments. We adopted the Chinese sentiment classification of adverbs (Table 2) by Chen et al. (2018), and constructed a word list to adjust the sentimental polarity, and assign each adverb in the reviews a sentimental value. The positive evaluation is recorded as a positive number, while negative evaluation is recorded as a negative number. According to the difference of the

Table 2. Score system of sentiment.

Sentiment score	Adverbs(in Chinese)
0.25	稍微 (a bit)、些许 (fairly)、有点 (a little)、有些 (a trifle)、略 (lightly)、略微 (slightly)、多少 (somewhat)
0.75	较 (rather)、较为 (comparatively)、比较 (relatively)、不大 (hardly)、不太 (not much)、不很 (adequately)
1.25	很 (progressively)、更 (increasingly)、更加 (very)、更为 (more)、越 (further)、越发 (more and more)、备加 (doubly)、愈 (even more)、愈加 (all the more)、愈发 (better)、越 (all the better)、格外 (extraordinarily)、太 (too)、挺 (well)、忒 (overly)、非常 (greatly)、特别 (particularly)、相当 (greatly)、十分 (very much)、甚 (deeply)、颇 (quite)、颇为 (incredibly)、甚为 (seriously)、满 (considerably)、蛮 (decidedly)、够 (enough)、多么 (highly)、真 (truly)、特别 (exceptionally)、尤其 (especially)
1.75	最 (most)、最为 (exceedingly)、极 (immensely)、极为 (intensely)、极其 (extremely)、极度 (acutely)、分外 (excessively)、要命 (severely)

在手工注释的过程中, 11名本科生使用开源代码软件Notepad++对从所有评论中随机选择的14000篇评论进行了注释。在手动注释后, 数据被分为75%的评估的训练集和25%的评估的测试集。

实验与模型训练

谷歌开发的Word2vec将带注释的评论变成了一个热门词向量 (Mikolov等人, 2013)。在深度学习框架下, 采用双向长短时记忆 (BiLSTM) -条件随机场 (CRF) 模型对数据进行训练和预测。BiLSTM是一种先进的深层神经网络序列模型, 用于提取自以为是句子中的表达 (Luo等人, 2018年)。该模型包括文本层、词性层、连接层和输出层, 其中输出层使用CRF进行数据输出, 并使用训练集进行模型训练。该训练集用于评估训练后的模型, 最佳实验结果平均达到84%的准确率。我们应用上述有效模型预测剩余的未标记评论, 并获得用于后续情绪分析的语料库。

数据分析

我们的研究结果将情绪极性 (即消极情绪和积极情绪) 与传统的基于词频的客人体验评估相结合。根据注释方案, 所有审查分为六个领域。识别并计算每个领域的特征词。对特写词进行分类有助于我们确定作者对某一特定问题的态度。识别和分类每个功能的积极或消极情绪, 可以揭示客户对特定功能的评价判断和态度。

副词在决定情绪强度方面起着重要作用。我们采用了Chen等人 (2018) 的《汉语情感副词分类》(表2), 并构建了一个词表来调整情感极性, 并为评论中的每个副词指定一个情感值。正面评价记录为正数, 负面评价记录为负数。根据不同的

表2. 情绪评分系统。

情绪得分	副词 (中文)
0.25	稍微 (a bit)、些许 (fairly)、有点 (a little)、有些 (a trifle)、略 (lightly)、略微 (slightly)、多少 (somewhat)
0.75	较 (rather)、较为 (comparatively)、比较 (relatively)、不大 (hardly)、不太 (not much)、不很 (adequately)
1.25	很 (progressively)、更 (increasingly)、更加 (very)、更为 (more)、越 (further)、越发 (more and more)、备加 (doubly)、愈 (even more)、愈加 (all the more)、愈发 (better)、越 (all the better)、格外 (extraordinarily)、太 (too)、挺 (well)、忒 (overly)、非常 (greatly)、特别 (particularly)、相当 (greatly)、十分 (very much)、甚 (deeply)、颇 (quite)、颇为 (incredibly)、甚为 (seriously)、满 (considerably)、蛮 (decidedly)、够 (enough)、多么 (highly)、真 (truly)、特别 (exceptionally)、尤其 (especially)
1.75	最 (most)、最为 (exceedingly)、极 (immensely)、极为 (intensely)、极其 (extremely)、极度 (acutely)、分外 (excessively)、要命 (severely)

sentimental strength, the total score is divided into four sentimental levels, and the value is 0.25, 0.75, 1.25, and 1.75. If the sentence does not have the adverb of any sentiment, it is recorded as 1 (negative sentiment is -1).

The following sentimental value calculation model was used. In this case, C is the total sentimental value, T stands for the total T aspects, λ_t is the sentimental value of t , and p_t stands for the weight of t aspect. The weight is the ratio of the total number of sentimental words in t to the total number of sentimental words in T . The calculation of λ_t is that the number of sentimental words in this level multiplied by the number of sentimental words. Subsequently, the sentiment values of each attribute were calculated.

$$C = \sum_{t=1}^T \lambda_t p_t$$

The actual sentiment of each attribute is multiplied by the percentage of each attribute of total reviews. The general sentiment is the sum of all the features.

To further explore the content and structure of sentiments, all the high-frequency words were recorded and fed into Gephi, which is a data visualization and manipulation software to provide visual representations of the associated networks between words. This study applied Gephi in two steps: (1) collecting all the high-frequency words and undertaking back-to-back translation from Chinese to English; (2) running a co-occurrence analysis on the most frequently mentioned words and building a cluster network. The results of semantic network analysis were presented in Section 4.

Findings

The general sentiment of customers about economy hotels in China

In accordance with the overall sentimental evaluation, “location” obtained the most positive evaluations (Score = 64860), followed by “facilities” (Score = 24263), “service” (Score = 17888), “price” (Score = 4350), “image” (Score = 193), and “reservation” (Score = 20). The larger coefficient of the sentiments indicates that economy hotel guests were overwhelmingly positive about many aspects of their experiences. One reason for this could be that travelers are more inclined to post-positive reviews rather than negative reviews (Z. Zhang et al., 2016).

Satisfactory features that attracted a more positive sentiment and dissatisfactory features that lead to negative sentiments were identified (Table 3). In the next section, the sentiments of features are discussed in detail. In Table 4 in the Supplementary Materials document, we have summarized the frequency of all the words that are related to the features and sentiments.

Guests' positive sentiments

Based on the frequency, the ranking of features represents the degree of customer concern. Sentiment words describe the detailed reasons. The first satisfactory feature is “service” and it includes positive comments about the services offered at the hotel. The guests indicated that they liked the economy hotel because the “service” was “pretty good” and “full of enthusiasm.” The “enthusiastic” and “thoughtful service” is represented through a “thumbs-

情绪强度，总分分为四个情绪水平，值分别为0.25. 0.75. 1. 25. 1. 75. 如果句子中没有任何情绪副词，则记录为1. 消极情绪为1. -1. .

使用了以下情感价值计算模型。在这种情况下， C 是总的情感价值， T 代表总的 T 方面， λ_t 是 T 的情感价值， p_t 代表 T 方面的权重。权重是 T 中的感伤词总数与 T 中的感伤词总数的比率。 λ_t 的计算是该级别的感伤词数量乘以感伤词数量。随后，计算每个属性的情绪值。

$$C = \sum_{t=1}^T \lambda_t p_t$$

每个属性的实际情绪乘以总评论中每个属性的百分比。总体情绪是所有特征的总和。

为了进一步探索情感的内容和结构，所有高频词都被记录并输入Gephi, Gephi是一个数据可视化和操作软件，用于提供词与词之间关联网络的可视化表示。本研究将Gephi应用于两个步骤：（1）收集所有高频词并进行背靠背的汉英翻译；（2）对最常提到的单词进行共现分析，并构建集群网络。语义网络分析的结果见 Section 4.

调查结果

顾客对中国经济型酒店的总体看法

根据整体情感评价，“地点”获得了最积极的评价（得分= 64860），其次是“设施”（得分= 24263）、“服务”（得分= 17888）、“价格”（得分= 4350）、“形象”（得分= 193）和“预订”（得分= 20）。情绪系数越大，表明经济型酒店的客人对他们体验的许多方面都非常积极。其中一个原因可能是旅行者更倾向于发表正面评论而不是负面评论（Z. Zhang等人，2016）。

确定了吸引更积极情绪的满意特征和导致消极情绪的不满意特征（表3）。在下一节中，将详细讨论人物的情感。在补充材料文件的表4中，我们总结了与特征和情感相关的所有单词的频率。

客人的积极情绪

根据频率，功能的排名代表客户关注的程度。情绪词描述了详细的原因。第一个令人满意的特点是“服务”，包括对酒店提供的服务的积极评价。客人们表示，他们喜欢这家经济型酒店，因为“服务”很好，“热情十足”“热情”和“周到的服务”通过“拇指”来表示-

Table 3. Features generated positive sentiments and negative sentiments.

Positive sentiment				Negative sentiment					
Domain	Rank	Satisfactory features	Count	Positive sentiment tendency	Domain	Rank	Dissatisfactory features	Count	Negative sentiment tendency
Service Facilities Location	1	服务 (Services)	69952	90.1%	Facilities	1	隔音 (Sound insulation)	24143	60.6%
	2	环境 (Circumstances)	43703	92.6%	Facilities	2	空调 (Air conditioners)	8322	59.3%
	3	位置 (Location)	37482	82.3%	Facilities	3	床上用品 (Beddings)	7822	56.4%
Location Price Reservation Facilities Service	4	交通 (Traffic)	33146	92.7%	Facilities	4	窗户 (Windows)	5814	55.1%
	5	地铁 (Subways)	30735	81.5%	Facilities	5	卫生间 (Toilets)	5346	54.7%
	6	性价比 (Cost performance)	29671	89.3%	Facilities	6	电视 (TV sets)	5061	56.8%
	7	押金 (Deposit)	26634	99.5%	Facilities	7	信号 (WiFi signals)	2630	51.0%
	8	卫生 (Sanitation)	24059	81.7%	Facilities	8	毛巾 (Towels)	2053	59.7%
	9	设施 (Room facilities)	21719	83.1%	Facilities	9	电梯 (Elevators)	2345	51.7%
	10	服务态度 (Service attitudes)	19985	90.6%	Facilities	10	吹风机 (Hair dryers)	1257	54.3%
	11	床 (bed)	13667	80.0%	Facilities	11	拖鞋 (Slippers)	1141	62.3%
	12	前台 (Receptions)	7154	78.2%	Facilities	12	马桶 (Toilet bowls)	1077	76.6%
	13	装修 (Decorations)	6359	76.0%	Reservation	13	返现 (Return cash)	266	55.6%
Facilities Location Facilities Service	14	机场 (Airports)	6248	86.5%	Reservation	14	发票 (Invoices)	231	59.7%
	15	热水 (Hot water)	4171	76.4%					
	16	服务员 (waitress)	3928	80.7%					
	17	公交 (Buses)	3302	83.9%					
Location	18	火车站 (Railway stations)	2426	86.2%					
Location	19	超市 (Supermarkets)	2287	86.4%					
Location	20	小吃 (Snacks)	2108	91.8%					
Service	21	打扫 (Cleanings)	1774	70.4%					
	22	退房 (Check-out)	1223	64.7%					

Note: Count is total frequency of feature occurrence. $\text{Positive(Negative)} = \text{Count of positive(negative)} / \text{Total count} * 100\%$.

表3. 特征产生积极情绪和消极情绪。

积极情绪					负面情绪				
域	排名	令人满意的特征	计数	积极情绪倾向	域	排名	不满意的特征	计数	消极情绪倾向
服务 设施 位置	1	服务 (Services)	69952	90.1%	设施 设施 设施	1	隔音 (Sound insulation)	24143	60.6%
	2	环境 (Circumstances)	43703	92.6%		2	空调 (Air conditioners)	8322	59.3%
	3	位置 (Location)	37482	82.3%		3	床上用品 (Beddings)	7822	56.4%
位置 位置 价格	4	交通 (Traffic)	33146	92.7%	设施 设施 设施	4	窗户 (Windows)	5814	55.1%
	5	地铁 (Subways)	30735	81.5%		5	卫生间 (Toilets) (2923)	5346	54.7%
	6	性价比 (Cost performance)	29671	89.3%		6	电视 (TV sets) (2874)	5061	56.8%
预订 设施 设施	7	押金 (Deposit)	26634	99.53%	设施 设施 设施	7	信号 (WiFi signals)	2630	51.0%
	8	卫生 (Sanitation)	24059	81.7%		8	毛巾 (Towels)	2053	59.7%
	9	设施 (Room facilities)	21719	83.1%		9	电梯 (Elevators)	2345	51.7%
服务 服务 设施	10	服务态度 (Service attitudes)	19985	90.6%	设施 设施 设施	10	吹风机 (Hair dryers) (683)	1257	54.3%
	11	床 (bed)	13667	80.0%		11	拖鞋 (Slippers) (711)	1141	62.3%
	12	前台 (Receptions)	7154	78.2%		12	马桶 (Toilet bowls) (825)	1077	76.2%
设施 位置 设施	13	装饰 (Decorations)	6359	76.0%	预订 预订 预订	13	返现 (Return cash)	266	55.6%
	14	机场 (Airports)	6248	86.5%		14	发票 (Invoices)	231	59.7%
	15	热水 (Hot water)	4171	76.4%					
服务 服务 位置	16	服务员	3928	80.7%					
	17	(女服务员)							
	18	公交 (Buses)	3302	83.9%					
位置 位置 位置	19	火车站 (Railway stations)	2426	86.2%					
	20	超市	2287	86.4%					
	21	(超市)							
位置 服务 服务	22	小吃	2108	91.8%					
	23	(零食)							
	24	打扫 (Cleanings)	1774	70.4%					
	25	退房 (Check-out)	1223	64.7%					

注：计数是特征出现的总频率，积极（消极）情绪倾向=积极（消极）情绪计数/总计数*100%。

Table 4.. Positive and negative features and sentiments.

Satisfactory features (Positive tendency)		Positive sentiments		Disatisfactory features (Negative tendency)	
Domain	Service	Facilities	Domain	Facilities	Domain
Service	服务 (Services)	不错 (Pretty good) (7824)、热情 (enthusiasm) (4789)、干净 (clean) (3465)、方便 (convenient) (1716)、推荐 (recommended) (1468)、也好 (better off) (1417)、卫生 (sanitary) (1254)、满意 (satisfied) (1172)、周到 (thoughtful) (910)、近 (close) (774)、赞 (thumbs-up) (716)、行 (good) (661)、到位 (thoughtful service) (652)、值得 (worth) (651)、热情周到 (enthusiastic and thoughtful) (646)、整洁 (neat) (566)、安静 (quiet) (565)、免费 (quiet free of charge) (564)、贴心 (caring) (447)、棒 (excellent) (422)、舒服 (comfortable) (395)	空调 (Air conditioners)	隔音 (Sound insulation)	差 (Bad) (3789)、不好 (not good) (2254)、不太好 (not so good) (1017)、吵 (noisy) (897)、较差 (poor) (122)、极差 (inferior) (108)、不行 (no good) (107)、不是太好 (not too good) (99)、吵醒 (awakened by noise) (55)、不怎么样 (not very good) (40)、超差 (terrible) (35)、坏 (awful) (30)
	90.1%		59.3%	60.6%	
Facilities	环境 (Circumstances)	不错 (Pretty good) (9726)、干净 (clean) (3305)、可以 (all right) (2573)、安静 (quiet) (2176)、方便 (convenient) (999)、卫生 (sanitary) (972)、舒适 (comfortable) (862)、行 (not bad) (745)、整洁 (neat) (678)、推荐 (recommended) (640)、近 (close) (466)、满意 (satisfied) (425)、舒服 (comfort) (415)、还好 (well enough) (409)、优雅 (elegant) (397)、也好 (better off) (338)、温馨 (warm) (285)	空调 (Air conditioners)		冷 (Cold) (283)、坏 (awful) (283)、吵 (noisy) (219)、不好 (not good) (200)、小 (small) (143)、差 (bad) (140)、噪音 (noise) (70)、不太好 (not so good) (68)、漏水 (water leakage) (60)、旧 (worn) (57)、老 (old) (52)、响 (loud) (42)、很小 (very small) (32)、闷 (stuffy) (40)、脏 (dirty) (28)、干 (dry) (19)、没用 (not working) (18)
	92.6%		59.3%		
Location	位置 (Location)	不错 (Pretty good) (6171)、方便 (convenient) (3943)、好找 (easy to find) (1794)、可以 (all right) (1432)、干净 (clean) (1072)、安静 (quiet) (678)、近 (close) (552)、行 (good) (467)、也好 (better off) (368)、推荐 (recommended) (361)、便利 (convenience) (320)、卫生 (sanitary) (286)、还好 (well enough) (276)、满意 (satisfied) (216)、整洁 (neat) (149)	床上用品 (Beddings)		小 (Small) (415)、硬 (hard) (312)、脏 (dirty) (137)、差 (bad) (134)、头发 (hairs) (83)、一般 (fair) (76)、不好 (not good) (75)、吵 (noisy) (70)、旧 (worn) (68)、很小 (very small) (64)、没换 (beddings unchanged) (63)、污渍 (stains) (46)、潮 (wet) (38)、破 (damaged) (36)、恶心 (disgusting) (32)、短 (short) (25)、血迹 (bloodstain) (23)、垃圾 (rubbish) (22)、不太好 (not so good) (21)
	82.3%		56.4%		

(Continued)

表4.. 积极和消极的特征和情绪。

令人满意的特征 (积极趋势)			积极情绪		域	不满意的特征 (负面倾向)		负面情绪	
服务	服务 (Services)	90.1%	不错 (Pretty good) (7824)、热情 (enthusiasm) (4789)、干净 (clean) (3465)、方便 (convenient) (1716)、推荐 (recommended) (1468)、也好 (better off) (1417)、卫生 (sanitary) (1254)、满意 (satisfied) (1172)、周到 (thoughtful) (910)、近 (close) (774)、赞 (thumbs-up) (716)、行 (good) (661)、到位 (thoughtful service) (652)、值得 (worth) (651)、热情周到 (enthusiastic and thoughtful) (646)、整洁 (neat) (566)、安静 (quiet) (565)、免费 (quiet, free of charge) (564)、贴心 (caring) (447)、棒 (excellent) (422)、舒服 (comfortable) (395)			设施	隔音 (Sound (绝缘))	60.6%	差 (Bad) (3789)、不好 (not good) (2254)、不太好 (not so good) (1017)、吵 (noisy) (897)、较差 (poor) (122)、极差 (inferior) (108)、不行 (no good) (107)、不是太好 (not too good) (99)、吵醒 (awakened by noise) (55)、不怎么样 (not very good) (40)、超差 (terrible) (35)、坏 (awful) (30)
设施	环境 (Circumstances)	92.6%	不错 (Pretty good) (9726)、干净 (clean) (3305)、可以 (all right) (2573)、安静 (quiet) (2176)、方便 (convenient) (999)、卫生 (sanitary) (972)、舒适 (comfortable) (862)、行 (not bad) (745)、整洁 (neat) (678)、推荐 (recommended) (640)、近 (close) (466)、满意 (satisfied) (425)、舒服 (comfort) (415)、还好 (well enough) (409)、优雅 (elegant) (397)、也好 (better off) (338)、温馨 (warm) (285)			设施	空调 (Air (空调))	59.3%	冷 (Cold) (283)、坏 (awful) (283)、吵 (noisy) (219)、不好 (not good) (200)、小 (small) (143)、差 (bad) (140)、噪音 (noise) (70)、不太好 (not so good) (68)、漏水 (water leakage) (60)、旧 (worn) (57)、老 (old) (52)、响 (loud) (42)、很小 (very small) (32)、闷 (stuffy) (40)、脏 (dirty) (28)、干 (dry) (19)、没用 (不工作) (18)
位置	位置 (Location)	82.3%	不错 (Pretty good) (6171)、方便 (convenient) (3943)、好找 (easy to find) (1794)、可以 (all right) (1432)、干净 (clean) (1072)、安静 (quiet) (678)、近 (close) (552)、行 (good) (467)、也好 (better off) (368)、推荐 (recommended) (361)、便利 (convenience) (320)、卫生 (sanitary) (286)、还好 (well enough) (276)、满意 (satisfied) (216)、整洁 (neat) (149)			设施	床上用品 (床上用品)	56.4%	小 (Small) (415)、硬 (hard) (312)、脏 (dirty) (137)、差 (bad) (134)、头发 (hairs) (83)、一般 (fair) (76)、不好 (not good) (75)、吵 (noisy) (70)、旧 (worn) (68)、很小 (very small) (64)、没换 (beddings unchanged) (63)、污渍 (stains) (46)、潮 (wet) (38)、破 (damaged) (36)、恶心 (disgusting) (32)、短 (short) (25)、血迹 (bloodstain) (23)、垃圾 (rubbish) (22)、不太好 (not so good) (21)

(续)

Table 4.. (Continued).

(Continued)

表4.. (续)。

(续)

Table 4.. (Continued).

Satisfactory features (Positive tendency)		Positive sentiments		Disatisfactory features (Negative tendency)		Negative sentiments	
Domain				Domain			
Reservation	押金 (Deposit) 99.5%	不错 (pretty good) (3259)、可以 (all right) (1487)、方便 (convenient) (955)、推荐 (recommended) (817)、行 (good) (384)、值得 (worth) (295)、大 (big) (216)、满意 (satisfied) (205)、便利 (convenience) (192)、便宜 (cheap) (170)、舒服 (comfort) (139)、免费 (free of charge) (138)、还好 (well enough) (132)		Facilities	信号 (WiFi signals) 51.0%	差 (Bad) (324)、不好 (not good) (212)、不太好 (not so good) (77)、弱 (weak) (54)、一般 (fair) (30)、连不上 (no connectivity) (13)、不行 (no good) (11)、极差 (inferior) (10)、差点 (fairly bad) (9)、不是太好 (not too good) (5)、较差 (poor) (4)	
Facilities	卫生 (Sanitation) 81.7%	干净 (Clean) (3489)、不错 (pretty good) (3294)、整洁 (neat) (407)、安静 (quiet) (351)、大 (big) (314)、舒服 (comfort) (155)、舒适 (comfortable) (142)		Facilities	毛巾 (Towels) 59.7%	旧 (Worn) (101)、脏 (dirty) (58)、破 (damaged) (50)、小 (small) (44)、差 (bad) (33)、一般 (fair) (25)、黑 (black) (25)、太旧 (so worn) (22)	
Facilities	设施 (Room facilities) 83.1%	齐全 (Well-equipped) (3377)、干净 (clean) (1511)、新 (new) (1180)、全 (complete) (324)、整洁 (neat) (298)、完善 (perfect) (293)、行 (good) (288)、实惠 (economy) (90)		Facilities	电梯 (Elevators) 51.7%	坏 (Not working) (106)、小 (small) (60)、差 (bad) (36)、吵 (noisy) (32)、不好 (not good) (31)、麻烦 (troublesome) (23)、旧 (worn) (19)、老 (old) (18)、慢 (slow) (18)、一般 (fair) (15)、坏 (Not working) (46)、小 (small) (30)、不好 (not good) (26)、吵 (noisy) (21)、差 (bad) (19)、一般 (fair) (18)、很小 (very small) (10)、旧 (worn) (7)、少 (few) (7)、	
Service	服务态度 (Service attitudes) 90.6%	不错 (Pretty good) (1916)、干净 (clean) (992)、也好 (better off) (496)、推荐 (recommended) (436)、满意 (satisfied) (383)、热情 (enthusiasms) (369)、值得 (worth) (214)、赞 (thumbs-up) (185)、整洁 (neat) (177)		Facilities	吹风机 (Hair dryers) 54.3%	坏 (Not working) (46)、小 (small) (30)、不好 (not good) (26)、吵 (noisy) (21)、差 (bad) (19)、一般 (fair) (18)、很小 (very small) (10)、旧 (worn) (7)、少 (few) (7)、	
Facilities	床 (Bed) 80.0%	舒服 (Comfort) (1969)、干净 (clean) (1350)、大 (big) (886)、舒适 (comfortable) (340)、软 (soft) (276)、整洁 (neat) (187)、卫生 (sanitary) (176)、新 (new) (1116)、宽敞 (spacious) (79)、喜欢 (love) (77)		Facilities	拖鞋 (Slippers) 62.3%	差 (Bad) (35)、小 (small) (22)、收费 (need to pay) (21)、坏 (broken) (16)、不好 (not good) (15)、臭 (smelly) (15)、脏 (dirty) (13)、	

(Continued)

表4.. (续)。

令人满意的特征 (积极趋势)		积极情绪		不满意特征 (负面倾向)		负面情绪	
域				域			
预订	押金 (Deposit) 99.5%	不错 (pretty good) (3259)、可以 (all right) (1487)、方便 (convenient) (955)、推荐 (recommended) (817)、行 (good) (384)、值得 (worth) (295)、大 (big) (216)、满意 (satisfied) (205)、便利 (convenience) (192)、便宜 (cheap) (170)、舒服 (comfort) (139)、免费 (free of charge) (138)、还好 (well enough) (132)		设施	信号 (WiFi signals) 51.0%	差 (Bad) (324)、不好 (not good) (212)、不太好 (not so good) (77)、弱 (weak) (54)、一般 (fair) (30)、连不上 (no connectivity) (13)、不行 (no good) (11)、极差 (inferior) (10)、差点 (fairly bad) (9)、不是太好 (not too good) (5)、较差 (poor) (4)	
设施	卫生 (Sanitation) 81.7%	干净 (Clean) (3489)、不错 (pretty good) (3294)、整洁 (neat) (407)、安静 (quiet) (351)、大 (big) (314)、舒服 (comfort) (155)、舒适 (comfortable) (142)		设施	毛巾 (Towels) 59.7%	旧 (Worn) (101)、脏 (dirty) (58)、破 (damaged) (50)、小 (small) (44)、差 (bad) (33)、一般 (fair) (25)、黑 (black) (25)、太旧 (so worn) (22)	
设施	设施 (房间设施) 83.1%	齐全 (Well-equipped) (3377)、干净 (clean) (1511)、新 (new) (1180)、全 (complete) (324)、整洁 (neat) (298)、完善 (perfect) (293)、行 (good) (288)、实惠 (economy) (90)		设施	电梯 (Elevators) 51.7%	坏 (Not working) (106)、小 (small) (60)、差 (bad) (36)、吵 (noisy) (32)、不好 (not good) (31)、麻烦 (troublesome) (23)、旧 (worn) (19)、老 (old) (18)、慢 (slow) (18)、一般 (公平的)	
服务	服务态度 (服务态度) 90.6%	不错 (Pretty good) (1916)、干净 (clean) (992)、也好 (better off) (496)、推荐 (recommended) (436)、满意 (satisfied) (383)、热情 (enthusiasms) (369)、值得 (worth) (214)、赞 (thumbs-up) (185)、整洁 (neat) (177)		设施	吹风机 (Hair 烘干机) 54.3%	坏 (Not working) (46)、小 (small) (30)、不好 (not good) (26)、吵 (noisy) (21)、差 (bad) (19)、一般 (fair) (18)、很小 (very small) (10)、旧 (worn) (7)、少 (few) (7)、	
设施	床 (Bed) 80.0%	舒服 (Comfort) (1969)、干净 (clean) (1350)、大 (big) (886)、舒适 (comfortable) (340)、软 (soft) (276)、整洁 (neat) (187)、卫生 (sanitary) (176)、新 (new) (1116)、宽敞 (spacious) (79)、喜欢 (love) (77)		设施	拖鞋 (Slippers) 62.3%	差 (Bad) (35)、小 (small) (22)、收费 (need to pay) (21)、坏 (broken) (16)、不好 (not good) (15)、臭 (smelly) (15)、脏 (dirty) (13)、	

(续)

Table 4.. (Continued).

Satisfactory features (Positive tendency)		Disatisfactory features (Negative tendency)	
Domain	Positive sentiments	Domain	Negative sentiments
Service	前台 (Receptions) 78.2%	Facilities 马桶 (Toilet bowls) 76.6%	坏 (Not working) (121)、堵 (clogged) (46)、不好 (not good) (46)、漏水 (water leakage) (28)、小 (small) (27)、差 (bad) (21)、脏 (dirty) (14)、吵 (noisy) (14)、很小 (very small) (12)、老 (old) (12)、旧 (worn) (11)、不太好 (not so good) (11)
Facilities	装修 (Decorations) 76.0%	Reservation 返现 (Return cash) 55.6%	垃圾 (Rubbish) (7)、坑 (bum) (7)、一般 (fair) (3)、慢 (slow) (3)、差 (bad) (3)、坑爹 (cheating) (3)、不好 (not good) (3)、贵 (expensive) (2)、坏 (awful) (1)、不行 (no good) (1)、一般般 (just so-so) (1)、不符 (discrepancy) (1)、奇怪 (strange) (1)、少 (little) (1)、不爽 (unhappy) (1)
Location	机场 (Airports) 86.5%	Reservation 发票 (Invoices) 59.7%	差 (Bad) (5)、一般 (fair) (4)、不好 (not good) (4)、太慢 (too slow) (4)、垃圾 (rubbish) (4)、麻烦 (troublesome) (3)

(Continued)

表4.. (续) .

令人满意的特征 (积极倾向)		不满意的特征 (负面倾向)	
域	积极情绪	域	负面情绪
服务	前台 (Receptions) 78.2%	设施	马桶 (Toilet bowls) 76.6%
设施	装修 (Decorations) 76.0%	Reservation	返现 (Return cash) 55.6%
位置	机场 (Airports) 86.5%	Reservation	发票 (Invoices) 59.7%
	热情 (Enthusiasm) (901)、不错 (pretty good) (513)、干净 (clean) (316)、方便 (convenient) (200)、免费 (free of charge) (160)、服务周到 (good service) (147)、礼貌 (polite) (112)、赞 (thumbs-up) (109)、耐心 (patient) (104)	干净 (clean) (499)、新 (new) (401)、温馨 (warm) (210)、喜欢 (love) (132)、卫生 (sanitary) (120)、方便 (convenient) (105)、整洁 (neat) (103)、特色 (characteristic) (94)、简约 (simplicity) (84)、舒适 (comfortable) (84)、大 (big) (72)、舒服 (comfort) (72)、简洁 (briefness) (66)、时尚 (fashionable) (62)、安静 (quiet) (61)、漂亮 (beautiful) (59)、精致 (exquisite) (34)	坏 (Not working) (121)、堵 (clogged) (46)、不好 (not good) (46)、漏水 (water leakage) (28)、小 (small) (27)、差 (bad) (21)、脏 (dirty) (14)、吵 (noisy) (14)、很小 (very small) (12)、老 (old) (12)、旧 (worn) (11)、不太好 (not so good) (11)
	近 (Close) (1820)、方便 (convenient) (1027)、免费 (free of charge) (242)、不远 (not far) (99)	差 (Bad) (5)、一般 (fair) (4)、不好 (not good) (4)、太慢 (too slow) (4)、垃圾 (rubbish) (4)、麻烦 (troublesome) (3)	垃圾 (Rubbish) (7)、坑 (bum) (7)、一般 (fair) (3)、慢 (slow) (3)、差 (bad) (3)、坑爹 (cheating) (3)、不好 (not good) (3)、贵 (expensive) (2)、坏 (awful) (1)、不行 (no good) (1)、一般般 (just so-so) (1)、不符 (discrepancy) (1)、奇怪 (strange) (1)、少 (little) (1)、不爽 (unhappy) (1)

(续)

Table 4.. (Continued).

Domain	Satisfactory features (Positive tendency)	Positive sentiments	Domain	Disatisfactory features (Negative tendency)	Negative sentiments
Facilities	热水 (Hot water) 76.4%	充足 (enough) (199)、快 (fast) (162)、 干净 (clean) (155)、方便 (convenient) (155)、热 (hot) (105)、足 (plenty) (83)、很足 (quite enough) (46)、很快 (quite fast) (38)			
Service	服务员 (waitress) 80.7%	热情 (Enthusiasm) (742)、不错 (pretty good) (238)、干净 (clean) (182)、礼 貌 (polite) (115)、耐心 (patient) (61)、卫生 (sanitary) (55)、服务周到 (good service) (54)、满意 (satisfied) (52)、赞 (thumbs-up) (48)、安静 (quiet) (47)、免费 (free of charge) (44)、贴心 (caring) (41)、周到 (thoughtful) (39)			
Location	公交 (Buses) 83.9%	方便 (Convenient) (1001)、近 (close) (515)、多 (more) (76)、便利 (convenience) (66)、不远 (not far) (61)			
Location	火车站 (Railway stations) 86.2%	近 (Close) (926)、方便 (convenient) (354)、不远 (not far) (50)、好找 (easy to find) (20)			
Location	超市 (Supermarkets) 86.4%	方便 (Convenient) (645)、近 (close) (176)、多 (more) (89)、便利 (convenience) (68)、很多 (many) (39)、大 (big) (35)、实惠 (affordable) (31)、不远 (not far) (30)、齐全 (well-equipped) (25)			
Location	小吃 (Snacks) 91.8%	多 (Many) (343)、方便 (convenient) (308)、很多 (a good many) (160)、干净 (clean) (134)、近 (close) (95)、便宜 (cheap) (31)、卫生 (sanitary) (30)、 实惠 (affordable) (20)、齐全 (well- equipped) (18)			
Service	打扫 (Cleanings) 70.4%	干净 (Clean) (413)、及时 (timely) (136)、不错 (pretty good) (103)			
Service	退房 (Check-out) 64.7%	方便 (Convenient) (84)、快 (fast) (82)			

Note: Rank-order of features is according to frequency of feature occurrence. Positive sentiment tendency = Count of positive sentiment/Total count*100%. For example, the positive sentiment tendency of 90.1% for guests means that 90.1% of the reviews with the feature guest contains positive sentiments (satisfactory features).

表4.. (续) .

域	令人满意的特征 (积极倾向)	积极情绪	域	不满意的特征 (负面倾向)	负面情绪
设施	热水 (Hot water)) 76.4%	充足 (enough) (199)、快 (fast) (162)、 干净 (clean) (155)、方便 (convenient) (155)、热 (hot) (105)、足 (plenty) (83)、很足 (quite enough) (46)、很快 (相当快) (38)			
服务	服务员 (waitress)) 80.7%	热情 (Enthusiasm) (742)、不错 (pretty good) (238)、干净 (clean) (182)、礼 貌 (polite) (115)、耐心 (patient) (61)、卫生 (sanitary) (55)、服务周到 (good service) (54)、满意 (satisfied) (52)、赞 (thumbs-up) (48)、安静 (quiet) (47)、免费 (free of charge) (44)、贴心 (caring) (41)、周到 (深思熟虑的) (39)			
位置	公交 (Buses) 83.9%	方便 (Convenient) (1001)、近 (close) (515)、多 (more) (76)、便利 (convenience) (66)、不远 (not far) (61)			
位置	火车站 (Railway 车站) 86.2%	近 (Close) (926)、方便 (convenient) (354)、不远 (not far) (50)、好找 (easy to find) (20)			
位置	超市 (超市) 86.4%	方便 (Convenient) (645)、近 (close) (176)、多 (more) (89)、便利 (convenience) (68)、很多 (many) (39)、大 (big) (35)、实惠 (affordable) (31)、不远 (not far) (30)、齐全 (well-equipped) (25)			
位置	小吃 (零食) 91.8%	多 (Many) (343)、方便 (convenient) (308)、很多 (a good many) (160)、干净 (clean) (134)、近 (close) (95)、便宜 (cheap) (31)、卫生 (sanitary) (30)、 实惠 (affordable) (20)、齐全 (well- equipped) (18)			
服务	打扫 (Cleanings) 70.4%	干净 (Clean) (413)、及时 (timely) (136)、不错 (pretty good) (103)			
服务	退房 (Check-out) 64.7%	方便 (Convenient) (84)、快 (fast) (82)			

注：特征的排名顺序取决于特征出现的频率。积极情绪倾向=积极情绪计数/总计数*100%。例如，客人的积极情绪倾向为90.1%，这意味着90.1%的客人评论包含积极情绪（满意的职能）。

up” and implies that they are “satisfied,” which leads them to “recommend” the hotel to others. The second satisfactory feature is “circumstances.” The customers enjoy the “clean,” “quiet,” and “comfortable” environment. The “circumstances” are considered “elegant” and “neat” and create an atmosphere with “love,” which in turn leads to “relaxation” and “pleasant enjoyment.”

The next satisfactory feature is “convenient” “location” that is “easy to find,” with “fast” and “well-equipped” “traffic” and transportation facilities. By analyzing the feature words, we found that the guests pay attention to transportation and geographical locations. They give importance to the distance from “metro station,” “airport,” “bus stations,” “railway stations” and look at it in terms of being “near,” “not far,” and “easy to find.” More importantly, they lay emphasis on the fact that they can access transportation “conveniently” and “free of charge.” Online reviewers also pay attention to “big” “supermarkets” that are “close” to the hotel so that guests can buy “affordable” items. While food and drinks are generally not expected in the economy hotel experience, provision of “a good many” of “snacks” at “affordable” prices that are “good” and “sanitary” is interpreted by guests as a delightful experience.

With respect to room, positive comments focus on “bed,” “decoration,” and “hot water.” Guests not only require “clean” and “neat” facilities, but also hope that facilities are “new” and “complete,” and rooms are “spacious.” A number of new words that indicate positive sentiments such as, “characteristic,” “briefness,” “fashionable,” “beautiful,” and “exquisite,” are found in the reviews. This implies that guests have high esthetic requirements even from economy accommodations.

As for service, economy hotel customers believe that “service attitude” of staff adds to the level of satisfaction. In this respect, many positive comments such as, “pretty good” service at the “receptions” and appreciation of “cleanings” staff are observed. In general, they hope that staff at the hotel are “clean” and “polite,” and offer “thoughtful” and “free of charge” services. They speak highly of the “enthusiasm,” of front desk staff and how “patient” they are; moreover, “timely” and “caring” cleaning is indicated with a “thumbs-up” and these hotels are “recommended” to others.

With regard to price, a new finding is that the feature that brings the highest positive sentiment is “deposit,” with 99.5% reviews revealing this positive sentiment tendency. In the case of many economy hotels, when checking in at the hotel, guests mention that the way to pay the deposit is “pretty good” and it is “cheap,” or even that they did not need to pay a deposit because it is “free of charge.” Therefore, guests can “check-out” “fast” and in a “convenient” manner. This convenience can be a comparative advantage of economy hotels. The efficiency of check-out leads to a satisfactory culmination of the entire experience of staying at the hotel.

Guests negative sentiments

The features that lead to dissatisfaction are the ones that are associated with negative sentiments more than positive sentiments. We analyzed the 363,723 reviews and identified 14 features, that include the major dissatisfactory experiences of the guests. We consolidated all the negative reviews to consecutively understand customer experience clearly.

这意味着他们“满意”，这导致他们向其他人“推荐”酒店。第二个令人满意的特征是“环境”顾客享受“干净”、“安静”和“舒适”的环境。“环境”被认为是“优雅”和“整洁”，创造了一种“爱”的氛围，这反过来又导致“放松”和“愉快的享受”

下一个令人满意的特点是“方便”“位置”，即“容易找到”，具有“快速”和“完善的”“交通”和运输设施。通过对特征词的分析，我们发现游客们关注交通和地理位置。他们重视距离“地铁站”、“机场”、“公交站”、“火车站”的距离，并从“近”、“不远”和“容易找到”的角度来看待它更重要的是，他们强调他们可以“方便”和“免费”使用交通工具在线评论者也会关注离酒店“很近”的“大型”超市，这样客人就可以买到“实惠”的商品。虽然在经济型酒店的体验中通常不需要食物和饮料，但以“实惠”的价格提供“很多”的“零食”，而且“好”和“卫生”，客人认为这是一种愉快的体验。

关于房间，正面的评论集中在“床”、“装饰”和“热水”上。客人不仅需要“干净”和“整洁”的设施，还希望设施“新”和“完整”，房间“宽敞”评论中有许多表示积极情绪的新词，如“特色”、“简洁”、“时尚”、“美丽”和“精致”。这意味着即使是经济型住宿，客人也有很高的审美要求。

在服务方面，经济型酒店的顾客认为员工的“服务态度”会提高满意度。在这方面，观察到许多积极的评论，例如“招待会”上的“相当好”服务，以及对“清洁”工作人员的赞赏。总的来说，他们希望酒店的员工“干净”和“礼貌”，并提供“周到”和“免费”的服务。他们高度赞扬前台员工的“热情”，以及他们的“耐心”；此外，“及时”和“关心”的清洁用“竖起大拇指”表示，这些酒店被“推荐”给其他人。

关于价格，一项新发现是，带来最高积极情绪的特征是“存款”，99.5%的评论揭示了这种积极情绪趋势。在许多经济型酒店的情况下，客人在入住酒店时提到，支付押金的方式“相当好”，而且“便宜”，甚至他们不需要支付押金，因为这是“免费的”因此，客人可以“快速”以“方便”的方式“退房”。这种便利可能是经济型酒店的一个比较优势。退房的效率使入住酒店的整个体验达到令人满意的顶点。

客人的负面情绪

导致不满的特征更多地与消极情绪有关，而不是与积极情绪有关。我们分析了363723条评论，确定了14个特征，包括客人的主要不满意体验。我们整合了所有负面评论，以便连续清晰地了解客户体验。

The biggest negative experience is because of “bad” “sound insulation.” Customers describe this as “not good” experience because it is “noisy” or they are “awakened by noise.” The “poor” and “inferior” sound-proofing of rooms leads to a “terrible” experience.

Electrical facilities in the hotel room also lead to a lot of negative sentiments, and “air conditioners” and “TV” are the cause of most complaints. A number of detailed reviews that mention these two aspects are presented in Table 5. The “air conditioners” are “noisy” and “cold,” or even “worn” out and have “water leakage.” Certain customers were disappointed with the “old-style” of “TV” and used negative descriptive words, such as “small,” “awful,” and as having a “snowy screen.” Customers have to deal with the aging electronic devices in the economy hotels, and this leads to a bad experience.

Uncomfortable “bedding” also generates unpleasant experiences for hotel guests. Our research found many detailed reasons for the complaints about bedding. The most important aspects mentioned were that the bedding was “small,” “hard,” and “dirty.” The experience of customers was “disappointing” and they were unsatisfied because of “wet,” “yellow,” and “damaged” bedclothes. Some reviews also mentioned that the “worn-out” bedding in the hotel room was full of “cigarette smoke” or even “mildewed.” This led to a “bad,” “disgusting” experience which was amplified when they saw “hair” and “blood-stain” on the “unchanged” “bedding.” An interesting finding is that many guests complained about the “windows” in economy hotels. They do not like the depressing interiors as the windows are usually “small” and “stuffy.” They complained that windows do “not open” and hence rooms are “badly ventilated.”

According to the results, factors such as “small” “toilet” in economy hotels were also mentioned in many negative reviews. “Towel,” “slippers,” “hair dryer,” and “toilet bowls” were found to be negative sentiment generators. Unfortunately, the toilets of economy hotels are “too simple,” “smelly,” and “dirty.” The “towels” are usually “worn” out and are dirty and “black.” “Slippers” are “thin” and “hard” but still “need to pay.” “Hair dryers” are “not working” and “not enough.” “Toilet bowls” are “clogged” and there is “water leakage.”

The “elevators” in economy hotels make customers feel uncomfortable as sometimes they are “not working” and are “small.” The “noisy” and “slow” elevators seem “troublesome.” Another issue in economy hotels is that they have insufficient “weak” “signal” coverage. The customers are unhappy when they have to face WiFi connection issues or “no connectivity” of the WiFi network. In terms of reservations, some customers complain about “return cash” and “cheating” and that staff take too much time in issuing the “invoices” or the process is “too slow.”

Comparison between positive and negative sentiments

Figure 1 demonstrates the semantic clusters and networks of positive and negative sentiments of the reviews. Clusters represent the satisfactory or dissatisfactory features around positive sentiments or negative sentiments.

Features related to facilities (marked with red color in Figure 1) such as bed, hot water, decoration, receive many positive as well as negative comments. However, the foci of customer satisfaction and dissatisfaction were different when comparing the positive and negative sentiments. As shown in Figure 1, many words related to location (yellow) are important in generating customers’ positive sentiments, while they are not significant in the negative reviews. The positive sentiments concentrate on convenient location and high-

最大的负面体验是因为“隔音效果差”客户称这是“不好”的体验，因为它“嘈杂”或“被噪音吵醒”房间的隔音效果“差”和“差”会导致“糟糕”的体验。酒店房间的电气设施也会引发很多负面情绪，“空调”和“电视”是大多数投诉的原因。表5. 出了提到这两个方面的一些详细评论。“空调”是“吵”和“冷”，甚至“磨损”和“漏水”某些客户对“电视”的“旧式”感到失望，并使用了消极的描述性词汇，如“小”、“糟糕”，以及“雪白的屏幕”客户们不得不应对电子设备的老化经济型酒店，这会导致糟糕的体验。

不舒服的“床上用品”也会给酒店客人带来不愉快的体验。我们的研究发现了许多关于床上用品的抱怨的详细原因。提到的最重要的方面是床上用品“小”、“硬”和“脏”顾客的体验“令人失望”，他们对“湿的”、“黄的”和“损坏的”床上用品感到不满意。一些评论还提到，酒店房间里“破旧”的床上用品充满了“香烟烟雾”，甚至“发霉”这导致了一种“糟糕的”、“恶心的”体验，当他们看到“未改变的”床上用品上的“头发”和“血迹”时，这种体验被放大了。一个有趣的发现是，许多客人抱怨经济型酒店的“窗户”。他们不喜欢令人沮丧的内部环境，因为窗户通常“小”且“闷热”他们抱怨窗户“无法打开”，因此房间“通风不良”

根据调查结果，许多负面评论中也提到了经济型酒店的“小”“厕所”等因素。“毛巾”、“拖鞋”、“吹风机”和“马桶”被发现是负面情绪发生器。不幸的是，经济型酒店的厕所“太简单”、“臭”和“脏”这些“毛巾”通常是“破旧”的，而且又脏又“黑”“拖鞋”既“薄”又“硬”，但仍然需要付钱“吹风机”既“不起作用”又“不够”“马桶”被“堵塞”，而且“漏水”经济型酒店的“电梯”

让顾客感到不舒服，因为有时他们“不工作”，而且“很小”“嘈杂”和“缓慢”的电梯似乎“有些麻烦”经济型酒店的另一个问题是，它们没有足够的“弱”信号覆盖。当客户不得不面对WiFi连接问题或WiFi网络“无法连接”时，他们会感到不高兴。在预订方面，一些客户抱怨“退钱”和“作弊”，而且员工花了太多时间签发预订单

“发票”或流程“太慢”

积极情绪与消极情绪的比较

Figure 1 展示评论的积极和消极情绪的语义集群和网络。聚类代表积极情绪或消极情绪的满意或不满意特征。

与床、热水、装饰等设施（图1中用红色标记）相关的功能得到了许多正面和负面评论。然而，当比较正面情绪和负面情绪时，顾客满意度和不满的焦点是不同的，如图1所示，许多与地点有关的词（黄色）对产生顾客的正面情绪很重要，而在负面评论中它们并不重要。积极的情绪集中在便利的位置和高-

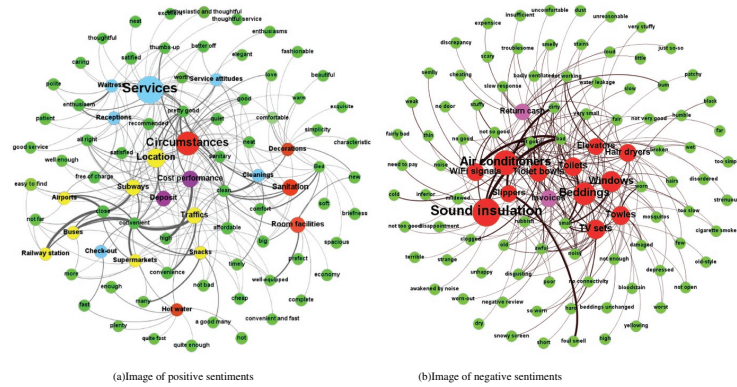


Figure 1. Sentiments image of economy hotel guests' reviews (a) Image of positive sentiments. (b) Image of negative sentiments. Note: The nodes represent high-frequency words, and the size of the node shows its importance; the line connecting the nodes represents the association between word, and the distance between nodes represents the degree of closeness. Red nodes identified features of facilities, yellow nodes identified features of location, blue nodes identified features of service, purple node identified features of reservation and price, green nodes identified sentiments affiliated to the sentiments.

quality service. Features related to service (blue) also obtained many compliments, indicating Chinese customers are overall satisfied about service of economy hotels. For the features of reservation (purple), the guests speak high of good deposit and quick check-out, but leave complaints about slow cash returning and invoicing.

In contrast, the structure of negative sentiments is more centric than positive sentiments, focusing on some specific facilities in guest room. Service environmental setting issues, including poor sound insulation, weak Wi-Fi, also lead to dissatisfaction. Some facility problems, such as noisy air conditioners, small TV, stuffy windows, and dirty bedding generate the major negative sentiments.

Discussion and conclusions

In this study, we collected extensive data and ran a fine-grained sentiment analysis to enable a comprehensive understanding of the consumer experience in economy hotels in China. We identified features and sentiments words that reflect consumers' opinions on the important experiential features contributing to their (dis)satisfaction with economy hotel stays. Since this list of words is a discrete representation of guest experience, we consolidate them as integral description. Moreover, the structure of guest experience is identified through sentiment imaging by comparing positive and negative opinions. The results showed several similarities and differences.

First, the current study is in line with the research by Hua et al. (2009) in revealing that a pleasant experience includes many physical features of the hotel. These include cleanliness, noise-free environment, sanitary surroundings, new facilities, and elegant decorations.

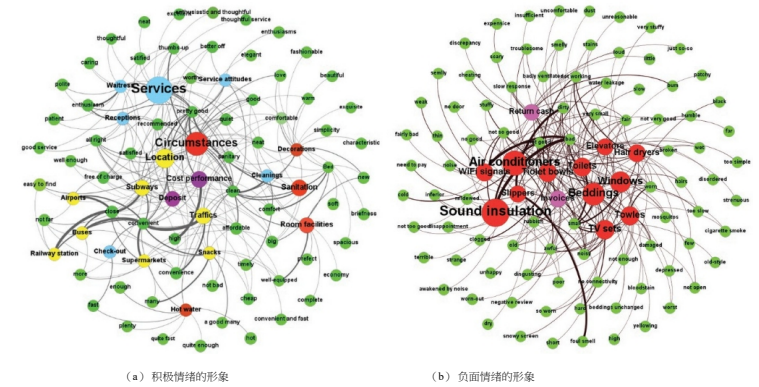


图1. 经济型酒店客人评论的情绪形象 (a) 积极情绪的形象。 (b) 负面情绪的形象。注：节点代表高频词，节点大小显示其重要性；连接节点的线表示单词之间的关联，节点之间的距离表示紧密程度。红色节点识别设施的特征，黄色节点识别位置的特征，蓝色节点识别服务的特征，紫色节点识别预订和价格的特征，绿色节点识别与情感相关的情感。

优质服务。与服务相关的功能（蓝色）也得到了很多称赞，表明中国客户对经济型酒店的服务总体满意。对于预订（紫色）的特点，客人们对良好的押金和快速退房赞不绝口，但对现金返还和发票开具速度缓慢表示不满。

相反，消极情绪的结构比积极情绪更为中心，主要集中在客房的一些特定设施上。服务环境设置问题，包括隔音效果差、Wi-Fi弱，也会导致不满。一些设施问题，如空调噪音大、电视小、窗户不通风、床上用品脏等，会产生主要的负面情绪。

讨论和结论

在这项研究中，我们收集了大量数据，并进行了细致的情绪分析，以便全面了解中国经济型酒店的消费者体验。我们确定了一些特征和情感词汇，它们反映了消费者对重要体验特征的看法，这些体验特征有助于他们对经济型酒店住宿的满意度。由于这张单子是客人体验的离散表示，我们将其整合为整体描述。此外，通过比较正面和负面意见，通过情绪成像识别客人体验的结构。结果显示了一些相似之处和不同之处。

首先，目前的研究与Hua等人（2009）的研究一致，该研究揭示了愉快的体验包括酒店的许多物理特征。这些包括清洁、无噪音环境、卫生环境、新设施和优雅的装饰。

However, the findings of this study are different from the survey conducted by Xu and Li (2016), who identified that the main factors in limited-service hotels that have an impact on customer satisfaction are, good value and room quality. Upon examining online reviews, it is evident that low-price is not the biggest positive sentiment for economy hotel guests. Our findings contradict with Duan et al. (2016)'s viewpoints that consumers of economy hotels focus on hotel performance from the perspective of more basic aspects. Economy hotel guests do not seem to be only driven by low prices; they also expect to demand other service aspects to fulfill a good experience (Xu, 2019). As this sector develops, service quality will be eventually the differentiator and will offer a competitive advantage among economy hotels.

Second, similar to the finding of Nash et al. (2006), negative sentiments mainly arise from complaints about the facilities. As has been established, economy hotels, in general, cost less and offer basic guestrooms (Chan & Ni, 2011). Although Guo et al. (2017) found quietness and maintenance are less important to economy hotel customers compared with luxury hotels, we identified sound insulation as the biggest dissatisfactory factor by customers staying in economy hotels. Economy hotels often adopt space saving methods to control fixed and operational costs. Although cost saving is one of the major features of economy hotels (Yan et al., 2015), this study recommends that economy hotels should not reduce room size and over-simplify the facilities as this leads to serious negative sentiments. This phenomenon is quite different from the low expectations of facilities in budget hotel guests in the western countries (Brotherton, 2004).

H. Q. Zhang et al. (2013) concluded that a typical economy hotel room is around 20 square meters with simple and inexpensive designs. Based on our findings we claim that design and amenities were very important for economy hotel guests in China based on their consumption habits. Chinese guests, even the ones who choose economy hotels, still hold traditional collectivism lifestyle such as family duty and caring for the children; therefore, their requirements of hot water and spacious room should be given high consideration. Our findings supplement the results from previous studies, such as that conducted by Xu and Li (2016), whose findings suggest that maintenance management are important even for economy sector hotels where cost and staffing have to be minimized.

Third, our research indicates that location of the hotel is a factor that has the most positive impact, and convenient access to public transit (such as subways, local bus station) is more important than private transportation (such as taxi). In the Chinese context, the importance of geographic location of economy hotels is a vital factor for competitive priorities (Subramanian et al., 2016). For economy hotel guests, transportation convenience is not only an auxiliary attribute, but is a core attribute that has an impact on customer experience. This finding is different from that of J. Peng et al. (2015).

We believe that the preferences for convenience in hotel location and transportation access may be related to cultural preferences for utility and function (X. R. Li et al., 2011), particularly in new environments. Guests are still sensitive to the "price-value relationship," but they change the low-price preference from room rate to public transportation and inexpensive food and beverages. If the location meets three basic requirements of consumers, namely, free-of-charge transportation, low-cost dining, and budget shopping, it can generate positive comments. Economy hotel chains often have many units in the same area and there is little variation among the hotels (Mellinas et al., 2019). In the economy hotel context, guests prefer hotels located close to transportation portals (airports and railway station) more than tourist attractions and entertainment venues. This contradicts the

然而, 这项研究的结果与Xu和Li (2016) 进行的调查不同, 他们发现, 在服务有限的酒店中, 影响顾客满意度的主要因素是价值和房间质量。通过查看在线评论, 很明显, 低价并不是经济型酒店客人最大的积极情绪。我们的研究结果与Duan等人 (2016) 的观点相矛盾, 即经济型酒店的消费者从更基本的角度关注酒店绩效。经济型酒店的客人似乎不仅仅是因为价格低; 他们还希望通过其他服务方面来实现良好的体验 (Xu, 2019)。随着这一行业的发展, 服务质量将最终成为差异化因素, 并将在经济型酒店中提供竞争优势。其次, 与纳什等人 (2006年) 的调查结果类似, 负面情绪主要来自对设施的投诉。正如已经建立的那样, 经济型酒店通常成本较低, 并提供基本客房 (Chan & Ni, 2011)。尽管郭等人 (2017) 发现, 与豪华酒店相比, 安静和维护对经济型酒店的客户来说不那么重要, 但我们发现, 对于住在经济型酒店的客户来说, 隔音是最大的不满意因素。经济型酒店通常采用节省空间的方法来控制固定成本和运营成本。虽然节约成本是经济型酒店的主要特点之一 (Yan等人, 2015年), 但本研究建议经济型酒店不应减少房间大小, 过度简化设施, 因为这会导致严重的负面情绪。这一现象与经济型酒店客人对酒店设施的低期望有很大不同

在西方国家 (Brotherton, 2004)。

张海清等 (2013) 得出结论, 典型的经济型酒店房间面积约为20平方米, 设计简单且价格低廉。根据我们的调查结果, 我们认为设计和便利设施对中国经济型酒店客人的消费习惯非常重要。中国客人, 即使是选择经济型酒店的客人, 仍然保持着传统的集体主义生活方式, 比如家庭责任和照顾孩子; 因此, 应高度考虑他们对热水和宽敞房间的要求。我们的研究结果补充了之前的研究结果, 例如徐和李 (2016) 的研究结果, 他们的研究表明, 即使对于成本和人员配置必须最小化的经济型酒店, 维护管理也很重要。

第三, 我们的研究表明, 酒店的位置是一个具有最积极影响的因素, 便捷的公共交通 (如地铁、当地公交车站) 比私人交通 (如出租车) 更重要。在中国背景下, 经济型酒店地理位置的重要性是竞争重点的关键因素 (Subramanian等人, 2016)。对于经济型酒店的客人来说, 交通便利性不仅是一个辅助属性, 也是影响客户体验的一个核心属性。这一发现与J. Peng等人 (2015) 的发现不同。

我们认为, 酒店位置和交通便利性的偏好可能与实用性和功能的文化偏好有关 (X. R. Li等人, 2011), 尤其是在新环境中。客人仍然对“价格-价值关系”很敏感, 但他们将低价格偏好从房价改为公共交通和廉价食品和饮料。如果地点满足消费者的三个基本要求, 即免费交通、低成本餐饮和廉价购物, 它可以产生积极的评价。经济型连锁酒店通常在同一地区拥有多个单元, 各酒店之间几乎没有差异 (Mellinas等人, 2019年)。在经济型酒店方面, 与旅游景点和娱乐场所相比, 客人更喜欢靠近交通门户 (机场和火车站) 的酒店。这与事实相矛盾

findings of Luo and Yang (2016) for hotels of all sectors. The finding is also different from that of studies on luxury and full-service hotels where guests look for exclusive dining experiences (Cetin & Walls, 2016). Economy hotel guests highly appreciate the availability of local services, products, and businesses (such as the number of restaurants and supermarkets nearby and snack availability).

Fourth, our study provides evidence of consistence with Ali, Amin and Cobanoglu (2016)'s finding that soft elements such as harmonious customer interactions, positive attitude, and quick responses, are an important dimension that has an impact on customer experience. Contradicting with Mohsin and Lengler (2015) conclusion that economy hotel guests have low expectations with service, this study found guests in China's economy hotels cherish enthusiastic face-to-face interactions with human contact. Frontline employees who directly serve customers still determine much of the customers' service experience (Kandampully et al., 2018). Therefore, a balance between technology and human touch has to be maintained in economy hotels. However, unlike the study conducted by Rahimi and Kozak (2017), this study indicates that professional and efficient service always ensures satisfaction amongst economy hotel guests. For economy hotels in China, Confucian values related to workplace dedication may result in relatively high expectations of Chinese visitors in performance related to service including check-in and cleaning.

Theoretical and practical contributions

While big data analytics has been touted as a new research paradigm in many disciplines, very few applications in the hospitality and tourism domain fully explore its capabilities. By using fine-grained classification, this study adds further depth to analytical methods in online review analysis. A major drawback in the current approach concerning sentiment analysis in hospitality is that it is technique-oriented, which heavily focuses on algorithms, without providing practical guidelines (Alaei et al., 2019). Our study attempts to address this limitation by taking into consideration the results to derive insights to improve the operation strategy of economy hotels.

As compared to a number of previous studies, this study has several important implications.

Firstly, from a theoretical perspective, our results extend the current knowledge on sentiment of hotel guests in economy hotels, an area where research is sparse generally in Asia and almost non-existent within the context of China (Z. Yang et al., 2017). This study provides an opportunity for enhancing economy hotel management in general and China's economy hotel management specifically to understand the positive and negative sentiments of customers. In other words, it identifies the factors that are satisfactory and dissatisfactory in this hotel sector.

The findings of this study shed light on the nature of economy hotel guest experiences. The positive and negative sentiments expressed through reviews and the overall sentiment are important factors based on which economy hotels can appropriately ensure operational and strategic improvements. By depending on real experience data of guests rather than the perceived data from a survey, a more general and truthful interpretation of this issue is possible.

Secondly, we applied sentiment analysis method by considering the language habits of Chinese hotel customers. Hotels in Chinese region account for near 60% of the supply in the

罗阳 (2016) 对各行业酒店的调查结果。这一发现也不同于对豪华酒店和全方位服务酒店的研究, 在这些酒店中, 客人寻求专属餐饮体验 (Cetin & Walls, 2016)。经济型酒店的客人非常欣赏当地服务、产品和业务的可用性 (如附近餐厅和超市的数量以及零食的可用性)。

第四, 我们的研究提供了与Ali、Amin和Cobanoglu (2016) 的发现一致的证据, 即和谐的客户互动、积极的态度和快速的反应等软元素是影响客户体验的重要维度。与Mohsin和Lengler (2015) 得出的经济型酒店客人对服务的期望较低的结论相矛盾, 本研究发现中国经济型酒店的客人喜欢与人进行热情的面对面交流。直接为客户服务的一线员工仍然决定着客户的大部分服务体验 (Kandampelly等人, 2018年)。因此, 经济型酒店必须在技术和人性化之间保持平衡。然而, 与拉希米和科扎克 (2017) 的研究不同, 这项研究表明, 专业高效的服务总能确保经济型酒店客人的满意度。对于中国的经济型酒店而言, 与工作场所奉献相关的儒家价值观可能会导致中国游客对入住和清洁等服务的表现有较高的期望。

理论和实践贡献

虽然大数据分析在许多学科中被吹捧为一种新的研究范式, 但在酒店和旅游领域, 很少有应用程序能充分挖掘其能力。通过使用细粒度分类, 本研究进一步加深了在线评论分析中的分析方法。当前酒店业情绪分析方法的一个主要缺点是, 它以技术为导向, 主要关注算法, 而没有提供实用指南 (Alaei等人, 2019年)。我们的研究试图通过考虑研究结果来解决这一局限性, 从而得出改进经济型酒店运营策略的见解。

与之前的一些研究相比, 这项研究有几个重要的意义。

首先, 从理论角度来看, 我们的研究结果扩展了目前关于经济型酒店中酒店客人情绪的知识, 这一领域的研究在亚洲通常很少, 在中国几乎不存在 (Z. Yang et al., 2017)。本研究为全面加强经济型酒店管理, 特别是中国经济型酒店管理提供了机会, 以了解顾客的积极情绪和消极情绪。换句话说, 它确定了酒店行业中令人满意和不满意的因素。

这项研究的结果揭示了经济型酒店顾客体验的本质。通过评论表达的积极和消极情绪以及整体情绪是经济型酒店能够适当确保运营和战略改进的重要因素。通过依赖客人的真实体验数据, 而不是调查中的感知数据, 可以对这个问题做出更全面、更真实的解释。

其次, 结合中国酒店顾客的语言习惯, 运用情感分析方法。中国地区的酒店占全球供应量的近60%

Asia-Pacific market (Yang & Cai, 2016). With the explosion of Chinese online hotel reviews, sentiment analysis plays an important role in opinion mining. Accurate understanding of sentiment expressed in Chinese reviews can establish a solid foundation for future research.

Thirdly, economy hotel managers need to respond to both positive and negative online comments to enhance and preserve the image of their establishments. Accordingly, we recommend that hotels and online review websites develop a review analysis platform by using automated text-mining methods, such as deep learning.

Fourthly, the new generation of economy hotels in China should consider redecoration or renovation in terms of design, hardware facilities and services, while considering esthetics and comfort. In general, the operators must improve the rate of utilization, enlarge the space for activities, broaden the vision, and also reduce the cost of installation and maintenance. The designers could reduce the unnecessary decorations in rooms to make the space more open and create a warm and quiet environment. Fashionable, practical, and green furniture and electrical equipment could be introduced into guest rooms. Hotel service providers should attempt to provide better quality of service during customers' entire duration of stay.

Fifthly, economy hotel investors in China should pay more attention to their physical and virtual locations in response to the needs of their guests. Hotels can be built next to universities or the airport to target some special market segments, such as students and transit tourists.

Limitations and future research

The research has some limitations which also point to future research. First, the performance of text analytics should be examined using multiple data sets in big data analytics. Future research should test the efficacy of deep learning models across different tourist places and across different review platforms in order to demonstrate its robustness.

Second, the most important component of sentiment analysis systems is sentiment lexicon. However, a Chinese lexicon in the tourism and hotel domain is still lacking. In future, the annotation scheme used in our study can be further improved to develop a supervised machine-learning system for the automatic detection of positive and negative sentiment in tourism domain. A high-quality tourism-specific Chinese sentiment lexicon should be built upon extensive tourism data.

Third, the relationship between the extracted entities needs to be optimized. Future research could apply the core technology of next generation artificial intelligence and integrate the new development with fine-grained sentiment analysis so that not only users' emotional viewpoints can be mined, but also the reasons behind them can be clarified.

Fourth, we only analyzed online textual reviews of economy hotels. Future research could enrich the analysis by developing techniques for analyzing textual contents incorporating other peripheral cues such as tags that come along with user-provided photos. Apart from textual information, photos of economy hotels can provide insights about the experiences of tourists and their specific interests. More research should be conducted to collect other information such as user ID in order to understand the relationship between personal characteristics or trip-related factors and consumer experience.

亚太市场 (Yang & Cai, 2016)。随着中国在线酒店评论的激增, 情绪分析在意见挖掘中发挥着重要作用。准确理解中文评论中所表达的情感可以为以后的研究奠定坚实的基础。

第三, 经济型酒店经理需要对网上的正面和负面评论做出回应, 以提升和维护酒店的形象。因此, 我们建议酒店和在线评论网站使用自动文本挖掘方法 (如深度学习) 开发评论分析平台。

第四, 中国新一代经济型酒店在考虑美观性和舒适性的同时, 应考虑设计、硬件设施、服务等方面的再装修或更新。一般来说, 运营商必须提高利用率, 扩大活动空间, 拓宽视野, 同时降低安装和维护成本。设计师可以减少房间里不必要的装饰, 使空间更加开放, 创造一个温暖安静的环境。时尚、实用、绿色的家具和电气设备可以引入客房。酒店服务提供商努力在客户的整个入住期间提供更好的服务质量。

第五, 中国的经济型酒店投资者应更多关注其实体和虚拟位置, 以满足客人的需求。酒店可以建在大学或机场旁边, 以瞄准一些特殊的市场细分, 如学生和过境游客。

局限性与未来研究

该研究存在一些局限性, 这也指向了未来的研究方向。首先, 应该使用大数据分析中的多个数据集来检查文本分析的性能。未来的研究应该在不同的旅游景点和不同的评论平台上测试深度学习模型的有效性, 以证明其稳健性。

第二, 情感分析系统最重要的组成部分是情感词典。然而, 旅游和酒店领域的汉语词汇仍然缺乏。在未来, 我们的研究中使用的注释方案可以进一步改进, 以开发一个有监督的机器学习系统, 用于自动检测旅游领域的积极和消极情绪。一个高质量的旅游汉语情感词典应该建立在广泛的旅游数据之上。

第三, 需要优化提取实体之间的关系。未来的研究可以应用下一代人工智能的核心技术, 并将新的发展与细粒度情感分析相结合, 这样不仅可以挖掘用户的情感观点, 还可以澄清其背后的原因。第四, 我们只分析了经济型酒店的在线文本评论。未来的研究可以通过开发分析文本内容的技术来丰富分析, 并结合其他外围线索, 如用户提供的照片附带的标签。除了文字信息外, 经济型酒店的照片还可以提供关于游客体验及其特定兴趣的见解。应该进行更多的研究来收集其他信息, 例如用户ID, 以便了解个人信息和身份之间的关系

特征或出行相关因素和消费者体验。

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