Original Research Article

Research on customer complaint hotspot identification and product improvement strategies driven by sensory analysis

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Abstract: With the continuous upgrading of consumer demand for products and services, it is particularly crucial for enterprises to identify problems and optimize services through complaints revealed in customer feedback. In natural language processing technology, sentiment analysis occupies a core position and can help enterprises extract useful data from numerous feedbacks. This article uses sentiment analysis techniques to focus on exploring the core issues in customer complaints and proposes targeted product optimization suggestions based on this. Introduced the working principle of sentiment analysis and its unique features in the field of customer service. Through case analysis, the complaint focus has been clarified in terms of product quality, transportation process, price information communication, and operational convenience. Based on sentiment analysis, strategies for product improvement have been proposed, such as analyzing the root causes of quality complaints, improving logistics and distribution efficiency, revising pricing policies, and conducting user experience evaluations, providing theoretical basis and practical guidance for enterprises to improve customer satisfaction and enhance product market competitiveness.

Keywords: Sentiment analysis; Customer complaints; Hotspot identification; Product improvement

1. Introduction

In today's market economy system, consumer customer complaints reflect deficiencies in products or services, which is an important basis for enterprises to optimize and innovate. The transformation of enterprises in the information age advocates a customer-centric service concept. Customer complaints are an important touchpoint between customers and businesses throughout the entire customer lifecycle. Proper handling of customer complaints can increase customer stickiness and enhance customer loyalty to the company. In addition to resolving issues during the complaint handling process, higher demands are also placed on the emotional experience of customers. This article relies on emotion recognition technology to explore how to use automated tools to mine key issues in customer complaints, and based on specific data, proposes strategies and suggestions for product improvement, with the aim of providing theoretical support and operational guidance for enterprises to improve product and service quality.

2. Overview of sentiment analysis techniques

2.1. Basic principles of sentiment analysis

The core of sentiment analysis lies in processing linguistic and textual data, uncovering emotional clues, and determining the emotional tendencies of the text based on them. This process can be roughly divided into several key steps, including text preprocessing, which includes segmenting the text, removing stop words, and restoring word forms. Feature selection usually uses methods such as Word Frequency Inverse Document Frequency (TF-IDF) or Word Set Model (BoW) to extract key emotional features from text. Emotion classification, which utilizes

machine learning (such as SVM, decision tree, etc.) or deep learning (such as CNN, LSTM, etc.) techniques to train features and classify emotions. Emotion analysis also involves quantifying emotional intensity in order to output more accurate analysis conclusions, such as distinguishing between different levels of mild negativity and strong negativity. Through this series of operations, enterprises can gain in-depth insights into consumer emotions, grasp consumers' subjective evaluations of products or services, and optimize them in a targeted manner.

2.2. Advantages of sentiment analysis in customer service

The core advantages of sentiment analysis in customer service can be explained from the following points: this technology can automatically process a large amount of user feedback, reducing the burden and cost of manual review and processing. With the help of sentiment analysis, companies can track consumer emotional fluctuations in real time, quickly identify negative emotions and complaint centers, and take immediate response measures. This technology can accurately tap into customers' implicit needs and dissatisfaction, helping enterprises to explore the practical problems faced by products or services in depth. Emotion analysis technology can also provide customized services in customer interaction, by interpreting customers' emotional reactions and optimizing communication strategies to enhance customer experience. For example, in the face of emotionally excited consumers, companies can adopt more patient and compassionate handling methods to improve customer satisfaction. Emotion analysis technology can also provide data analysis support for product improvement and market decision-making in enterprises, enabling them to rely on customer feedback to upgrade product quality, improve service standards, and establish long-term competitive advantages.

3. Customer complaint data analysis and hotspot identification

3.1. Product quality issues

In consumer feedback, product quality issues occupy an important position and are one of the main factors causing dissatisfaction and complaints. This type of problem covers deficiencies in product performance, design oversights, and substandard raw materials, all of which directly affect the actual user experience. For example, insufficient battery life of electronic products, frequent malfunctions of household appliances, and non-compliance with quality standards for food are common examples. With the continuous improvement of consumers' requirements for product quality, once the product fails to meet consumers' expectations, dissatisfaction will quickly escalate, leading to complaints. Continuous quality issues can also weaken consumers' trust in the brand, causing adverse effects on the brand's long-term image and market position. Dissatisfied consumers tend to express their dissatisfaction through online comments, social media platforms, or contacting after-sales service, which provides a channel for companies to timely understand product quality issues. Enterprises can use sentiment analysis techniques to identify which products or product lines are most susceptible to quality complaints, conduct in-depth analysis of complaint content, and uncover potential deficiencies in quality management. The source of quality issues may be hidden in multiple links such as production processes, supply chain management, and quality monitoring. Consumer feedback provides valuable clues and directions for enterprise improvement.

3.2. Inaccurate logistics delivery

In the rapidly developing e-commerce industry, the accuracy of the delivery process has become a key

factor affecting customer satisfaction. The flaws in logistics services, such as delivery delays, loss of goods in transit, delivery to the wrong address or missing goods, and slow updates of logistics information, directly affect consumers' shopping experience. Customers have high expectations for real-time feedback on delivery time and logistics status when selecting products. Once the logistics fails to fulfill their obligations as promised or the information provided is not detailed enough, it can easily trigger negative emotions among customers. Especially during the peak logistics period of holidays, the instability of services is more prominent, which is more likely to cause consumer dissatisfaction. Logistics services involve numerous links, including warehousing, transportation arrangements, information synchronization, etc. The inaccuracy of delivery is the result of multiple factors working together. Consumer complaints focus on specific logistics details or service attitude issues. Through sentiment analysis, companies can extract core problems from complaint data, identify shortcomings in the delivery process, improve logistics routes, and enhance delivery efficiency.

3.3. High prices, inaccurate promotion information

The high pricing of goods and inaccurate promotional information have become one of the hot issues in consumer complaints. With the increasing sensitivity of consumers to prices, any inaccuracies or contradictions in price information can trigger strong dissatisfaction among consumers. Especially on online shopping platforms, promotional activities often attract the attention of many consumers. Once the actual price of a product does not match the promotional information, or the promotional rules are not clearly stated, consumers will feel misled or even deceived. For example, when customers see promotional information such as "limited time special offer" or "full amount discount", they may find that they have not enjoyed the corresponding discount at checkout, or that the product price has not significantly decreased during the promotion period, which undoubtedly reduces their trust in the brand. In addition, some merchants use vague discount terms in their promotional activities, causing consumers to have doubts about the discount amount and triggering negative emotions during the purchasing process. Especially during major promotional festivals such as Double Eleven and 618, complaints about inaccurate or unclear prices will increase. For enterprises, inaccurate pricing and promotional information can have an impact on sales performance and may also lead to consumer churn. Therefore, timely use of sentiment analysis technology to capture and respond to these complaint focuses is particularly crucial.

4. Product improvement strategy based on sentiment analysis

4.1. Identify the specific reasons for quality complaints through sentiment analysis

Emotion analysis technology can conduct in-depth analysis of consumer feedback, helping companies accurately identify the root cause of product defects. In previous quality monitoring, manual data collection and classification were required, which was inefficient and may overlook key user dissatisfaction details. With the help of sentiment analysis technology, enterprises can quickly process massive user feedback and screen out emotional indicators related to product quality. For example, by analyzing emotional language in consumer reviews, companies can identify which product attributes or features have caused user dissatisfaction and refine these doubts. In the field of electronic products, issues may focus on battery life, system smoothness, and other aspects. In the field of clothing, it may be due to material discomfort or insufficient durability. Emotion analysis technology helps companies identify potential quality issues, accurately determine which quality issues are of greatest concern to users, and optimize product design and production processes in a targeted manner. Emotion analysis can also reveal the emotional intensity of user feedback, assisting businesses in determining whether a

quality issue is widespread or only experienced by individual consumers. By using this method, enterprises can quickly identify the root cause of quality issues, take corresponding improvement measures to enhance product quality, and reduce the subsequent quality complaint rate.

4.2. Optimizing logistics routes and delivery time based on customer emotional feedback

Deep adjustment of logistics delivery routes and delivery times is one of the key strategies to improve consumer satisfaction. Based on customer emotional feedback, sentiment analysis technology helps companies identify problem areas in logistics processes and implement precise improvement measures. Through emotional analysis of customer complaint data, companies can grasp the specific dissatisfaction of consumers with logistics services. For example, consumers may report issues such as delivery delays, delayed updates of logistics information, and poor service attitudes of couriers, all of which can lead to negative changes in consumer emotions. Emotion analysis can track the crux of these issues and assist businesses in identifying key obstacles in the delivery process. By improving delivery routes, companies can reduce unnecessary transportation steps and decrease delivery time. In addition, sentiment analysis can help companies track fluctuations in delivery time, ensuring the speed and accuracy of logistics services. This technology can also track changes in consumer emotions in real time, quickly identify negative feedback during the delivery process, and respond quickly to solve actual problems for consumers, enhancing their satisfaction and loyalty. By utilizing intelligent analysis of consumer emotional feedback, enterprises can continuously improve their logistics system, enhance delivery efficiency, and improve overall consumer experience.

4.3. Optimizing pricing strategies and transparency of promotional activities

Openness and transparency have become important factors in determining customer satisfaction when formulating pricing strategies and implementing promotional measures. With the help of sentiment analysis technology, businesses can accurately capture consumers' emotional reactions to prices and promotional activities, and adjust their strategies accordingly. During the promotion period, a large number of consumers may experience negative emotions due to discrepancies between the advertised and actual selling prices, as well as undisclosed additional fees. Emotion analysis can filter out emotional clues related to prices and promotions from feedback from numerous consumers, helping businesses identify the focus of consumer complaints such as high prices and misleading promotional information. For example, consumers may feel dissatisfied because the promotional promotion of "buy one get one free" does not match the actual received goods, and sentiment analysis technology can capture this information in a timely manner to assist businesses in optimizing promotional strategies and price standards. Emotion analysis helps businesses identify problems and gain insights into consumers' price sensitivity and acceptance of promotions, enabling them to develop pricing strategies and promotion plans that are more in line with consumers' expectations.

5. Conclusion

With the help of sentiment analysis technology, enterprises have gained a new way to handle customer dissatisfaction information, which helps them to more accurately explore the core issues of customers. By analyzing the emotional color in customer complaints, companies can quickly identify potential drawbacks in areas such as product quality, transportation processes, pricing strategies, etc., and adjust and improve product and service levels based on customer feedback. The product optimization path based on sentiment analysis

proposed in the article can help enterprises improve customer satisfaction index, strengthen brand loyalty, and ensure sustained competitive advantage in the fierce market competition. In the future, with the advancement and popularization of sentiment analysis technology, enterprises will be able to deepen the level and accuracy of data analysis, more effectively adapt to the diversification and personalization of customer needs, and promote the sustainable development of enterprises.

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Fund project

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