

Abstract of Doctoral Thesis

Information discovery methods that lead to innovation creation using natural language processing and statistical processing

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The purpose of this research is to propose a method for discovering information that leads to the creation of innovation using natural language processing and statistical processing for targeting information associated with services and products. In the past, services and products were classified by hand and qualitative judgment. There was arbitrariness. However, when conducting an analysis, word-of-mouth posted during a specific period were collectively analyzed without dividing the passage of time. It was not possible to analyze over time and grasp the change in value. As a result, the extracted information is the discovery of overt needs. It is useful for resolving dissatisfaction with current services and products. However, it was not information that led to the emergence of innovation. Therefore, this study was conducted with the aim of discovering information that leads to the creation of innovation using natural language processing and statistical processing (multiple regression analysis, principal component analysis, NMF, LDA) for word-of-mouth sites for airlines and home appliances.

1. By analyzing the correlation between the frequency of appearance of adjectives and customer satisfaction, adjectives that contribute to customer satisfaction were discovered. In addition, the specific reason was grasped by referring to the sentences containing the discovered adjectives. In the future, when analyzing text, it will be necessary to look at not only classification but also correlation.

2. Analyze the correlation between the evaluation score of product characteristics and customer satisfaction for products of different generations of the same product model. Product characteristics that contribute to customer satisfaction for each product have been discovered. Companies develop and bring products to market on the basis of chronological product development plans. By analyzing products of different generations, it is possible to analyze on the basis of perspective of product strategy. In the future, when conducting text analysis, it is necessary to have a perspective on the basis of the product strategy of the company that takes the passage of time into consideration.

3. Product characteristics were quantitatively grouped on the basis of the evaluation score of product characteristics. Product characteristics could be divided into 5 or 7 groups. Also, one product characteristic is not classified into one group. It was classified into multiple groups. As a result, product characteristics related to technology and product characteristics related to aesthetics were mixed in the classified group. The two values are organic, not independent of each other. And it turned out that it was necessary to think in an integrated manner. In addition, the products could be classified quantitatively on the basis of the results of grouping the product characteristics. In the future, it is necessary to reexamine various discussions that can be expressed in two dimensions and analysis that independently deals with product characteristics.

4. By using mathematical formulas, each period of the product life cycle and product characteristics were quantitatively related. When the importance of product characteristics changes over time, the changing point in the product life cycle or the period of the product life cycle can be estimated. In the future, when analyzing the relationship with each period of the product life cycle, it will be necessary to perform a quantitative analysis.

Based on the above, the proposed method of this study is an innovative method that can discover information that leads to the innovation creation by combining conventional natural language processing and statistical processing with a viewpoint that considers the passage of time and an external theory. It provides the best platform for further research in text analysis.