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## Understanding the customer requirements from online big data

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With the advent of big consumer data, business and design professionals are facing several challenges as well as opportunities to tailor their products or services to meet customer requirements (CRs). Actually, how to understand CRs is widely discussed and many approaches are advised in different academic research fields. Nonetheless, conventional approaches mainly handle a small number of consumer data, which are usually obtained from customer survey and feedbacks. The remarkable 4Vs' characteristics of big data, i.e., volume, variety, velocity and value, lead many conventional approaches fail to exploit rich and critical information from big consumer data. Hence, the efficient and effective analysis of big consumer data will no doubt facilitate designers to improve their products and offer them chances to gain new appraisal from potential consumers.

In this talk, several critical problems are identified regarding the analysis of big consumer data for new product design.

(1) Firstly, how to translate CRs in big consumer opinion data into engineering characteristics (ECs) is analyzed, which is one of the most crucial task in QFD (Quality Function Deployment). Specifically, a probabilistic language analysis approach is proposed to translate big consumer opinion data into ECs automatically. In particular, the statistical concurrence information between keywords and those nearby words is analyzed. Based on the unigram model and the bigram model, an integrated learning algorithm is advised to estimate the impacts of keywords and those nearby words for the identification about which ECs are implied in a given context.

(2) Next, how to recognize the trends of CRs from big consumer opinion data is discussed. In particular, with the help of pros and cons reviews, a supervised learning approach is firstly utilized to identify product features and sentiment polarities are extracted from big consumer opinion data. Appropriately, the average opinion over one specific product feature is regarded as the associated CRs. A Kalman filtering approach is then proposed to analyze the dynamic changes of CRs in the product feature level of big consumer opinion data, which help designers to notice and forecast the trends of CRs.

(3) Moreover, the analysis of CRs on competitive products is conducted with the help of big consumer opinion data. The ultimate goal of product comparisons is to reveal the strengths and the weaknesses of competitive products. Generally, when designers conceive new models, customer satisfaction of competitive products in different feature dimensions is often compared. Thus, sentiment polarities in product feature level are utilized and they are assumed to follow a Dirichlet distribution. A Bayesian method is accordingly developed to make comparisons with similar products in terms of different features.

Comparative experiments are conducted and illustrative examples are shown to demonstrate the availability of the proposed approaches to analyze big consumer opinion data and how these approaches will facilitate designers' daily work. This research is argued to incorporate an interdisciplinary collaboration between engineering design and information management. It aims to facilitate designers by exploiting the valuable customer information from big consumer data for market-driven product design.

## Biography

Ping Ji obtained his PhD in Industrial Engineering from West Virginia University in 1991. He worked in National University of Singapore before, and now he has been working in the Hong Kong Polytechnic University over 18 years. He has published more than 100 papers in reputed journals and has been serving as an editorial board member for several journals.

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