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Quantitative Research of Consumer Experience Types Based on Online Reviews: With the Example of Automotive Products

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Abstract: Base on consumer psychology and experiential theory, a forth diagram model of consumer experiential types is established from two dimensions of consumer sentiment and experiential value. By extracting and analyzing evaluation words, sense of achievement words and emotional words from the consumer online reviews, consumer sentiment computing is conducted as well as the fuzzy inference about the experiential value. Consumer experiential type is further identified combining fuzzy sentiment corpus and inference rules of experiential value. The experimental study about the consumer experience is conducted with the case of 11 models of automobiles on the automotive review site. Reasonable conclusions are reached and marketing advice is come up with. Validity of the method is also verified.

Key words: Consumer experience, sentiment computing, online reviews, fuzzy inference

INTRODUCTION

Since the 1980s, more and more researchers have pursued an extension in consumer experience. To sum up, consumer experience is a particular feeling which produced in the process of an interaction between consumer and product (Addis and Holbrook, 2001; Bennett *et al.*, 2005).

Bernd *et al.* (2004) proposed SEMs and ExPros management model also classification from a psychological aspect on consumer experience. He divided experience into five patterns: Sense experience, feel experience, think experience, act experience and relate experience (Bernd, 2001, 2004). Zhang (2005) proposed a five-dimensional system analysis of consumer experience which is similar to the model of Schmitt's based on summarizing the experience theory, combined with experiential marketing strategies.

This study define consumer experience for acquire and established a forth diagram model of consumer experiential types. By extracting valuation words, sense of achievement words and emotional words from the consumer online reviews, then combining fuzzy sentiment corpus and fuzzy inference rules of experiential value.

THEORY AND MODEL

In this study we establish the consumer experiential model on the base of Zhang, H.M.'s five-dimensional system and measure consumer experience from the factors which influence experience and the value of experience. Wertenbroch and Dhar (2000) studied the utility and pleasure preferences in the process of consumer experience. Thus, many scholars believe that the value of the consumer experience can be divided into two types-utility and pleasure.

Another significant factor that influences consumer experience most is the emotion. Most scholars hold that consumer generate purchasing intention, make purchasing decisions and keep maintaining loyalty to a brand or product greatly depends on consumer sentiment and emotion. Thus, the four-figure model of consumer experiential types required "emotional" dimension, too. Finally, in view of the theoretical basis and two sub-dimensions, experience-value (Ex-v) and emotion-value (Em-v), this article built the four-figure model of consumer experiential types as follows as Fig. 1.

CALCULATION AND ANALYSIS

Fuzzy calculation method: In the online review, the psychology of consumer experience is expressed in the form of natural language and that the emotional tendency of natural language exists in forms of fuzzy semantics.

The valuation words in online reviews, which express the feeling of utility about the products and brands, is correspond to the practical value (P-V) of experience. The sense of achievement words in online reviews, which express the sense of accomplishment about the products and brands, is correspond to the hedonic value (H-V) of

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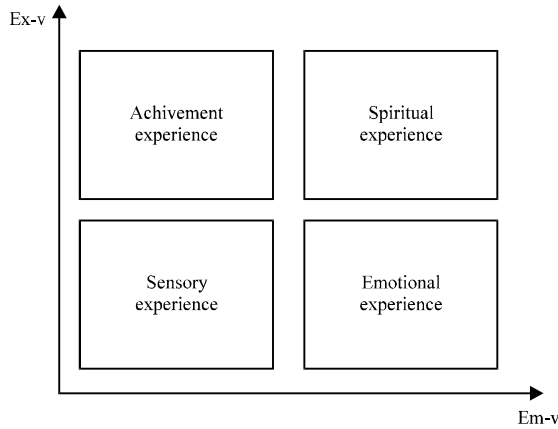
Fig. 1: Four-figure model of consumer experiential types

experience. It can be found that the valuation words, sense of achievement words and emotional words expresses practical value, hedonic value and emotional value in consumer experience process after critical studied about the online reviews. In order to excavate the emotional related to consumer experience, this article make fuzzy processing to this three kinds of words. The measurement of the meaning of valuation words, sense of achievement words and emotional words can be divided into five ranking separately on positive and negative category continuum, micro (A), small (B), neutral (C), large (D) and extreme (E). Each rank corresponds to a fuzzy membership function, namely,-E,-D,-C,-B,-A, +A, +B, +C, +D, +E. The Gaussian function is chosen as a template to define fuzzy membership functions for 10 sentimental ranks in domain [-4, 4]:

$$\mu_{\underline{w}}(x) = \text{gaussmf}_{\underline{w}}(x, \sigma_{\underline{w}}, a_{\underline{w}}) = \exp\left[\frac{-(x - a_{\underline{w}})^2}{2\sigma_{\underline{w}}^2}\right]$$

Here, a_w, σ_w is the expectation and standard deviation of Gaussian membership function when the emotion level is $\underline{w}$, respectively. With the field of [-4, 4], for negative, $x \in [-4, 0]$, $a_{-E} = -4$, $a_{-D} = -3$, $a_{-C} = -2$, $a_{-B} = -1$, $a_{-A} = 0$; for positive, $x \in [-4, 0]$, $a_{+A} = 0$, $a_{+B} = 1$, $a_{+C} = 2$, $a_{+D} = 3$, $a_{+E} = 4$. Zhao *et al.* (2011) to see detailed description of calculation method of semantic value.

On the basis of fuzzy words, this study focuses on auto network comments with the characteristics and properties of a car in terms of establishing corpus of cars. On the basis of the evaluation words and emotional words in "knowledge network" which is created by Dong Zhendong (http://www.keenage.com/html/e_index.html), this article extract valuation words, sense of achievement words and emotional words in comments and establish a corpus of small cars (Xu *et al.*, 2008).In this study, we do

word segmentation on the platform of language technology demonstration which is created by the Information Retrieval Laboratory in Harbin Institute of Technology. The method is as follows: first, we do the grammar structure analysis and the keyword extracting. Second, we do the union, intersection and complementary operation with the base of words relationship. Finally, we do the multi-statement analysis calculated (Xu *et al.*, 2008).

Construction of the inference rule base: The four-figure model of consumer experiential types is constructed by two dimensions: Experience value and emotional. Besides, the dimension of experience value is obtained by reasoning the practice value and the hedonic value. This article built the inference rules in the form of nature language.

To calculate the experience value degrees based on online reviews, we take valuation and achievability as the antecedent, take the experience value as the consequent and then establish an experience value fuzzy reasoning system. The format of the expression is as described below.

IF valuation and achievability THEN experience value: In this study, the basic principles for establish inference rules is that the consequent enhanced with the antecedent increases. As for consumers, the higher the practical value and hedonic value, the greater the value of the product to the consumer experience. Reasoning process using Mamdani method and use the Matlab toolbox to reasoning.

CASE STUDY AND ANALYSIS

We extracted 11 models of cars with a total of 3154 comments on the Automotive Review Network (http://www.xgo.com.cn/) and at last selected the 2257 reviews which available to calculate by the method of analysis. And it can be directly found that the valuation words in consumer reviews occupy a larger proportion, while the number of sense of achievement words and emotional words is relatively small.

The experiment mainly involves three types of cars: ordinary cars (A), SUV (B) and sports cars (C). In order to well analysis the compute results, we selected different price level of each brand. The compute results of different price levels and vehicles are shown in Table 1.

By fuzzy reasoning the practical value and hedonic value, we get the experience value. On the base of four-figure model of consumer experiential types, through two dimensions of the experience value and emotional, we could identify each car's type of consumer experience.

Table 1: Calculation results of auto

| Car type	Car version	Grade	P-V	H-V	Em-v	Ex- v	Experience type
A	Chery QQ3	Low	1.058	-1.367	5.427	2.07	Emotional experience
	Mazda 6	Middle	1.981	0.520	5.338	3.50	Emotional experience
	Myotan	Middle	3.371	5.599	4.563	7.60	Achievement experience
	BMW 7	High	4.520	6.502	3.765	8.49	Achievement experience
B	Honda CRV	Middle	2.176	3.493	5.399	5.20	Spiritual experience
	Land rover discovery 4	High	2.551	3.618	7.249	5.56	Spiritual experience
	BMW X6	High	2.613	4.556	8.275	6.15	Spiritual experience
C	Mazda MX5	Middle	2.407	6.677	5.082	8.11	Spiritual experience
	Audi TT	Middle	2.888	6.883	6.899	8.63	Spiritual experience
	Porsche911	High	5.583	7.189	7.500	8.97	Spiritual experience
	Lamborghini	High	6.198	7.437	9.275	9.09	Spiritual experience
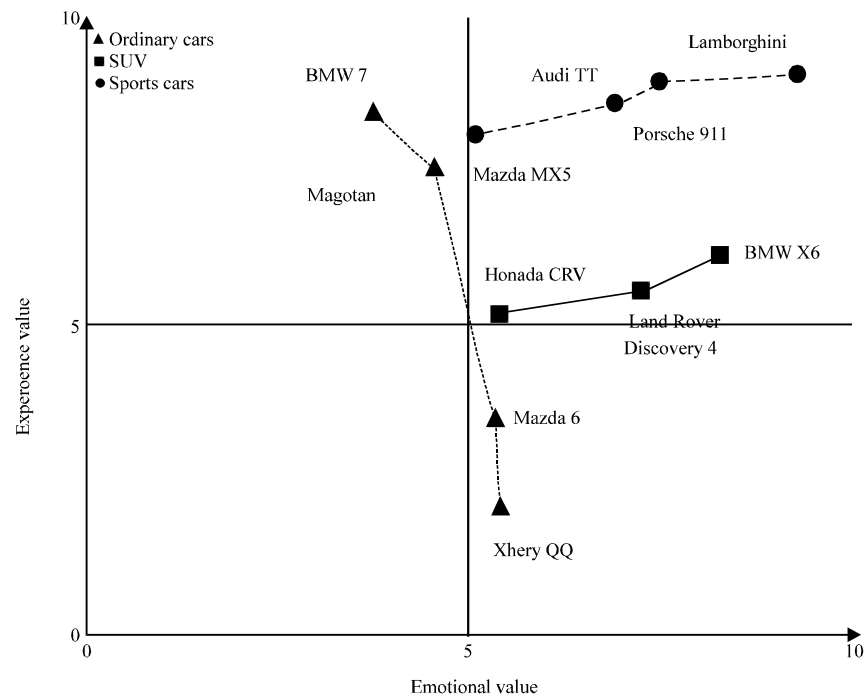
Fig. 2: Result of identifying consumer experience type

The conclusion could be obtained in Fig. 2 as follows. Generally speaking, high-grade SUV's consumers and sports cars' consumers are in high spiritual experience; low-standard ordinary cars' consumers are in the range of emotional experience; high-grade ordinary cars' consumer belongs to achievement experience.

The practical applicability, achievability and emotion which SUV consumer and sports cars consumer experienced is high; the practical applicability and achievability which high-grade ordinary cars consumer experienced is high but the emotion is low; the emotion of low-standard ordinary that consumer experienced is high but the practical applicability and achievability is lower. It is hard to obtain the soul experience, which existed in little consumer experience.

CONCLUSION

This study has proposed a method to compute consumer experience through the study of online reviews. Fuzzy computing and fuzzy inference were used in the method. At the same time, the method has been verified by means of instances. It has important actual significance for scientific management, precision management, evaluation and improvement of marketing strategy.

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