감성공학을 이용한 제품검색 시스템의 설계

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A Study of Products Searching Expert System Using Kansei Engineering

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Abstract

Today multi-item and small lot production has been applied to the general production system for consumers' needs. Therefore the production for consumers' needs have been product every moment, and buying have been made through various forms. But it is not easy for consumers to find the products which they want among many products. Furthermore although in the internet shopping mall many products can be presented to consumers, there are no ways to search fast the products which they want.

This study has observed the fact that generally consumers' purchasing start with the image of products for their needs. So we suggest the way to show fast the most near products which consumers want in the internet by accepting Kansei words as product image.

1. Introduction

Recently diversity of consumers' needs and increase of internet shopping mall have made consumers buy most of products from the internet instead of buying them in the general store. In future this shopping will develop, and we know that various products will appear in the internet [1]. However it is true that there is a little study about inference logic as to how to search increasing products to users fast.

This study describes the problems of the present searching method and suggests the searching method using Kansei engineering.

At the present time a searching method in the internet shopping mostly is a searching method by product classification and a searching method putting product name. In the most of internet shopping mall, the lists of products of buying are presented, consumer select the interesting one of products.

But there are some problems of this method.
1) In the case of many products on server, a user does not know all products on server are until he inspects all products.
2) Therefore he spends the long connecting time until he find the product which he wants.

In order to overcome this problem, this study, after accepting the product for consumers' needs as an image, suggests the product searching method using Kansei engineering with searching the most suitable product to the image.

2. Product Searching using Kansei Engineering

2.1 A theoretical study of Kansei Engineering

Human Kansei related to the product is classified into the sensual Kansei to form of products and the functional Kansei related to convenience for product use. This study, focusing on products, analyzes what image human have on his making products, and uses one of searching methods[2],[3].

In the study on product design a technique of Kansei engineering from translating physical design element of human image to realizing specific products is widely classified into Kansei engineering technique of functional development, Kansei engineering technique of interpretation, and Kansei engineering technique of virtual reality Kansei engineering technique[4],[5].

In order to suggest one of product searching methods using the concept of Kansei engineering, there is the following design.

2.2 Development of searching method using Kansei engineering
1) First investigation

Figure 1 shows the procedure to design the products searching expert system.

First investigation to decide Kansei words

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Second investigation to analyze the relationship between Kansei words and products

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Design of relationship database of products

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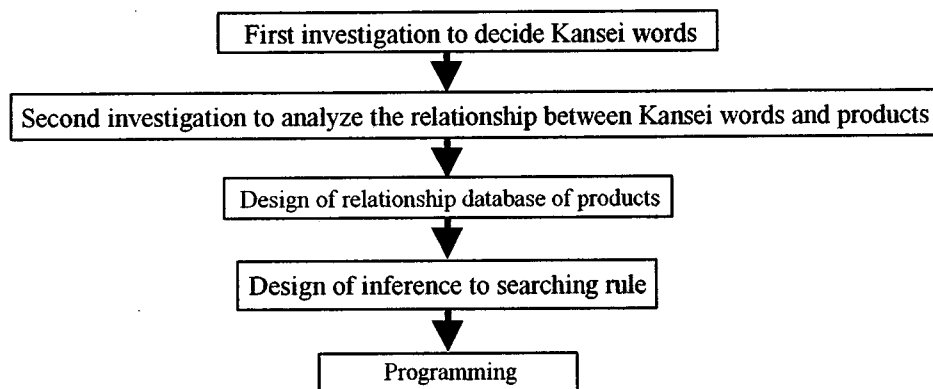Design of inference to searching rule

↓

Programming

Figure1 Procedure to design the products searching expert system

Figure 2 shows the contents about first investigation. The purpose of first investigation is to decide words and word number after studying of consumers' generally using an word to buy products. The searching method is made in the list based on words sampling from books and catalogues related to product of the object.

Word of high frequency by investigating employees and designers as a target is sampling.

First investigation

Frequency of use

many   few
1. Word 1 ☐   ☐
2. Word 2 ☐   ☐
3. Word 3 ☐ . ☐

Sample   No

Figure 2 Papers of first investigation

Second investigation

| Sample 1 |

1. Word 1 ☐ ☐☐ ☐ ☐
2. Word 2 ☐ ☐☐ ☐ ☐
3. Word 3 ☐ ☐☐ ☐ ☐

Sample   No

Figure 3 Papers of second investigation

2) Second investigation

The purpose of second investigation is to analyze the relationship between the sampling word of first investigation and the product of object. The investigation of the relationship of the sampling word from the first investigation is divided into 5 classifications. Figure 3 indicates the second investigation content.

3) Design of database

The design of database decides the relationship between words and products of object. Normalizing means to give the value between 0 and 1.

A formula for normalizing are the following.

i: product number
j: word number
Q(I,j): mean of product number i and word number j
P(I,j) : nomalized value of Q(i,j)

$$P(i,j) = \frac{Q(i,j) - Min\{Q(i,j), j = 1,2,....., J\}}{Max\{Q(i,j), j = 1,2,...., J\} - Min\{Q(i,j), j = 1,2,...., J\}} \times 0.8 + 0.1$$

$$\cdots\cdots\cdots(1)$$

$$(i = 1,2,...., I; j = 1,2,...., J)$$

The correlation of each product and each word should be database(table 1).

Table 1 Table of relationship words and products

	Word 1	Word 2	Word 3 · · · · · ·		Word J
Product 1	P(1,1)	P(1,2)	· · · · · ·		P(1,J)
Product 2	P(2,1)	P(2,2)	· · · · · ·		
Product 3			· · · · · ·		
·			P(i,j)		
·			· · · · · ·		
·			· · · · · ·		
Product I	P(I,1)		· · · · · ·		P(I,J)

3. Design of inference logic and programming

The product searching logic means the product choice logic to search the most suitable product for consumers' needs. This study uses Minimax method among many inference logic[6].

This method is the method to search products for consumers' need after sorting of the orderly big product among intersection of sets to relating word.

KP(i,j): intersection of sets of product i in the case of selecting word
SP(i) : product number of maximum value among intersection of sets

$$KP(i) = Min\{P(i,j), j = 1,2,...., J\}$$

$$\cdots\cdots\cdots(2)$$

$$(i = 1,2,...., I)$$

Figure 4 indicates a flow of program. In the initial value is the information of consumers' sex, age, and product image for their needs. Analysis of input data means the arrangement processing of content to input to correlation database.

Analysis of relationship calculates information searching product through inference logic based on sampling data from correlation database.

The product selected presents the form of sampling product from product database by product searching information.
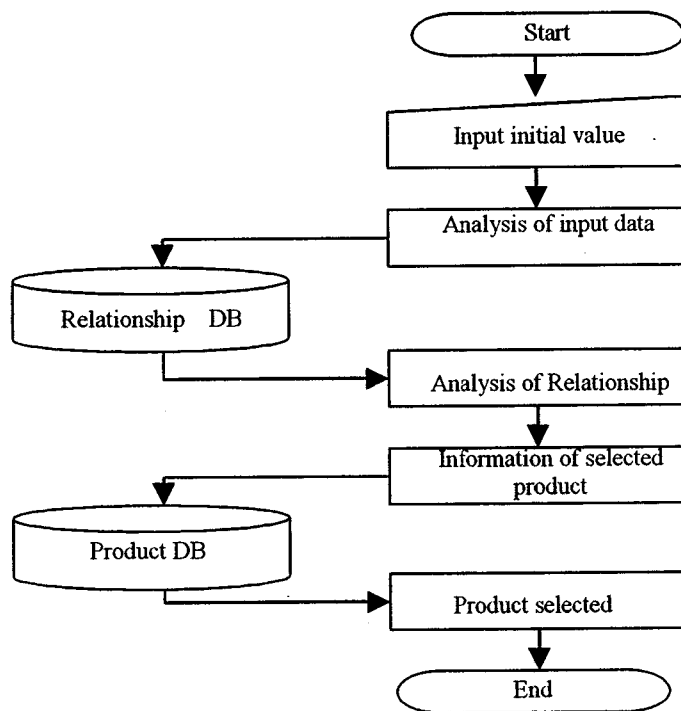
Figure 4 Flow of program

4. Conclusion

This study suggested the new method of product searching system in the internet shopping. From now on it is expected that a study to coordinate more effective searching method to consider the correlation of other products is needed.

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