Chapter 73
Kansei Evaluation of Product Recommendation Based on a Partial Comparison Process

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ABSTRACT

This paper aims to find a new evaluation method for collecting Kansei and Context data, which is based on a partial comparison process; and a specification method based on customer's target, which is suitable for the special Kansei and Context data obtained from partial comparison process. For collecting Kansei and Context data, we randomly select 5 objects from all objects, and ask people to compare them on each attribute. After many times comparisons, many comparison lists will be obtained. With these lists, we map them into a directed graphic, and with using some graphic processing techniques, we combine all the comparison lists into a whole list without any contradictions, and we map the whole list into a certain range as our evaluated data. To access these special Kansei and Context data, we also discussed two specification methods based on semantic differential method. To test the new method on collecting Kansei data and the specification method, a comparison system and a recommendation system are developed.

INTRODUCTION

"Kansei" is a Japanese word, which roughly means "sensibility," and it is usually used to express the emotionally feeling of individual on the object, with using the sight, smell, taste and other sense approach; and it is also affected by the environment, mood, physiological status of the individual. In today's increasingly competitive market, the issues of describing the Kansei feelings of the customers to help them choose the right product are more and more important; even in design process of the product (Nagamachi, 1995; Nagamachi, 2002; Nagasawa, 2004), the "Kansei" issues are becoming more important. The researches related to Kansei is commonly called Kansei Engineering, which was invented by *Nagamachi* at Hiroshima University in the 1970s, and defined as "translat-

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ing technology of a consumer's feeling and image for a product into design elements" (Nagamachi, 1995), has been proved as an efficient and successful approach in many fields (Nagamachi, 2002; Schütte, 2005), such as automotive, home electronics, office machines, cosmetics, food and drink, packaging, building products, and other sectors. The word Kansei expresses the subjective feelings of a product by people immanent phenomenological perception using all senses, viewing, hearing, touching, smelling and other ways (Schütte, 2005). In Kansei related researches, the most common method of the collection data is the semantic differential (SD) method (Huynh et al., 2010), which uses a set of adjectives and asks evaluators to express their feelings to an object with those words (Schütte, 2005; Grimsæth, 2005).

Kansei Engineering cannot only be used by designer for designing product (Lai et al., 2006; Lin et al., 2007; Llinares & Page, 2007), but can be also used for consumers to help them choose the right product according to their requirements. Generally, the first process of Kansei Engineering is to obtain the Kansei data from the objects. The most commonly method is to identify the Kansei attributes of the objects and ask people to evaluate the objects according to their personal feelings (Yan et al., 2008), in which the semantic differential (SD) method is often used (Osgood et al., 1957). Specifically, the M-point method based on SD is a popular method in evaluation process (Nakamori, 2011). The people participated in this evaluation process for obtaining the Kansei data are usually asked to sign their feelings in the M-point scale, but there might be some problems: when they face to a lot of objects for evaluation, their feelings might be confused, because human can distinguish objects efficiently when the objects is less than 5, when there are more than 5, it would be difficult and inefficient to distinguish[1]. For example, when they evaluate object A, they may think A is "very cute," and mark it as [cute, 7] (in 7-point scale), and when they evaluate object B, they may think it is the most cute one, and mark it the same as object A [cute, 7], then the Kansei data cannot distinguish these two objects on attribute "Cute."

When consumers express their requirements for purchasing products, they usually have a multi-attribute expression; this means that an aggregation method of those attributes becomes an important part in matching consumer's requirements. We can suppose that the requirement of the consumer is a whole entity, and we can use the Kansei words selected by consumers to describe the entity, so it would become an ontological issue[2]. The consumers' requirements would be then interpreted as consumers' ontological profile.

In this article we will firstly propose a partial comparison based evaluation method. Specifically, we separate the objects into some small groups, which contains no more than 5 objects; and ask people to compare the object of the group to make a ranking list; after many times comparison, we can get a huge number of ranking lists; then we can aggregate them into a whole list, which contains all objects; after that, we can map the whole list into M-point scale as our evaluation data. Considering the multi-attribute requirement, an Ontological structure will be used in aggregating the multi-attribute requirement to meet the preferences of the consumers.

A PARTIAL COMPARISON BASED EVALUATION PROCESS

Identification of the Kansei Attributes

We will describe in this paper a consumer oriented evaluation problem with Kansei data and Context data for traditional crafts. Let O be the set of objects to be evaluated and N is the cardinality of set O, i.e., $N = |O|$. For evaluating the object, we have to identify the Kansei attributes for people