A Rough-Sets Approach to Kansei Evaluation Modeling and Design Support

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ABSTRACT

This paper proposes a Kansei modeling technique by using the Rough-sets Theory based on a set of evaluation data for Kutani-ware coffee cups. Kutani-ware is a famous traditional craft that is a very important traditional industry in Japan. However, it has been shrinking recently because of the changes in lifestyle or the appearance of more functional modern products. To reactivate this industry by developing and recommending products that attract people's feelings, this study develops a modeling technique for identifying relations between design and feeling by obtaining some if-and-then rules. An important contribution of the paper is that the proposed technique can suggest new designs by analyzing customers' Kansei requirements, which are not used in the evaluation experiment. This makes the recommendation successful by determining people's Kansei into data instead of attempts.

Keywords: Design, Kansei Engineering, Kansei Evaluation, Kutani-Ware, Rough-Sets Theory

INTRODUCTION

Kansei

Kansei is the impression somebody gets from a certain artifact, environment or situation using all of their senses of sight, hearing, feeling, smell, taste as well as their reorganization (Schütte & Eklund, 2003), (Nagamachi, 1994). Kansei incorporates the meaning of the words sensitivity, aesthetics, feelings, emotions affection and intuition (Lee et al., 2002). Shimizu sees Kansei as being closely related to sophisticated human abilities such as sensibility, recognition, identification, relationship, making and creative action, where the process of biding together these concepts also is part of the Kansei (Shimizu et al., 2004). As the performance of commodities is not the only factor people focus on when they merchandise, therefore, it is important for manufacturers to have a customer-focused approach in order to improve attractiveness in development of new products, which should satisfy not only requirements of physical quality, but also consumers’ psychological needs, by essence subjective (Petiot & Yannou, 2004).

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Kutani-Ware

Kutani-ware is a representative traditional craft in Ishikawa Prefecture, which is based on advanced techniques, and has priceless cultural value. The Kutani-ware industry was promoted by Syoza Kutani, who pushed the mass production of Kutani-ware for export. The trade activities in the 1980s included developing new commodities, opening up oversea markets, developing new techniques and proposing new designs. According to the statistics, there are more than 1,000 kinds of traditional crafts in Japan. All of these crafts have been important not only from the economic perspective, but also particularly important from the culture perspective in maintaining a spiritual heritage which makes the country unique. Because of the development of Japanese economy after the war and the westernization of people’s lifestyle, the traditional industries achieved splendid results in the 1980s. However after the bubble economy collapsed, the production volume decreased notably, and the number of staff was also reduced sharply (see Figure 1 and Figure 2).

Kansei Engineering

Kansei Engineering is a method for systematically exploring people’s feeling about a product and translating them into design parameters (Schütte & Eklund, 2003). Kansei Engineering is also a method for product development, which based on customers’ impressions and feelings (Nagamachi, 1994; Jodon, 2006). Kansei Engineering is adaptable to a wide range of product applications. According to Nagamachi (2002), there are two directions of flow in Kansei Engineering: one of which is “from design to diagnosis” and the other one is “from context to design”. The first one involves manipulating individual aspects of product’s formal properties in order to test the effect of the alteration on user’s overall response to the product. The other one involves looking at the scenarios and contexts in which the product is used and then drawing conclusions about the implications of this for the design. A great benefit of Kansei Engineering is that it can be used to link a variety of product properties to omit emotions. Studies have been done on things like micro level surface finishes of glass materials (Barnes et al., 2004), and music genres for mobile phone ads (Deng & Kao, 2003). There are many works done with Kansei Engineering methodology development within the period between fall 2000 and spring 2005. Someone studied how to apply Kansei Engineering in an European context (Schütte & Eklund, 2004), someone proposed model on Kansei Engineering to allow the identification of development needs and the definition of new product features.

Figure 1. The production of traditional crafts in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (Hundred million yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>3000</td>
</tr>
<tr>
<td>1979</td>
<td>4000</td>
</tr>
<tr>
<td>1983</td>
<td>5000</td>
</tr>
<tr>
<td>1987</td>
<td>4500</td>
</tr>
<tr>
<td>1991</td>
<td>5500</td>
</tr>
<tr>
<td>1995</td>
<td>4800</td>
</tr>
<tr>
<td>1998</td>
<td>4200</td>
</tr>
<tr>
<td>2000</td>
<td>3800</td>
</tr>
<tr>
<td>2005</td>
<td>3000</td>
</tr>
</tbody>
</table>
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