

Customer-oriented Design Support System: The Case of Eyeglasses Design Using Desktop Virtual Reality

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Abstract

The rapid-changing consumer market has encouraged many product designers to create products that are closely related to consumer's psychological needs. Several methods have been introduced to aid such design goal but Kansei Engineering (KE) is the most notable tool that helps translates human feelings into design parameters. With the aid of advanced computer technologies, various computerised KE systems have been developed. However, the integration of desktop virtual reality in such system has yet to be fully explored. This paper presents the use of desktop virtual reality in the development of a customer-oriented design support system. A case study on teen eyeglasses design is also presented to evaluate the proposed method. The findings revealed that desktop virtual reality provides a better user experience and help enhance consumers' decision making.

1. Introduction

Undeniably, many products in today's consumer market share similar functionality and usability. Such situation has driven the consumers to be more selective and demanding when evaluating products. Moreover, the proliferation of Internet marketing and electronic commerce (e-commerce) has created a highly globalised market, giving consumers greater exposure to various products available worldwide [1]. This in turn, diversifies customers' needs and requirements. It is, therefore, become even more pivotal if not inevitable to take customer psychological requirements into consideration and to reflect these requirements in the design of a particular product [2]. Kansei Engineering (KE) is a tool created for such purpose. It

is an effective technique for translating human *Kansei* (feelings and desires) into product design element [3], and has been widely used universally [4].

The changing trend in employing KE has prompted many producers and product designers to focus on customer-oriented product design concept, in which human evaluation and decision making are crucial in influencing the final product design. Traditional method of incorporating this concept is by "order-made" design whereby a designer will try to capture a customer's needs and demands and proceed with actual product design. However, as noted by Yanagisawa and Fukuda in [5], this method can be very time-consuming, taxing and costly. Therefore, a support system that can help product designers to predict customer's thought and display a model which matches their preferences with computer graphics or virtual objects would be beneficial.

There are indeed several ways to display a product design on the computer system for consumers to evaluate. Two-dimensional (2D) drawings or paintings, realistic photo images, and video presentation are among the common methods used. In the present study, which is the first part of the ongoing research and development work on the KE design support system funded by Ministry of Science, Technology and Innovation, the integration of three-dimensional (3D) desktop virtual reality (VR) and KE is presented. The main aim of this study is to investigate further the use of desktop virtual reality in the development of a KE system particularly in aiding the *Kansei* survey.