Style Design of Pet Dog Knitted Garment Based on Kansei Engineering [*]

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Abstract

People's psychological needs are becoming more important with society's development and lifestyle change. Pets, as companions and family members of human beings, provide people with emotional support. Under the new relationship between people and pets, pet garment has become a popular way to enhance communication and interaction between people and animals and has commercial value. However, there is a lack of research focusing on developing pet garments that meet pet dog owners' emotional needs. This paper takes the design of a pet dog knitted garment as an example. It combines Kansei Engineering (KE) and Analytical Hierarchy Process (AHP) to guide the design practice. It introduces the method of a fuzzy comprehensive evaluation to verify the matching degree between the designed pet dog knitted garment style and the Kansei Image of the pet dog owner. The study aims to explore a scientific design method for pet garments to meet the emotional needs of the pet dog owner. The research results show that combining KE and AHP can effectively realise the perceptual demand and make the design decision more scientific and reasonable.

Keywords: Kansei Engineering; Analytical Hierarchy Process; Pet Gog Knitted Garment; Style Design; Fuzzy Comprehensive Evaluation

1   Introduction

With the development of the social economy, the acceleration of urbanisation, the increasing independence and individualisation of urban residents' families, and the ageing of the population have become more prominent [1]. Keeping a pet dog has gradually emerged as a modern form of leisure, consumption, and emotional support for residents. Due to changes in residents' lifestyles and family demographics, the dynamics between people and pets have shifted, and the original human-pet relationship is primarily driven by people's emotional needs [2-4]. Consequently, pet

dog owners have begun to pay more attention to dressing their pet dogs, accelerating the growth of the pet dog garment market. For pet garments, different scholars have discussed and studied from different perspectives, forming a variety of viewpoints and theories. In the early stage, the research on pet dog garments mainly focused on practicality. A prototype of a garment style suitable for various types of pet dogs was constructed, and the garment structure of a pet dog was developed from a single item [5-7]. In addition, some special functions of pet dog garments have also received attention. Design pet dog nightwear with anti-lost function and smart pet dog garments for health and emotional monitoring [8, 9]. Time, people's demand for pet dog garments has gradually shifted from practicality to decoration. Some scholars have proposed that "pet dog garment is a way to express the owner's emotion." This means that a pet dog garment is not only a tool to protect the pet dog's body but also can be designed to show the owner's emotions and personality. At present, the design of pet dog garments primarily focuses on product differentiation transformation and frequently overlooks the emotional needs of pet dog owners. However, with the increasing emphasis on establishing a harmonious symbiotic relationship between people and pets, pet dog owners are now placing additional importance on scientificity, humanisation, use experience, and sustainability of pet dog garments. As a result, pet dog owners favour pet dog knitted garment, which offers superior comfort, breathability, stretching freedom, warmth retention, and sustainability. At the same time, the emotional needs of pet dog owners have certain subjectivity and diversity, and it is difficult to obtain a universal theory and design direction. How to scientifically design a pet dog knitted garment that meets the emotional needs of pet dog owners is an urgent problem to be solved.

In addition, many studies have been devoted to improving style design decision-making methods to achieve designs that meet spiritual, psychological and emotional needs. Therefore, it is imperative to adopt a scientific approach to style design for pet dog knitted garments. Currently, there is a lack of a standardised design decision-making method. Most existing approaches rely on qualitative and subjective methods, posing challenges in ensuring the objectivity and scientific rigour of design decisions. Kansei Engineering (KE) was first proposed by Kenichi Yamamoto, president of the Mazda Group in Japan, in the mid-1980s [10]. It is a theory and technology of product design that quantitatively and partially expresses the perceptual problems of human physiological and psychological sensations. In the 1970s, Saaty, an American operational research scientist, developed the Analytic Hierarchy Process (AHP), a comprehensive evaluation method for system analysis and decision-making [11]. AHP decomposes the target problem based on relevance and affiliation, constructs a hierarchical model, and mathematically represents decision-making thinking using quantitative information, enabling scientific and objective decision-making. The combination of KE and AHP offers a solution to the challenge of quantitatively describing Kansei demand by considering Kansei's appeal, implicit cognition, and multi-objective decision-making. In recent years, in the field of garments, the research on the combination of KE and AHP has focused on the evaluation of garment style [12], garment colour evaluation [13] and garment brand evaluation [14]. However, it is applied to the decision-making of garment style design.

This study takes pet dog knitted garment as the research object, based on the research method of KE combined with AHP, combines the subjective consciousness of perceptual demand with the objective analysis of AHP, proposes an evaluation method to guide the style design of pet dog knitted garment, and develops pet dog knitted garment products with more emotional needs. Promote the development of pet apparel design from a single practicality to a more comprehensive consideration of the emotional needs of pet owners.