# Intelligent Pet Product Innovation with Service Design and Pet Behavior Analysis

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**Abstract.** With pets playing an increasingly important role in people's lives, people's demand for pet products is becoming increasingly diverse and personalized. In this context, intelligent pet products have emerged, providing new opportunities for pet owners to have a better pet life experience. This article discusses the pet product market to some extent. Based on this, it further explores service design and pet behavior analysis. Combining the characteristics of pet products, it discusses the innovation of intelligent pet products from two aspects: the application of intelligent technology in pet products and the application of analyzing pet behavior data, thereby promoting the continuous improvement of the design level of intelligent pet products.

**Keywords:** Service design; Analysis of pet behavior; Intelligent pet products.

## 1 Introduction

Pets are playing an increasingly important role in human society. They are not only loyal companions of people, but also a part of the family, regarded as family members. This special status has prompted people to care and pay attention to pets, and has also led to the flourishing development of the pet product market. However, with the continuous progress of society and the rapid development of technology, people's demand for pet products is also constantly evolving. They expect more intelligent, convenient, and personalized solutions to take care of and accompany their pets. Therefore, innovative research on intelligent pet products for service design and pet behavior analysis is of great practical significance.

## 2 Overview of the Pet Products Market

### 2.1 Current Situation and Trends of Pet Products Market

The pet product market has experienced significant growth in the past few years and shows a sustained development trend, as shown in Fig.1. The current situation of this market is reflected in the continuous improvement of consumers' quality of life for pets, and the gradual popularization of the concept of treating pets as members of the


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family. With the advancement of urbanization and the improvement of living standards, more and more families are choosing to keep pets, which has driven the expansion of the pet product market. Modern people's attention to pets is not only limited to meeting basic needs, but also includes providing pets with higher quality and more diverse life experiences. This trend has led to the emergence of various innovative pet products in the market, thereby meeting the diverse needs of consumers for pet life. At the same time, with the rapid development of intelligent technology, consumers' demand for smart pet products is also constantly increasing, which brings new opportunities and challenges to the market.

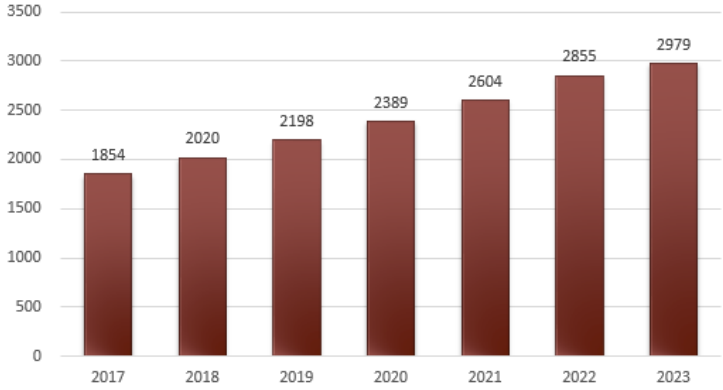


**Fig. 1.** Global Pet Products Market Size from 2017 to 2023 (Unit: 100 million yuan)

## 2.2 The position of intelligent pet products in the market

With the continuous progress of technology, intelligent products and solutions have penetrated into various fields, and the pet product market is no exception. Intelligent pet products provide pet owners with a more convenient and intelligent way to manage and take care of their pets by integrating technologies such as sensors, internet connectivity, and artificial intelligence. Different types of products are shown in Figure 2. For example, a smart pet feeder can automatically feed pets based on the set time and amount, a smart pet monitoring camera allows owners to remotely monitor pet behavior, and a smart pet collar can track pet location and health status. These intelligent products not only improve the quality of life for pets, but also make it more reassuring and convenient for owners to take care of their pets. Therefore, the position of intelligent pet products in the market is gradually increasing, and more and more consumers are willing to invest in and purchase these innovative products, which also brings growth opportunities and competitive advantages to the pet product industry. With the continued development of technology, it is expected that smart pet products will continue to become a key driving force in the market in the future.

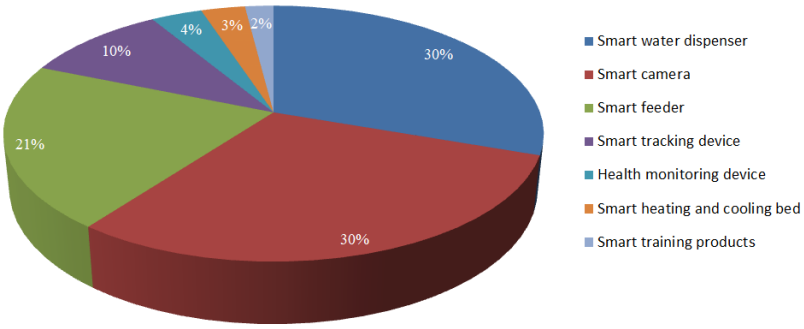


**Fig. 2.** Pie chart of the proportion of intelligent pet products

### 2.3 Market demand and consumer expectations

As family pets become more and more members of families, the market demand is also showing diversified and personalized characteristics. Consumers expect pet products not only to meet basic needs such as food, shelter, and healthcare, but also to provide more convenient and intelligent functions. For example, consumers hope that pet food can provide more flavors and special formulas to meet the taste and health needs of pets. In addition, more and more pet owners are concerned about the safety and health of their pets, so the requirements for safety and quality standards are also increasing. At the same time, consumers expect pet products to better meet their emotional connection with pets, such as providing more interactive and entertainment options, which has also led to the rise of intelligent pet products[1].

## 3 Service Design and Pet Behavior Analysis

### 3.1 Concept and principles of service design

Service design is a design method and concept centered on meeting user needs and improving user experience. It emphasizes user centeredness, designing and optimizing services through in-depth understanding of user needs, expectations, and behaviors to provide a better user experience.

The principles of service design include user participation, cross functional team collaboration, prototyping, and user feedback loops. Firstly, user participation is the core principle of service design, which requires active interaction with users during the design process, understanding their needs and feedback. Secondly, cross functional team collaboration is to ensure that experts from different professional fields can jointly participate in service design to integrate various knowledge and skills. Prototyping is to quickly test and validate various ideas during the design process, in order to find the best solution. Finally, the user feedback loop emphasizes continuously obtaining user feedback during the service design process, and continuously improving and optimizing the service based on the feedback[2].

### 3.2 The importance and application fields of pet behavior analysis

Firstly, pet behavior analysis helps to understand pet behavior patterns, habits, and needs. By observing and analyzing the behavior of pets, one can better understand their lifestyle, such as their activity time, dietary habits, social behavior, etc. This information is crucial for designing smart products that meet the needs of pets. Secondly, pet behavior analysis can help improve interaction and communication among pet owners. Intelligent pet products can provide important information about pet health and happiness to owners by monitoring and interpreting their behavior. For example, a smart pet bowl can provide health advice based on the pet's dietary habits and intake, or a smart pet collar can provide exercise advice by analyzing the pet's exercise behavior. Finally, pet behavior analysis also plays a role in pet healthcare and health monitoring. By monitoring pet behavior changes, potential health issues can be identified early and the quality of life of pets can be improved[3].

## 4 Innovation in Intelligent Pet Products

### 4.1 Application of Intelligent Technology in Pet Products

(1) Intelligent feeders, litter trays, pet tracking devices, etc.

Firstly, an intelligent feeder is a device that provides timed and precise meals for pets. These devices are typically equipped with programmable timers and dispensers, allowing pet owners to set meals based on their pet's dietary needs and schedule. Some smart feeders also have remote control functions, allowing pet owners to monitor and adjust their meals at any time through smartphone applications. This not only facilitates pet owners, but also ensures that pets can receive food on time, especially when the owner is not at home. In addition, some intelligent feeders can also record pets' dietary habits and intake, providing useful data for their health.

Secondly, intelligent cat litter pots are innovative products designed for cat owners. These cat litter pots are usually equipped with sensors that can detect cat feces and automatically clean them. Once the cat finishes using the litter basin, the system will automatically collect solid waste into a container, reducing the daily maintenance work of the pet owner. At the same time, the smart cat litter can also monitor the cat's urination frequency and health status, and provide real-time reports through mobile applications to help pet owners identify potential health issues in a timely manner.

Finally, a pet tracking device is an intelligent device used to track the position of pets. These devices are usually attached to pets' collars and use GPS technology and mobile network connectivity to allow pet owners to track their pet's location at any time. This is particularly useful for pets who have wandering habits or are prone to getting lost. Pet owners can set up a secure area through a mobile app, and once the pet crosses this area, the system will immediately send a notification. In addition, some pet tracking devices also provide health monitoring functions, such as activity tracking and sleep analysis, to help pet owners better take care of their pets' health and behavior.

(2) Connectivity and Internet Services.

By connecting pet products to the internet, innovative features and services not only provide more convenience for pet owners, but also enhance their quality of life.

Firstly, connectivity and internet services allow pet owners to remotely monitor and manage pet supplies. For example, some smart pet feeders are equipped with Wi Fi connectivity, allowing pet owners to view their pet's diet at any time through mobile applications, remotely control the operation of the feeder, and even observe real-time videos of their pets through built-in cameras. This remote access feature is particularly valuable for owners who need to regularly check their pets, ensuring that they are taken care of regardless of whether they are at home or not. Secondly, connectivity and internet services also provide opportunities for social interaction. Some pet products are equipped with social media sharing functions, allowing pet owners to share their pet's activities and photos on social platforms, interact with other pet owners, and exchange experiences. This social interaction not only enhances the connection between pet owners, but also provides more attention and care for pets[4].

### 4.2 Application of Analyzing Pet Behavior Data

(1) Pet Health Monitoring.

Modern intelligent pet products increasingly focus on the behavior patterns and habits of pets, monitoring and interpreting their activities through sensors and data analysis technology, providing valuable information about pet health for pet owners.

Firstly, pet health monitoring evaluates the overall health status of pets by analyzing their activity levels, exercise patterns, and dietary behaviors. For example, the motion sensor equipped with the smart pet collar can record the pet's steps, activity time, and calorie consumption, helping pet owners understand their pet's movement status. Abnormal activity patterns or significant reductions in activity may be early indications of pet health issues. In addition, some intelligent feeders can record pet eating habits, including eating time and amount, to help pet owners monitor their pet's diet. Secondly, pet health monitoring can also provide information about the sleep quality and behavioral patterns of pets. The sleep of pets is very important for their health, so some pet products are equipped with sleep monitoring function, which can track the sleep time, depth, and cycle of pets. This helps pet owners understand their pets' sleep habits and promptly detect any signs of sleep problems or restlessness. In addition, the analysis of pet behavior data can also detect abnormal behaviors of pets, such as anxiety, depression, or discomfort, and help pet owners take measures to improve their pets' emotions and behavior.

(2) Behavior prediction and improvement.

By collecting and analyzing pet behavior data, intelligent pet products can identify and predict pet behavior patterns in advance, thereby helping pet owners take measures to improve pet behavior and quality of life.

Firstly, behavior prediction predicts potential behavioral problems by analyzing pet behavior patterns and activity habits. Intelligent pet products can record the activity time, location, and behavioral changes of pets. Through algorithm analysis, abnormal or unusual behavioral patterns can be identified. For example, pets may exhibit anxious, frustrated, or restless behaviors that may be related to health issues or living

environments. By predicting these issues in advance, pet owners can take timely measures, such as providing more interaction, improving the environment, or consulting veterinarians for advice, to improve pet behavior and mental health. Secondly, behavior improvement is achieved by providing feedback on pet behavior data to assist pet owners in training and guiding their pets' behavior. Intelligent pet products can interact with pets through sound, vibration, or light signals, and reward or correct their behavior based on their behavioral feedback. For example, some smart dog collars can emit sound prompts to help train dogs to comply with rules, such as not pulling ropes randomly. This real-time feedback and training can help pet owners shape their pet's behavioral habits, improve their discipline and adaptability[5].

## 5 Conclusions

In summary, the innovation of intelligent pet products for service design and pet behavior analysis has provided pet owners with more convenience and ways to pay attention to their pets, not only improving their quality of life, but also enhancing the interaction and relationship between pet owners and pets. The continuous development of this field will continue to improve the quality of life of pets, enhance the interaction and relationship between pet owners and pets, and bring more innovation and opportunities to the pet supplies industry.

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