Application of Human-Computer Interaction Based on Big Data Technology in Electronic Product Design

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Abstract. With the development of information technology and the improvement of people's living standards, people's requirements for product design are becoming higher and higher. As the necessary equipment in people's work and life, electronic products occupy a very important position on the way forward of the society. In the contradiction between product and human demand, human-computer interaction technology comes into being, which provides a solution to this problem. This technology builds a bridge between the product and the demand, so that the product can really serve people, rather than people to adapt to the design of the product. Accordingly, this study discusses the basic situation of human-computer interaction technology, the concept of electronic product design and the application of human-computer interaction technology in electronic product design.

Keywords: Human-Computer Interaction, Electronic Product Design, Big Data

1. Overview of human-computer interaction technology

1.1. The concept of human-computer interaction technology

Human-computer interaction is a cross-discipline, which covers a very complex and wide range of contents. Human-computer interaction (HCI) mainly studies, designs and uses computer technology, and focuses on the research of the interface between computers and people. The interface here refers to a broad concept. For example, the following three forms are considered interfaces: 1) GUI: browsers, computer kiosks, hand held computers, phones, etc. 2) Voice: like intelligent assistant. 3) Robots [1].

Researchers in the field of HCI will not only observe the way people interact with computers, but also design technologies to make the interaction between people and machines more innovative. As a research field, HCI involves many disciplines, such as computer science, behavioural science, design, media research and many other disciplines. One of its important research contents is user satisfaction. Of course, this indicator is difficult to quantify, only through the questionnaire to investigate and collect relevant information. A lot of research in this field is to improve the interaction between human and machine by improving the usability of the computer interface.

1.2. The main research contents in the field of human-computer interaction

The main research contents of human-computer interaction are as follows [2]:

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1. Design a new computer interface to optimize a specific purpose, such as efficiency or ease of learning.

2. Use computer software to apply and implement the interface.

3. A method of evaluating the availability or other characteristics of different computer interfaces.

4. Study the use of computers by human beings and their influence on society and culture.

5. Model and theorize the use of computers.

6. Abstract the design of computer interface and create the concept of theoretical nature.

7. A study of different views on the potential value of various proper nouns and research directions.

At present, the hot research directions in the field of human-computer interaction are as follows: 1) User experience and availability; 2). Understand human behaviour; 3). Engineering interactive systems and technologies; 4). Privacy, security and visualization; 5). Beyond individual interaction; 6). Devices and modes; 7). In the field of health; 8). Game field; 9). Accessibility.

1.3. The importance of human-computer interaction technology

Since the 1980s, the development of human-computer interaction has become more and more important with the development and popularization of computer and information technology. Especially in the last 5-10 years, the costs and barriers to the application of science and technology have been greatly reduced. Some technologies that used to be used only in laboratories or sci-fi movies have been used in people's daily lives. The importance of human-computer interaction becomes extremely important [3].

It is believed that in a few years, the world will be a world intertwined by artificial intelligence, the Internet and the Internet of things. We deal with computers every moment of our life. However, the most likely unstable factors and outliers in this smooth operation are when people are involved in the computer system. Therefore, the predictability of human-computer interaction is the key to ensure the smooth operation of artificial intelligence system. For example, self-driving car is a relatively mature technology and system, which can ensure human safety in the process of driving. But if the driver is a psychopath and his wish is to drive the car into a wall, then there is a contradiction between the human brain and the car's human-computer interaction system. At this time, the human-computer interaction system is needed to predict the coming situation. The general human-computer interaction system will give people the highest control, which means that the operation of this psychopath will change the safety operation of artificial intelligence and eventually crash the car. This could endanger the lives of yourself and others. The more advanced human-computer interaction system can, through the method of virtual reality, when predicting the person's psychological fluctuation, show the picture of a car crash and death on the glass in advance and organize the car to move forward at the same time. This operation can satisfy his psychology, but it does not hurt himself or others.

In addition, because artificial intelligence needs huge amounts of data, the technology of human-computer interaction becomes more important. The quality of the data itself will largely depend on the design of human-computer interaction. For example, Douyin platform can bring a pleasant experience to users, mainly because the platform will collect user interactive data, and use it to analyze users' psychology and guess users' preferences. Push the videos that users may want based on the results of the analysis. This is a very rigorous process. If the human-computer interaction technology is not in place, for example, it is troublesome to open a video, and the pushed video is not what the user wants, then the will of the user will be affected, which will also have an impact on the development of the platform. Users reduce the number of times to use the platform, the platform is more difficult to collect user preferences, then the pushed video is more not in line with users' psychological expectations. This creates a vicious circle. Therefore, in the design of human-computer interaction, every link is very important.

Human-computer interaction can also develop human potential. In addition to the intelligence of the brain, the potential of the body can also be tapped. A good human-computer interaction system can make people more capable. In recent years, wearable devices, such as sports bracelets, have appeared
frequently on the market. This kind of bracelet can detect all kinds of data of the human body just by staying on people's wrists. In other words, the product does not touch the body, so that human beings can more accurately quantify their physical fitness. This is a big change in the human-computer interaction system. According to this trend, in the future, more science and technology will not only be able to quantify the superficial parameters of the human body, but also create corresponding strategies and atmosphere according to these parameters, so that people's movement, sleep and other aspects have a positive impact on the system. Unlike robotics, robotics creates a new "human" that makes it smarter and can serve people, while human-computer interaction systems use devices to arm themselves, thus making them more powerful.

2. An overview of the design concept of electronic products
The more complex and advanced the plan is, the more difficult it is to achieve the desired goal. In the end, the solutions that find interesting are actually more traditional ways. The progress of society depends on the most basic application improvement, not the most advanced technological exploration. Because the former is to make complex things economic on a large scale [4].

Based on the development process of game consoles, this paper summarizes the design concept of electronic products.

(1). Cost reduction, technology degradation.

Technologies that have become obsolete in one product may become innovative and popular when applied to another. Using car parts rather than sophisticated designs to make baby incubators is the same way of thinking. Previously, the biggest growth rate of Alipay was the popularity of collection code stickers in third-and fourth-tier cities, which activated the online transactions of many small and micro individuals. And its essence is actually a QR code plus sticker, which is much more economical than using NFC to transform payment scenarios. When all VR uses 4K resolution and a variety of advanced sensors as the standard, VR devices made of paper boxes and game consoles can make users experience a variety of VR and AR pleasures with only a few pieces of paper plus the main body of the game console.

(2). Optimize the system but not make a breakthrough at a certain point.

For the product, the sense of use is much more important than any other aspect. The shell of the game console is actually very cheap. But one advantage of the sense of cheapness is that it is easy to maintain. The game console itself is consumable, and if it breaks down and the maintenance cost is high, it may lose a user. For example, the design standard of some game consoles is that it is not bad for 80kg heavy objects to be squeezed continuously for 1 minute. Some design standards are 1.5 meters high fall 10 times can still work properly. All this kind of work is actually designed to extend the life of the console and allow users to play more games in the cycle.

(3). Design comes from life.

In the game, newcomer guidance is almost textbook-like existence. Users can basically apply their life experience to the game. And these interactions will surprise users. If you want to climb a tree, climb it. If there are apples on the ground, pick them and eat them. If you see a fire, you can try a torch. These designs enable users to retrieve communications and become a happy child. When it comes to ice, a bonfire can melt. As for the physical engines that are difficult to climb in the rain and unable to fly in the wind, they are all a reflection of real life.

(4). Don't waste the design on useless modules.

Computers are the rigid needs of life, so users will force themselves to figure it out even if they don't want to. But the game is a "useless thing", so users are very impatient, let alone read the instructions. If there is something you don't understand, the user will soon give up. Therefore, users are not allowed to have a little bit of unpleasant factors in the design of game products. The handle of the game console is designed to be as small and light as a remote control. Huge game consoles can scare people who are not good at games. On the other hand, with a simple and small remote control, the user will react with a wave in his hand, and the user will immediately want to try something to play with.
3. Application of human-computer interaction technology in electronic product design

3.1. Application of human-computer interaction technology in electronic product design

(1). Tailor-made products for users
(2). Embed computer technology into the product
   From cooking equipment to lighting and sanitation, from blinds to car braking systems, there are obvious benefits of embedding computer technology in product systems. Such a system can be powered without any automation process.
   (3). Enhance the real experience of users in the product
   Enhance the social interaction between users by providing all kinds of information about the people they are talking to.
   (4). Emotion and human-computer interaction
   In the interaction between human and computer, the most eye-catching research is the interaction between human emotion and machine. Researchers have developed a system with emotional sensing by studying how computers detect and deal with human emotions. This system describes human emotions in an automated way, thus improving the efficiency of human-computer interaction [5-6].
3.2. The problems of human-computer interaction technology in practice
The biggest problem in interaction design is that users are surrounded by countless smart devices, countless screens, and countless reminders. This can lead to a large amount of information overload, completely beyond the scope of the user can digest. The more information users get, the more anxious they become. Product and game designs are designed to make users addicted, so users seem to fall into a trap. The product can not let the user relax, but let it consume energy and time endlessly. At the beginning of the popularity of mobile phones, some psychologists found that many people heard their phones ring, and later called this phenomenon "Phantom vibration syndrome". In recent years, ringtones have been replaced by vibrations and people's habit of checking their phones frequently. As a result, there is a new anxiety, "fear of low power". In other words, many people have a great sense of anxiety whenever the battery of their mobile phone falls below a certain level and cannot be recharged immediately.

A good interactive system that minimizes user attention should be like water, nourishing everything in silence. In today's market, every smart light bulb is equipped with an APP. But why can't users turn on the lights automatically when they get home and turn them off automatically when they go back to the house to sleep? Why the thermostat in the user's home can not automatically perceive the user's living habits, so as to automatically adjust the temperature according to the habits. When the user walks into the car full of shopping bags, why can't the trunk open automatically? That is to say, the design thinking that minimizes the user's attention is the most commercially valuable interaction design. It can help users solve all kinds of anxiety and make the product really serve users instead of doing the opposite.

4. Conclusion
At present, mankind is in a period of information explosion and rapid development of science and technology, a variety of new technologies and new needs are springing up like bamboo shoots after a spring rain. In these large numbers of requirements, human-computer interaction technology, as an epoch-making technology, has gradually entered the line of sight of people. Human-computer interaction technology can connect people and products to the maximum extent. Since then, the products have produced temperature, and they can sense people's temperature, physical condition, emotion and other reactions, and carry out customized and automatic operation for them. Although there are still some defects in the field of human-computer interaction. For example, too many screens and messages will cause users to fall into anxiety, contrary to the original intention of the product design. However, it is believed that after continuous improvement and development, human-computer interaction technology can finally bring new breakthroughs for product design.

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