

Research on the Application Method of Interaction Design in Human-Machine Interface Design

Yan Sun*

California College of the Arts, 1111 8th St, San Francisco, CA

*Corresponding author: sun6833@163.com

Abstract: In recent years, with the development of social economy, people's quality of life is getting better and better, and the original functions of computers can no longer meet our needs. As a result, IT elites in today's society have launched new computer technologies such as "interaction design" and "human-machine interface design" to provide convenience for the majority of computer users. Interface is a medium for transmitting information and emotions, and it has been widely used in electronic products, computers, mobile phone menus, computer software interfaces, network design and so on. "Interaction" is the direct and indirect communication between people and devices, systems, websites, etc. Interaction design is a key link in human-machine interface design, which has a great impact on the quality of products. The article briefly introduces the interactive design and the design of human-machine interface, and discusses the application method of interactive design in the design of human-machine interface.

Keywords: Interaction Design, Human-Machine Interface Design, Application Method

1. Introduction

Interaction design was originally part of the design field of graphic design and website design, and then gradually developed into an independent design category. Today, interaction design has gone far beyond the design scope of text and pictures, and replaced by the creation of all design elements on the computer screen. In other words, the interaction in product experience, such as user contact and input, which may be involved in the design process, belongs to the category of interaction design. As a branch of design discipline focusing on interactive experience, the concept of interactive design was first proposed by Bill Moggridge, who is respected as the "father of the modern notebook" in 1984. Its purpose is to establish an organic relationship between service providers, products and users. With the continuous development of economy, people have higher and higher requirements for the working environment. The application of "interaction design" and "human-machine interface" can bring better visual experience and operation convenience for users. Therefore, we must carry out deeper research on the two, and apply interaction design to the design of human-machine interface. Can let the user get the maximum degree of satisfaction in the working environment.

2. The Overview of Interaction Design and Human-Machine Interface Design

2.1. The concept of interaction design

IxD (The Interaction Design Association) explains Interaction Design as follows: Interaction designers aim to create practical products and services and take The basic principles of user-based Design; The practical operation of interaction design must be based on the understanding of the actual users: including their goals, tasks, experiences, needs, etc.; From a user-centric perspective, interaction designers provide solutions to complex design challenges and define and develop new interactive products and services while striving to balance user needs, business development goals and technology development levels. In the early stage, interaction design mainly focused on the relationship between people and mechanical products. With the popularity of computers, interaction design paid more attention to the use process and operation mode of people. The research content of interaction design is mainly divided into two levels: theoretical research and application research. Theoretical research mainly focuses on the definition, components, characteristics, design principles and methods of interaction design. Application research focuses on improving the use experience of products or services through interaction design, with a wide range of topics and research perspectives, covering science and

technology, education, art, sports, health, medical treatment, public space, transportation and other fields.

"Interaction design" refers to designing interactive products to support people's daily work and life. In particular, interaction design involves creating new user experiences to enhance and expand the way people work, communicate, and interact. Interaction design is a key link in the design process (structural design, interaction design, visual design). Therefore, how to deeply think and discuss the connotation of interaction design has become an important starting point for our human-computer interaction design. Excellent interactive products often refer to products that are easy to use, efficient to use and have a comfortable experience.

2.2. The concept of human-machine interface design

"Human-machine interface" refers to all areas involving human-machine interaction. The designed interface is the exchange of information between people and things. It can even be said that all the communication between people and things belongs to the design interface, and its content elements are very broad. Design interface refers to the synthesis of all the information faced and analyzed in the design process, reflecting the relationship between people and objects. In the development process, interface design is a very critical link, which will affect the development of the entire team. Efficient interface design is often a predictable process, which is developed by the needs of users who are understood by the developers themselves. In addition, for interaction designers, the broadening of information dimension is of great significance for human-machine interface design. Traditional information media are two-dimensional, such as planar graphic ICONS, when operating, is two-dimensional space movement. The traditional two-dimensional human-computer interaction mainly includes interface and interactions. The interface elements imply control over layout and size, and the interaction elements represent the logic of the flow of the interface elements.

2.2.1. The division of human-machine interface

The design of human-machine interface can be divided into three categories to facilitate the understanding and analysis of the design interface.

(1) Functional design interface: receive the function, operation and control of the object, as well as the interaction with the product, that is, the use of materials and the application of discipline technology. Such interfaces embody the harmony between design and human.

(2) Emotional design interface: It is to convey feelings to people and gain emotional resonance with people. This sense of information conveys both certainty and uncertainty. Such interfaces are the embodiment of human-to-human relationships.

(3) Environmental design interface: the communication between external environmental elements and people. Any kind of product, a kind of plane visual communication, a kind of art work of the internal and external environment cannot be separated from the surrounding environment. It can be said that the design interface is based on the functional interface, the environment is the premise, and the emotion is the center., an organic and systematic relationship has been formed between the three. Due to the complexity of design elements, it is difficult to determine the criteria for design evaluation. "Design interface" reflects the information transfer between "people" and "objects", and is also the content of "design art", covering all aspects of "design" and defining the goal and process of "design".

2.2.2. The design principles of human-machine interface

The advantages and disadvantages of human-machine interface design are closely related to the designer. In excellent human-machine interface design, some of the principles can be applied to any other human-machine interface design, usually from the perspectives of interaction, information, display, data input, etc. to design a good human-machine interface, we must first have rational cognition, then be creative, and have practical information analysis and processing. Therefore, we must remember the basic principles of human-computer interaction. When designing, we should always pay attention to our own behavior and make the interface that users prefer.

(1) Keep the style unchanged: menu, command input, data display and other functions must be consistent on the same user interface. A unified human-machine interface is more aesthetic.

(2) Dynamic confirmation query: ask the user to confirm all actions that may cause damage, such as "are you sure?" And so on, which allows permission restore (undo) for most operations and allows user errors.

(3) Immediate response command: the user interface should be able to quickly respond to the user's decision, improve the efficiency of dialogue, movement and thinking, minimize the number of buttons, shorten the distance of mouse movement, and prevent the user from feeling overwhelmed.

(4) Setting auxiliary system: the human-machine interface shall be set with a context sensitive help system to ensure that the user can get assistance in the shortest time, and use short verbs or verb phrases to remind instructions as much as possible.

(5) Reasonably arrange the interface: reasonably divide and effectively use the screen. Display only relevant information and give the user the operation to maintain the visual environment: for example, enlarge and reduce the image; Use windows to separate all kinds of information and display only meaningful error messages, so as to prevent users from being troubled by the complexity of the data.

3. The importance of interaction design in human-machine interface design

Generally speaking, human-machine interface design is based on human-machine interaction design, a complete interface design can meet the requirements of users. In the design of human-machine interface, it is necessary to carry out interactive design, only human-machine interface without interactive function design is not realistic, and can not fully meet the needs of users. The realization of human-machine interface needs to be realized through interaction, so in the design of human-machine interface, it is necessary to meet both the visual needs of users and the operational needs of users. In addition, for interaction designers, the broadening of information dimension is of great significance for human-machine interface design. Traditional information media are two-dimensional, such as planar graphic ICONS, when operating, is two-dimensional space movement. Traditional two-dimensional human-computer interaction mainly includes two design pairs. The images are interface and interactions. The interface elements imply control over layout and size, and the interaction elements represent the logic of the flow of the interface elements.

4. The application method of interaction design in human-machine interface design

4.1. To design for the user

The human-centered design advocated by interaction design should be more used in the existing interface design. User-centered development requires understanding users and their tasks, and using that information to guide design. As we all know, user-centric design is about understanding the needs of users. This requires us to study the personality, hobbies, living habits and value orientation of different users. When designing human-machine interface, we should ensure that the whole system is user-centered, and user-centered interface setting can improve the maximum satisfaction of users. On the one hand, in the design of human-machine interface, it is necessary to link the needs of users, and carry out the overall demand analysis, analysis of their psychological characteristics, behavior, and so on, and finally integrate the obtained data into the design of the interface to achieve better results. For example, the interface designed for children should be designed with rich interface and interesting content to attract children's attention. To design such an interface, we need to study children's color preferences and what children think is popular. In addition, in the design of children's interface, we need to take into account the use of children, for example, consider the touch interactive design to meet the children's inflexible state. For example: for children, their thoughts are relatively simple, naughty, and naive, so we need to make their interface more easy to understand, and the colors should be bright, lively, vivid, and close to children's life (such as cartoons), which is Their nature makes it easier for them to interact in the game, which attracts them to use their work, which increases their popularity. On the other hand, we have to patiently understand their special needs, actively communicate with them, and let them fully participate in the design, so as to better understand their interactive functions and interfaces, and let them truly feel themselves needs are gradually being met. Of course, in the design process, we must also continuously integrate the concept of interaction, so that users can be more satisfied with the product. Therefore, when designing human-computer interaction, it is necessary to integrate user-oriented and interactive concepts into it, and combine human-computer interface with perfect interactive functions to achieve the best interaction effect for users.

4.2. To introduce emotional elements into interface design

The primary purpose of interaction design is to make users respond positively, to make users feel

relaxed, and to experience fun in use. Design an interactive interface that can generate special emotions for users, and encourage users to learn, play, and socialize. When users use the designed products, they will integrate their emotions into it. In the design, in addition to achieving visual aesthetics, they also need to create an atmosphere that makes users feel comfortable in the interaction. Users generate interest in the product. For example, when users use the software, they must download in advance. We must not only design a beautiful and reasonable download interface, but also design some interactive interfaces, so as to avoid users being bored when downloading. This is a very important Good optimization to enhance the customer experience. Of course, on some interactive buttons, we can also use some beautiful icons to display to increase the user's feeling. Therefore, the user's emotional factors should be scientifically and reasonably integrated into the product design, in order to better improve the user's satisfaction.

The use of various shapes, fonts, colors, patterns and other elements can affect the user's feeling when using it. The more graphical interface design, the better the user experience. Conversely, if an interface lacks imagination, users will not have any interest. Previous interface designs focused on ease of use, but rarely used interactive emotional interfaces. However, a recent study has shown that emotional interaction design can influence users' evaluation of the system's usability. In addition, if the "look and feel" of the interface is comfortable, then users are likely to have a higher acceptance and acceptance of the product. In this way, the emotional needs of users can be met and the satisfaction of users can be improved through beautiful graphics, clever combination of elements, beautifully designed fonts, elegant pictures and colors. As mentioned earlier, interactive design is not only about ease of use, but also aesthetic design, such as how the user interface looks and sounds good. Then, how to find a balance between ease of use and other design requirements becomes a key issue. This will become an effective means of interface design.

5. Conclusion

In summary, in order to meet the needs of more users, computer interactive design and human-machine interface design has become a key part, so it is necessary to explore the application of interactive design in human-machine interface design in order to achieve better results. Not only allows users to be visually pleased, but also allows users to pass their instructions to the calculator in the shortest time, so that the work efficiency is greatly improved. In a word, interface design is not only a simple art design, but also should consider its use mode in the design, and integrate more interactive design theories into the interface design to meet the use mode and requirements of different users. The perfect interaction function and beautiful interface design are combined to meet the user's convenient and quick use needs. Only such interface design is a successful design.

References

- [1] Xingchang Wang. *Application analysis of human-computer interaction design in industrial design [J]. Industrial design*, 2016 (07): 100 + 102.
- [2] Kaixi Wang. *Application analysis of human-computer interaction design in industrial design [J]. Popular literature and art*, 2019 (04): 128.
- [3] Xiaotong Xu. *Research on interactive design in human-computer interface design from the perspective of new media [J]. Science and technology innovation guide*, 2017, 14 (1): 123-125.
- [4] Jinghao Yan, Jinsong Fan. *Application of multimodal human-computer interaction technology in innovative design [J]. China machinery*, 2019 (18): 26-28.
- [5] Sifeng Ma. *Analysis of emotional factors in interactive interface design [J]. Packaging Engineering*, 2022, 43(12): 355-358.
- [6] Wei Wang, Yijing Yang. *Interaction Change in the Age of Intelligent Products: Design for Entity Contactable Interaction [J]. Art View*, 2022 (06): 129-133.
- [7] Zhongwei Chu, Dong Wei. *Application of Interaction Design in Human - Machine Interface Design [J]. Art and Design (Theory)*, 2007 (04): 93 - 95.
- [8] Fanting Tang. *Innovative Application of interactive design in museum exhibition Form [J]. Collection & Investment*, 2022, 13(06): 128-130.
- [9] Zhonghua Ma, Xiaofeng Hao, Yanxuan Qiao. *Research on Interactive design of smart home terminal based on user experience [J]. Industrial Design*, 2022(06): 106-108.