

Analysis on the Design of Computer Software User Interface

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Abstract: The rapid development of computer technology is of great significance in improving our life quality and the work efficiency. Software is a necessary tool to realize the multiple functions of computers. In the process of developing software, it is necessary to give consideration to the requirements of using efficiency and operation comfort. Optimizing the user interface can solve problems in the interaction between people and computers, and improve the satisfaction degree of users to the software. This paper analyses documents and key points in the design of computer software user interface.

1. Introduction

Nowadays, the applied range of computers is expanding continuously. In order to give full play to computers, we need to pay more attention to software development, and optimize the software user interface for the purpose of satisfying users' requirements. It is necessary to analyze the actual needs of users, fully consider the colour characteristics of the design object and the state observed by people's vision, so as to ensure that all factors are well coordinated and avoid actual operation difficulties caused by unreasonable interface design.

2. Document Requirements for the Design of Computer Software User Interface

2.1 The Design of Best Visual Area

When designing the user interface of computer software, the core requirement is to meet the actual needs of users: ensure the simplicity and rationality of the overall layout. From the perspective of ergonomics, simple layout can improve the efficiency of human-computer interaction. At the same time, we also need to follow the principle of coordination, pay more attention to the best view area and the effective view area of the interface, and divide the interface equally or follow the golden section principle. Generally, when the head is still and the eyes are moving normally, the best visual areas are 25% to the left in the horizontal direction, and 0° - 30° downwards in the vertical direction. Through reasonable design, the important contents of the software can be concentrated in the best view area. All contents should be effectively combined to reduce the time spent by users. The diagonal cross position of the screen is the user's direct view point; the upper quarter position is the focus attracting users' attention. These points need to be taken as key points in design.

2.2 Screen Content Distribution

When designing software content, the overall coverage rate should not exceed 40%, and the group coverage rate should be controlled within 62%. Controlling the degree of crowdedness of content can better adapt to people's visual habits.

First of all, the interface content design should have a strong sense of visual hierarchy

If we want users to browse the visual elements with a clear order, we should provide a strong sense of visual hierarchy. If users browse the same things in the same order every time, and the senses of visual hierarchy are not obvious, users will fail to find the focus and feel in a mess. It is difficult to maintain a clear hierarchical relationship in the case of constant design changes, because all hierarchical relationships are relative. If all elements are highlighted, there will be no focus at all. If one element needs to be added and highlighted, the designer may need to reconsider the visual

weight and layout of each element to re-achieve the clear visual hierarchy. Though most people don't notice the visual hierarchy, it's the easiest way to enhance design.

Secondly, appropriate organization of visual elements can reduce the cognitive load of users.

As the designer John Maeda said in his book *Simplicity*, properly organizing visual elements can simplify complexity and help others understand your expressions, such as the inclusion relationship of the interface content more quickly and accurately. The organization of orientation and direction can naturally display the relationship among elements. Organizing contents appropriately can reduce users' cognitive load. They don't need to think about the relationship among elements, since the designer has already shown it. Designers should use the organization to show the relation, rather than forcing users to make a distinction. The designer should arrange the content in the interface directly, rather than forcing users to figure out the problem.

Thirdly, interface contents should be displayed in sequence.

In principle, screens only show necessary contents. If the user needs to make a decision, he or she should be provided with enough information to choose from. The user can go to the next screen and find out required details. Designers should avoid over interpreting or presenting everything at once. If possible, placing the selection on the next screen and presenting information step by step can make the interface interaction clearer.

2.3 Visual Balance of Interface

According to researches on the balance of interface display, if the visual plane is asymmetric, people may feel that the whole picture is inclined. Increasing the sense of visual balance of the interface properly can improve the symmetry of the visual plane, making the whole interface cleaner and more recognizable, and better meeting the user's psychological requirements. Generally, in design, it is necessary to reasonably control the proportion of blank area and text area in the software interface, reduce the application of fancy transitional modes, and try to set all content blocks in a completed block area to improve the sense of wholeness of the content.

2.4 Each Screen Needs a Theme

Every picture we designed should have a single theme. In that way, users can use it to its real value; the interaction can become easy to get started, and convenient to use and modify when necessary. If a screen supports two or more themes, the whole interface will immediately become chaotic. One article should have only one theme and a strong argument; interface design should also have one theme, which is also the reason for the existence of the interface.

Because of the uniqueness of theme in each screen, secondary actions cannot supersede the main action. Each screen can contain one primary action and multiple secondary actions at the same time, but secondary actions cannot supersede the primary. The article exists for people to read, not for people to share it on Twitter. So when designing the interface, designers should try to reduce the visual impacts of secondary actions, or display them after the primary action is completed.

The single theme may lead to rigid transition between interfaces, so the designer should also pay attention to the natural transition of interfaces. The interfaces are all linked with each other. When designing, we should carefully consider the way and content of interaction, and realize it accurately through design. It's like our daily conversation, which needs to provide topics for in-depth conversation. When users have completed these steps, the interface should give them a natural way to continue and achieve their goals.

3. Key Points of Designing Computer Software User Interface

3.1 Software Framework Design

When designing computer software user interface, the first step is to design the framework of the whole software system. The framework has high complexity and involves all application functions of the software. Based on the operation steps and program requirements, designers should carefully analyze each node, trying to find the final software framework which is friendly to users and can

meet the requirements of program development. Simplicity and clarity are basic requirements. It is necessary to coordinate and analyze the contents of the interface, improve the utilization rate of space, and reduce decorated contents without practical effects. At the same time, the positions of labels, buttons, the status bar, the scroll bar, the menu and other contents should be reserved in advance according to the zoom status and resolution requirements. In addition, it is necessary to make effective collocation of multiple colours, and set the software trademark in a prominent position. Generally, the scroll bar is set on the right side; the status bar is set on the lower side; the main menu is set on the top or the left side. The layout can meet the psychological and visual requirements of users to the greatest extent.

3.2 Graphic Design

Usually, people memorize corresponding contents through the forms of words, pictures, graphics and scenery, and through their understanding on the meaning of words and pictures. In contrast, people have relatively poor memory on the whole story and the completed picture; the difference between the text memory and the picture memory is obvious. Pictures and images can transmit all kinds of information more directly, helping people to achieve simple and efficient understanding. In view of this feature, when designing the user interface of computer software, we need to pay attention to the design of graphics and image content. According to the features of software functions, we can choose abstract or concrete design methods to realize human-computer interaction. If screen elements have different functions, they should look different. On the contrary, if their functions are the same or similar, they should look the same. In order to maintain the consistency, junior designers often use the same visual processing effect in elements that should be distinguished. But in fact, it is appropriate to use different visual effects.

Among them, the abstract method can better highlight the inherent characteristics of things. It extracts and summarizes the regularity of existence, determines the unique modelling elements of visual graphics, and can form visual elements through simple geometric graphics, faces, lines and points. The concrete method takes the real things as the basis, and effectively combines decoration and realism to recreate the real things. It focuses on the beauty of the natural form, and is more vivid in expression.

3.3 Interface Colour Design

Colour is also a key point in the design of computer software user interface. Selecting the colour of application can directly produce strong impacts on users. By using different colours to represent the buttons and charts of corresponding functions, it will be more convenient for users to operate. The human-computer interaction becomes more convenient and comfortable. At the same time, colour can be used to classify the interface objects and become a common sense resolution element. Users can find out corresponding function buttons and complete the operation through distinguishing different colours. People's visual perception organs have certain limitations and specific characteristics; when designing the interface, we must ensure the suitability of colour selection, and make a comprehensive analysis of the limitations and advantages of human visual sensitive cells. Human vision is the most sensitive to yellow and green, and the least sensitive to blue. In this way, we should try to avoid the use of blue fonts in the design; the minimum size of icon should be controlled in the range of human visual recognition, which can meet the operation requirements and improve users' comfort degree in operation.

However, colour is not the decisive factor. The colour of an object will change with the change of light. When the sun is setting or shining brightly, the sceneries we see are quite different. In other words, colour is easy to be changed by the environment. Therefore, when designing, we cannot regard colour as the decisive factor. Colours can be eye-catching guides, but should not be the only element to make a difference. In the case of long-term reading or long-term facing the computer screen, the contents should be emphasized while the background colour should be relatively dim or soft. Of course, designers can also use a bright background colour according to readers' favour.

3.4 Interface Text Design

Texts in the interface are mainly used in conversations, titles and prompt information. They are applied in detail description and concept representation, and can be divided into device texts and annotation texts. Among them, the device text is the internal function of the computer software system. After the user selects a menu option, the system will execute relevant commands in the background; the interface describes the operation and function of the icon, the radio button, the check box, the menu and the button through the label. The main purpose of the annotation text is to make the function and status of the computer software system visible. For example, system messages can send error conditions and system status; tool tip texts can help users understand all kinds of information more comprehensively and realize different functions and operations more conveniently. In order to improve the design effect of computer software user interface, it is necessary to comprehensively study the characteristics of people's reading progress. Usually, people distinguish the shape, letters or words of Chinese characters at first, and then determine the meaning they represent. Therefore, based on the characteristics of users, we should make the interface easier to be learned and comprehended, pay attention to the text layout and wording, and ensure that the user interface has high comfort level.

4. Issues on Computer Software Interface Design

4.1 Protect and Respect USERS' Attention

When we are reading, there are always some things that can distract our attention, making it difficult for us to focus on reading quietly. Therefore, it is very important to attract the user's attention when designing the interface. The disorder surrounding environment of the key application can distract people's attention; clean screen is important to attract users' attention. If the interface must display ads, they should be displayed after the user finish the reading process. Respecting user's attention can not only make the user feel more pleasant, but also achieve better results in the planted advertisement. Therefore, to design a good interface, keeping and respecting users' attention is a prerequisite condition.

4.2 Keep the Interface under the Control of Users

People often feel comfortable when they can control themselves and the surrounding environment. Software system which fail to consider users' feelings often make this kind of comfort disappear, forcing users to enter the state of unplanned interaction, which makes users feel uncomfortable. Ensuring that the interface is under the control of users, and that users can decide the state of the system, the goal of interface design will be easily achieved through a little guidance.

Users' feeling is the best when they can directly manipulate the object. But it is not easy to achieve. In the interface design, the icons we add are often not necessary. For example, we use too many buttons, graphics, options, accessories and other cumbersome things so that we can finally manipulate UI elements rather than important things. The initial goal, however, is to simplify the process and makes users be able to operate directly. Therefore, in the process of interface design, we need to understand the natural gestures of human beings as much as possible. The interface design should be simple and let the user experience the feeling of direct operation.

4.3 Built-in the "Help" Option

In an ideal user interface, the help option is unnecessary because the user interface can effectively guide the user to learn. Functions like the "next step" are actually the embedded "help" in the context. They only appear in the appropriate place when the user needs it, and hide in other times.

The designer's task is not to build a help system and let users find out the solutions in it. The help system shifts designers' responsibility of finding out users' needs. Instead, the designer needs to make sure that users know how to use the interface; they can be guided and learn in the interface.

In addition, designers need to focus on the critical moment of zero state. The user's first

experience of using an interface is very important, but it is often ignored by designers. In order to help users adapt to our design quickly, the design should be in the zero state, which is the state that nothing happens. But this state is not a blank canvas; it should be able to provide direction and guidance and help users quickly adapt to the design. There will be some friction in the initial interaction; but once users understand the rules, there will be a high chance of success.

5. Conclusion

The variety of computer software is increasing. In order to improve the competitiveness of products, in addition to ensuring the perfect functions, we also need to do a good job in user interface design, in order to provide a comfortable and easy operating environment for users, and improve their recognition degree of the software.

References

- [1] Guo, X. (2012). Research on Usability of Software User Interface Icons, Nanjing University of Aeronautics and Astronautics.
- [2] Xiao, P. (2015). Computer Software User Interface Design. *Wireless Internet Technology*, no. 17, pp. 91-92.
- [3] Su, Z.Q. (2015). Design of User Interface for Analytical Computer Software. *Electronic Technology and Software Engineering*, no. 24, pp. 89