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USER IN MODERN SOFTWARE APPLICATIONS INTERFACE SATISFACTION ANALYSIS OF PROBLEMS

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Abstract. Human computer interface is known to be associated with designing websites or applications. The main goal is to ensure user satisfaction. User interface means the organization of interaction between the user and the components of the computer system. The interface should be usable. It is known that there is no absolute thing that is suitable for every user. It is possible that the existing interface is suitable for solving a specific problem for a certain category of users, but it may be inconvenient for another category. For example, a website is being developed, it is not possible for everyone to use it equally. The presented article analyzes the merits and demerits of applications designed with the synthesis of machine learning and artificial intelligence to ensure user interface satisfaction.

Keywords: User interface (UI), Web user interface - WUI (Web User Inteface), Graphical interface - GUI (Graphical User Interface), ergonomic standards, environment.

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1 Introduction

An interface is a system of rules and tools that regulate and ensure the interaction of several processes or objects. User interface (UI-User interface) is a system of rules and tools that regulate and ensure the interaction of the program with the user. The concept of user interface includes not only the image on the screen, but also the ways in which the user interacts with the system, designed in three-dimensional, animated or simply stylish design. Thus, the user interface refers to the organization of interaction between the user and the components of the computer system. The interface should be usable. But there is no absolute thing that is suitable for everyone. It is possible that the existing interface is suitable for solving a specific problem for a certain category of users, but it may be inconvenient for another category. For example, a website is being developed, it is not possible for everyone to use it equally. Technical designers or programmers should take this criterion into account and always keep psychometric and synergistic indicators in mind as a priority direction. In this regard, the analysis and research of user interface satisfaction problems in modern software applications is relevant.

2 Statement of the problem

It is known that the starting point of a good interface in modern technical systems is a metaphor. The process of interaction with the user does not take place in the real world, but with the help of artificial devices such as a screen, mouse and keyboard. Therefore, it is necessary to "fix" the metaphor somewhere (Cagiltay, 2011; Dogan et al., 2016; Bansal & Khan, 2018; Geddie et al.,

2001; ISO 9241, 1992/2001; Nielsen, 1993). In addition, the possibilities of the world inside the computer are usually wider than those of the physical world, and this can be successfully used for a more powerful interface. Finally, there is computer experience among professionals, and this experience seems natural to the creators of new interfaces. Hence, the existence of a metaphor for the interface is a must. The environment on the screen and the ways of interacting with the system should address the situation familiar to the user. Thus, the window interface is thought of as a metaphor for a desktop with documents. The use of metaphor is very important:

First, it is easier for the user to understand and interpret the image on the screen.

Secondly, you don't need to look at the manual every time to find out how to perform this or that action. At least some action should come "naturally" from the metaphor.

Thirdly, encountering a familiar metaphor for the user creates a sense of psychological comfort and confidence.

Let's assume that the design of the conceptual interface is required. That is, it is required to develop a system of interface elements within the framework of a metaphor, a sketch of the processing of the interaction alphabet necessary for the user. At this time, depending on the subject area, it is necessary to find an elegant way of describing individual elements of conceptual design, as well as their groups. And finally, a general image style that is easily recognizable and pleasing to the eye should be formed.

The conceptual design of the interface should be based on the idea of the interface environment. When working with the system, the user is immersed in the interface environment. The word "environment" is used as a designation for the "signal-action" relationship inherent in human behavior in various environments. This idea belongs to Gibson, a psychologist who claims that our perception is based on motivation, in the sense that if we want to eat, we see only edible things, and if we are tired, we see only pieces of furniture designed for relaxation [2-4]. That is, a person does not just see the environment, guided by various motives, but questions it. In turn, the environment gives different signals to a person. Along with answers to his inquiries, there are first-rate (or always required) signals of physical danger. Based on the received signals, a person performs various actions. This model is correct for artificial environments. Gibson believes that this is also true for natural environments and finds it very fruitful for interface design as a starting point (Bansal & Khan, 2018).

Thus, the buttons of various dialogs in the standard window interface can be interpreted as signals to press them. But these signals are extremely weak, because all the buttons look the same, they differ only in the text on them, and their functions are different. That is, from all visual tools - shape, size, color, text - only text is used in dialog buttons. It is considered good practice to have buttons of the same size and neatly placed to force the user to read the text every time. The exception that proves the rule is the OK button, which does not look like text, but looks like a picture (hieroglyph). Concepts of environment and concept of metaphor are closely related to each other. If the visual environment and some supporting elements remind the user of something already familiar, he will be able to quickly adapt to it. At the same time, the chosen metaphor can dictate all the graphical decisions of the interface design. However, one must be wary of the photographic resemblance of the computer environment to the chosen metaphor. Still, the computer environment is artificial, and it will not be possible to completely replicate all elements of interaction from the physical world. And the photographic likeness can induce the user to use this built environment exactly as it looks. When the user encounters the difference for the first time, he will experience a serious psychological shock that can lead to a complete rejection of the system. We approach the important principle of interface design - the balance between the interactive capabilities of the program and the complexity of its visual range. The interface should provide a balance between the functionality of the program, its manipulation capabilities and visual range.

3 User interface from a hardware-software point of view analysis of types

The main problem in the user interface is the synchronization of the user's attention point with the system's action point. This challenge requires the user to be able to tell the system where and what they want to change (usually by clicking the mouse button in the right place). On the other hand, the system should draw the user's attention to the most relevant changes. Many programs use different forms of video dynamics, called multimedia. The software user interface consists of 3 parts, internal and external from the hardware point of view:

1. Graphical environment (Visual interface) is a form of presenting information to the operator. A program has a graphical user interface if it displays information graphically and requires a pointing device (such as a mouse) for user interaction.

2. Menu environment - a complex form that includes all effective possibilities. If the program is given commands through a menu system, the program has a menu-driven interface. Menus are ideal for occasional applications, but experienced users may find them too slow.

3. Command environment - The operator enters commands through the keyboard, for example, on DOS, OS/2, or VAX/VMS systems, a user can get a list of files by issuing the keyboard command

Many programs use different forms of graphical interface called multimedia. The graphical interface combines animation and windowed interface.

In the graphical interface, the user deals with the sequence of images. The flexibility of programs is determined by programmers by the time lost between images. Interface psychologists, on the other hand, measure the time it takes for a user to start connecting with a new image on the screen. This interval includes not only the time of displaying a new image on the screen, but also the time of its notification by the user. After all, the user spends some time and effort to understand how each next image is related to the previous one. By increasing the transition time from one image to another (i.e., the time of an animated transformation of images), animation significantly reduces the time it takes to understand a new image. In the psychological sense, there is no new image, there is a modified old one, and since all the transformations take place before the eyes of the viewers, the user is ready for interaction almost immediately. Another feature of an animated user interface that greatly increases its usefulness over a graphical interface is the increased use of dynamic visual cues. Dynamic visual cues are changes to the image on the screen to provide additional information to the user. It is already possible to observe examples of such signals in the standard window interface in modern applications. This allows for increased user satisfaction. When the program performs long movements, the mouse cursor takes the shape of an hourglass. This is a signal that the system will temporarily not respond to user actions. A second example is changing the image of a button when you click on it with the mouse. This is a signal that the system believes that the user has interacted with this particular button.

However, while solving many problems to ensure user satisfaction, the animated interface, as it often is, presents difficult problems for the programmer and designer. The main types of user interface are described in Figure 1 (Bansal & Khan, 2018; Geddie et al., 2001; ISO 9241, 1992/2001).

As you can see from the figure, the most widely used of these types is the GUI (Graphical User Interface), which is based on the web user interface (WUI). The style details of a web user interface are no different from the style details of a graphical interface. An example of this is Web browsers. A transition to time-controlled programs is observed to use the animation interface. Regardless of the user's actions, the program built on the graphical interface always has something to do, for example, to change the flashing phase. At the same time, of course,

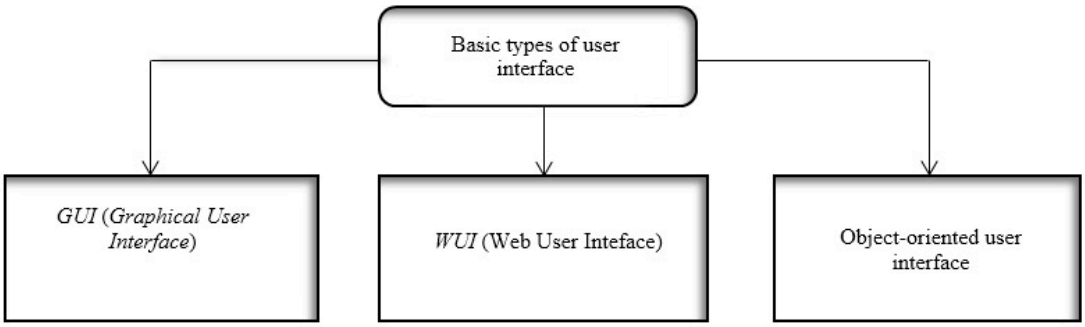

Figure 1: Types of user interface

it should be constantly available for interaction, but unlike many current multimedia programs, it should not interrupt the displayed flow, but should smoothly change according to the user's influence. Such requirements are most easily implemented in the specific architecture of time-controlled applications. On each clock cycle of such a program, the image on the screen is rebuilt, and user-initiated events, such as keyboard input, are handled by changing the state of the program. A corresponding change to the display occurs in the next step (perhaps not immediately). Thus, the visual level is added to the two usual levels of the program - functional and interface. The design of a specific program requires the development of its own interaction environment (oriented to the implementation of a specific functionality) based on a generally accepted system of dynamic visual signals. Thus, the visual solution in conceptual design is formed by giving priority to the principle of a systematic approach from the bottom-up and the top-down. Object-oriented user interface reflects all properties, behavior, functionality of an object. Object class assignments, class hierarchies, and class hierarchy inheritance made transparent at design time provide transparency.

4 Result

Thus, regardless of which type of interface is used, the regulatory requirements for the ergonomics of the user interface are essentially different from the syntactic and manipulation rules, which refer to the psychophysiological characteristics of the specific implementation of the already selected type (style) of the user interface (and the corresponding standard) in a certain application. In these circumstances, ergonomic standards may only require obtaining some general ergonomic guidelines that the selected type (style) should provide during application. It is assumed that the application should be optimally integrated into the technical environment. A number of older standards (ISO International Organization for Standardization 9241 P. 3-9 standards) address this specific environment (keyboards, displays, keyboard and mouse input devices, workstation furniture, and work environment dimensions such as lighting or noise levels). Ergonomic aspects of an application's user interface are a natural extension of hardware and workplace ergonomics.

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