

UDC 004.4'275

METHOD OF CONSTRUCTION OF ADAPTIVE INTERFACE OF MULTIMEDIA PRODUCT

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The purpose of the article is to develop a method of constructing an adaptive interface of a multimedia product. The hypothesis of the study was that the system is easier to adapt if there is a prototype of the user, whose features are his ability to perceive the information in one way or another. The user model in this article is based on the criteria of the primary system of the information perception. To select the individualization of the interface in the work it is proposed to use the unit of processing information about the user. The software implementation of the adaptive interface in the multimedia presentation product is offered. A software implementation of a multimedia product with statements according to the proposed test has been developed. After testing, the system itself analyzes the information obtained and displays the test results. The practical result of the article is a multimedia presentation product, which includes a unit for collecting and processing user information.

Keywords: *interface, multimedia product, adaptive interface, user, interface library.*

Formulation of the problem. The knowledge acquired by mankind is preserved due to the desire to record the information obtained. A person always seeks to share his information with others and find reliable means for its transmission and storage. Today's society has the right to be called informational, because at this stage of its development the main product of human production is information. Nowadays, the role of information has significantly increased, the number of people employed in the field of information technology in the production of information products and services is growing. As a result, various types of multimedia products are gaining in importance, for the effective operation of which adaptive interfaces should be created.

Analysis of recent research and publications. Scientific research on the subject of the article is devoted to the creation of user interfaces [1–2], analysis of the structure of the adaptive interface [3–5], development of adaptive interfaces [6], assessing the quality of software development interfaces and multimedia products [7–9].

The methods of developing multimedia products used today often do not take into account the stage of interface development. A study of the literature has shown that today the concept of adaptive interface is not applicable to a multimedia presentation product.

The purpose of the article. The main purpose of the study is focused on the development of methods for building an adaptive interface of a multimedia product.

Presentation of the main research material. The system is easier to adapt if there is a certain prototype of the user, whose features are his ability to perceive information in one way or another. This assumption is based on the following provisions:

the preparation of the interface of the multimedia presentation product should be carried out in such a way that it is understood by as many people as possible;

the maximum efficiency of interaction between the system and the user occurs when the system has some idea of the user. This means that the system has some characteristics that help to classify the user using the built-in model.

Most of the above principles can be neglected to a greater or lesser extent. But in the study and design of adaptive interfaces, the most important of the basic principles is the ability to individualize these interfaces. Regarding the specific principles of designing adaptive interfaces, the principle of taking into account the peculiarities of the perception of a particular type of information, in accordance with the above provisions adopted within the study, should be added.

In the article, the user model is based on the criteria of the primary system of information perception. The model describes through which internal channel a person can perceive this or that information. This is necessary for the user to quickly adapt to the system so that the user can quickly understand the principle of the interface and as soon as possible to solve their problems on the informative part of the multimedia presentation.

To select the individualization of the interface, you must use the user information processing unit. In order for the system to independently determine which model to use for a particular user, it is necessary to create a mechanism for collecting and processing data about this user.

To reduce the time for training the user to work with a computer system (multimedia presentation product), ie for training the user of the system interface, it is advisable to use design techniques and follow the requirements for the design of controls. In this case, we are talking about the use of rules for constructing the functional qualities of the system. The organization of graphic elements plays an important role in the effective interaction of the user and the system because design techniques help to solve communication problems. The interface should be based on some interface library. To build a library of users it is necessary to take into account the features of each of the described models.

The implementation of the adaptive interface in the multimedia presentation product is shown in Fig. 1.

Scheme shown in Fig. 1, will serve as a basis for the creation of guidelines for building an adaptive interface of a multimedia presentation product, and they will be based on the principles of the possibility of individualization and taking into account the peculiarities of perception.

Construction of the adaptive interface of the multimedia presentation product is based on the collection and analysis of user information, compiling a user model in accordance with the peculiarities of information perception. In this case, we can highlight recommendations for building an adaptive interface of a multimedia presentation product.

The main channels of perception are the following:

- 1) visual channel;
- 2) audio channel;
- 3) kinesthetic channel.

The visual channel perceives visual images, the audio channel - auditory images, the kinesthetic image is based on sensations.

The model of neurolinguistic programming is based on the idea that each person has his favorite channel of perception, which he trusts more than others [9]. Hence the concept of the leading channel of perception.

It should be noted that in the perception of information, we use all our external channels of perception, although we pay attention to one channel more than the other.

The primary system of perception - the dominant internal channel of information perception, through which the perception of the vast majority of information.

The primary system is similar to running a computer program - invisible, but necessary for the operation of the computer as a whole. It is sometimes called an input system because it provides materials for conscious reflection.

In turn, you should understand that none of the systems is completely dominant, it all depends on what you want to do. Therefore, the division of people by type of perception of information is very conditional.

Stage 2. Next in the construction of the adaptive interface, it is necessary to develop a unit for processing knowledge about the user. This stage involves the following tasks:

- 1) development of a test to determine the user model;
- 2) creation of a module for formalizing test information.

At this stage, the formation of the analytical part of the system, through which you can get knowledge about the user and process them. The module of formalization of test results is necessary for the interaction of the user and system. The adaptation of the multimedia presentation environment to this user will depend on this module.

The unit of processing knowledge about the user includes composing a test, visualization of the test text, and construction of the analytical part using the software.

In the framework of this study, a psychological test is used, because the criterion for constructing an adaptive interface is the primary system of information perception.

According to the classification of psychological tests (Fig. 2), the diagnosis of this study can be characterized as a standardized test.

Standardized test - a psychological test with a clearly defined and unchanging list of questions, instructions, methods of processing results, and counting points [6].

Stage 3. After the formation of the unit of processing information about the user, it is necessary to proceed to the construction of the basic basis of a multimedia presentation.

At this stage, the creation of a general type of multimedia presentation. The shell and the content will be the basis for further development of interface options according to user models.

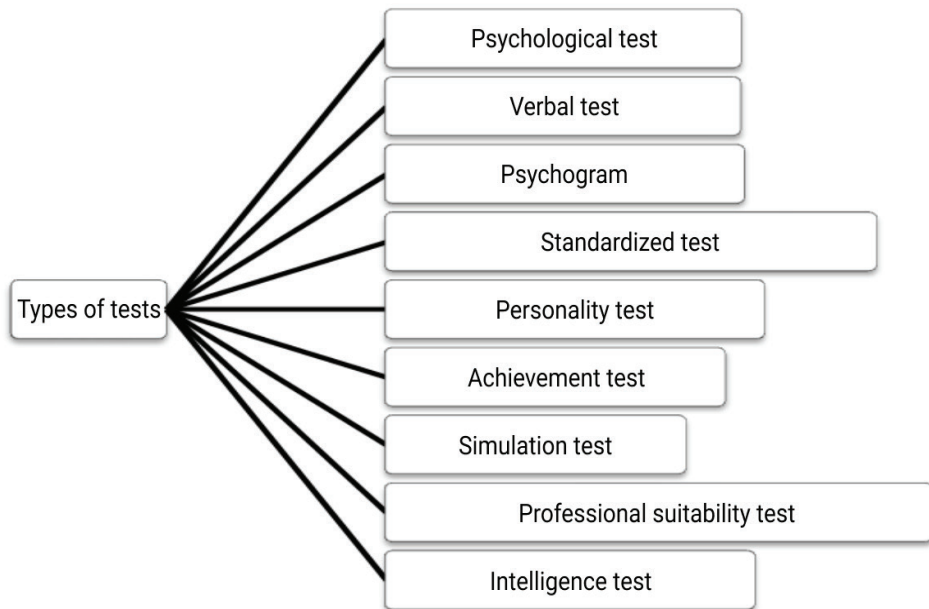


Fig. 2. Classification of psychological tests

A characteristic feature of this stage is the visual solution of communication, reducing the time of adaptation of the user to the system through the use of design techniques and formulated requirements for the construction of both the informative component and the controls of the multimedia presentation product.

Stage 4. At the final stage, it is necessary to form a library of interfaces based on user models.

The final stage involves the graphical implementation of the features highlighted by users at the stage of analysis and classification.

As part of this study, a prototype of a multimedia presentation product of an advertising nature was developed. The technology of creating a multimedia presentation is based on the use of the software product AutoPlay Media Studio.

1) Presentation in AutoPlay Media Studio is currently one of the most effective advertising technologies. It has a number of advantages, the main of which are:

2) minimal development costs and a high degree of efficiency;

3) ways to convey the presentation. Ability to place and view the finished product on the Internet, send by e-mail, or publish on CD / DVD. Moreover, the sound, video, and graphics can be optimized in size so that you can put an easier to download version, without visible loss of quality;

4) the interactivity of the presentation. This means that at any time the viewing can be interrupted and start watching another section, the most currently of interest to the user;

5) possibility of viewing on any output device (monitor, projection screen, plasma screen);

6) informative and multimedia presentation. AutoPlay Media Studio is a rich information product that includes not only text, still images, and standard animation, but also animation, sound effects, 3D graphics, video - all that contribute to the perception of information.

As a psychological diagnosis of the user was developed a test based on the method of determining the cognitive-activity style (L. Rebbek). The technique is focused on determining various cognitive ways of perception, thinking, communication, etc.

The text of the psychological diagnosis contains 15 statements.

In each of the test items, it is necessary to note the answer that most characterizes the attitude of the subject to this statement. All test items are filled in similarly. Upon completion, the system will independently determine the results and display them on the screen. Test statements are presented in Table 1.

Table 1

Text of diagnostic testing

№	The statement
1	I remember the material better when I write it down.
2	I remember the material better if I discuss the information aloud.
3	Moving objects help to remember information.
4	I make a lot of records.
5	I can easily understand what is being said, even if I don't see who is saying it.
6	I like to model.
7	I visually remember pictures, words, numbers.
8	I don't remember people, but I remember what they said.
9	I move my lips when I read „about myself”.
10	I have to look at people to understand what they are talking about.
11	Hearing helps me to think.
12	I am happy to collect postcards, coins, stamps.
13	Constant noises annoy me during classes.
14	I can easily tell people by their voices.
15	I get nervous when I don't move for a long time.

An example of the implementation of the page with the statement from the proposed test is shown in Fig. 3.

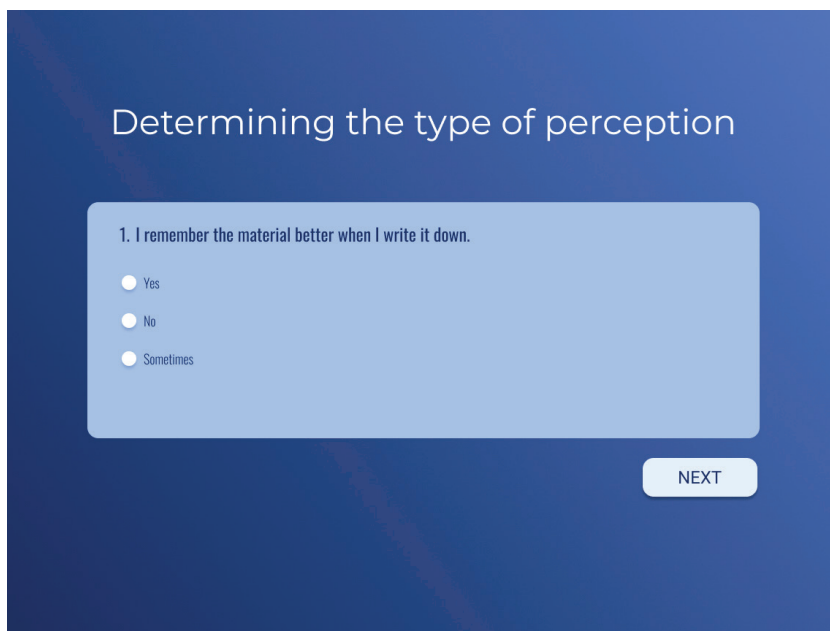


Fig. 3. Implementation of the test in MPP

After testing, the system itself analyzes the information obtained and displays the test results. DV with test results is shown in Fig. 4.

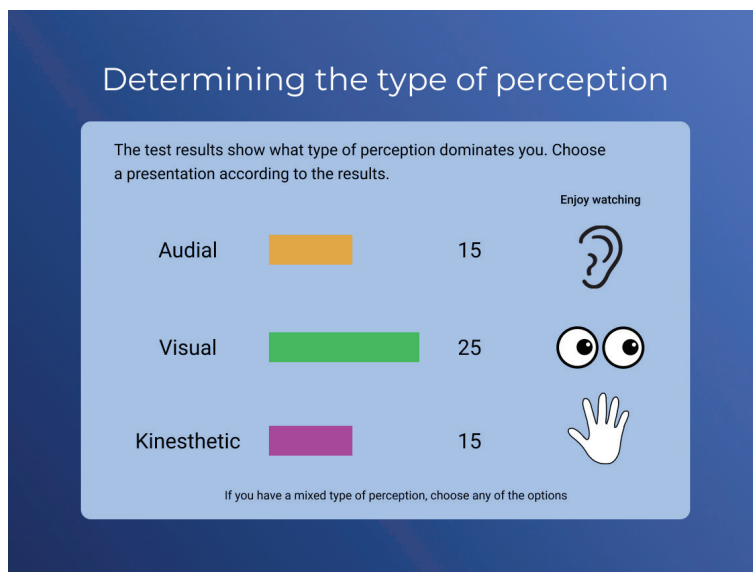


Fig. 4. The output of test results

It should be noted that the system is equipped with input control, ie if the subject did not choose any answer, he will be warned by a special message (Fig. 5).

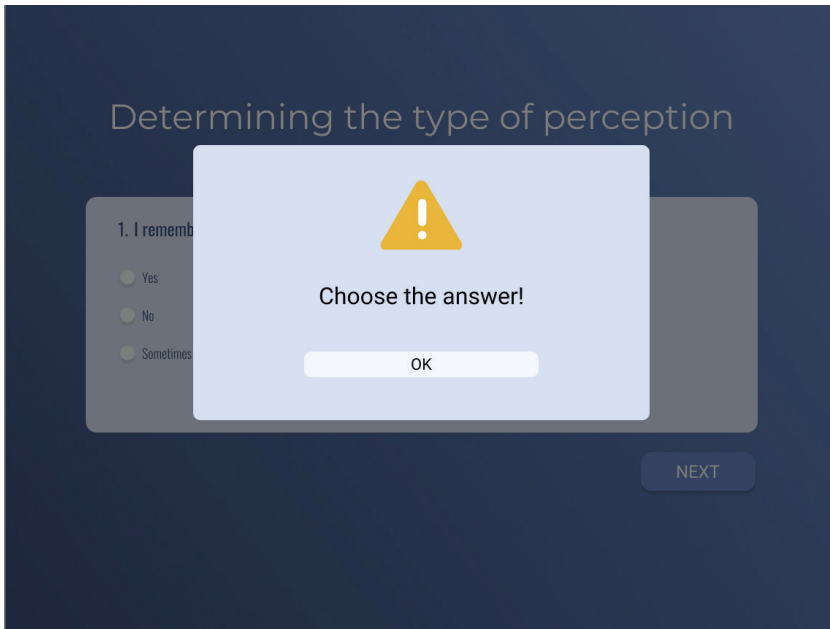


Fig. 5. Control the input of answers

According to the recommendations given above, a multimedia presentation product of an advertising nature was built.

An example of the location of textual information and graphics in the presentation product is shown in Fig. 6.

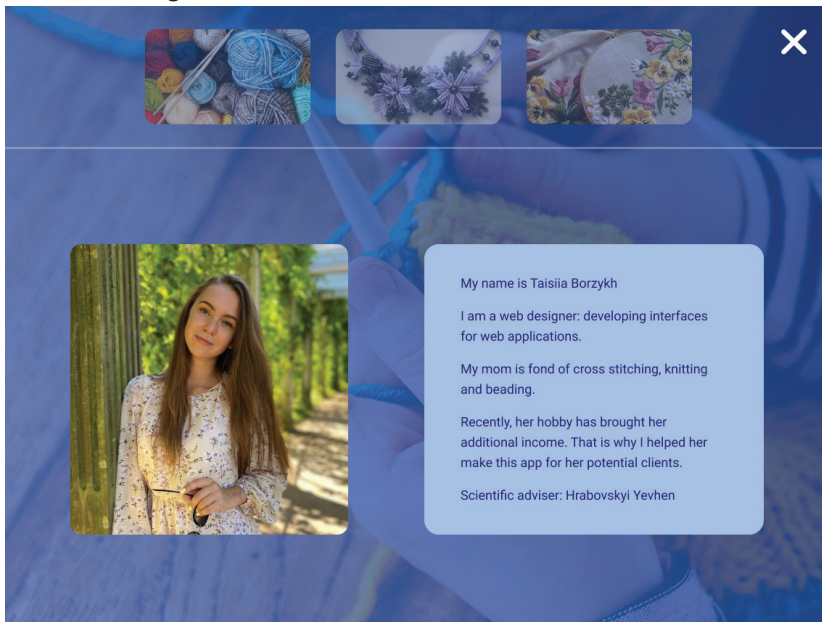


Fig. 6. Example of placing textual information in the MPP

1) The user interface is divided into smaller units, called interface elements, or controls.

2) In multimedia presentation products, the elements of the interface are the navigation system and menu, as well as some function buttons (exit the program, provide the output of the printed version of the multimedia presentation, etc.).

3) In accordance with the principles of construction of adaptive interfaces given in subsection 1.2, the following recommendations should be taken into account:

4) to increase the speed of the user controls should be made visible and clear;

5) to reduce the number of user errors, it is not recommended to make small buttons (such a button is not easy to press); determine the “default” status on user-dangerous buttons.

1) There are also requirements for the design of interface elements. The requirements for the text of the interface elements are as follows [5]:

2) the names of the elements must be short and clear to the user;

3) the name of the element should reflect its function;

4) the most significant word should be in the name of the element first;

5) for the name of the element that triggers the action, it is advisable to use a verb in the infinitive;

6) if the menu item is used to launch a window with the continuation of the dialogue, then at the end of its name should put three dots;

7) icons should only be used for the most important menu items.

It makes sense and the location of the interface elements on the screen, this is due to the following requirements:

1) menu items should be grouped;

2) groups should be separated by dividing strips;

3) those elements that are used more often, it is advisable to place in the upper left part of the screen, and those that are less often - in the lower right part of the screen;

4) termination buttons (command buttons to control the window) should be at the bottom of the window or on the right side.

Fig. 7 shows that the menu items are grouped, are separate from other interface elements.

Taking into account the recommendations for the design of the informative component of the presentation and the requirements for the design, it is necessary to highlight the features that should have controls, depending on the type of perception of information by the user.

The following nuances are implemented in this multimedia product for audio: when hovering over the interface elements, sound signals are emitted, which can cause associations with certain actions.

Navigation elements and menus in the presentation product for visuals are accompanied by pop-up graphic prompts. The pictures tell one where the user can go by clicking on a button.

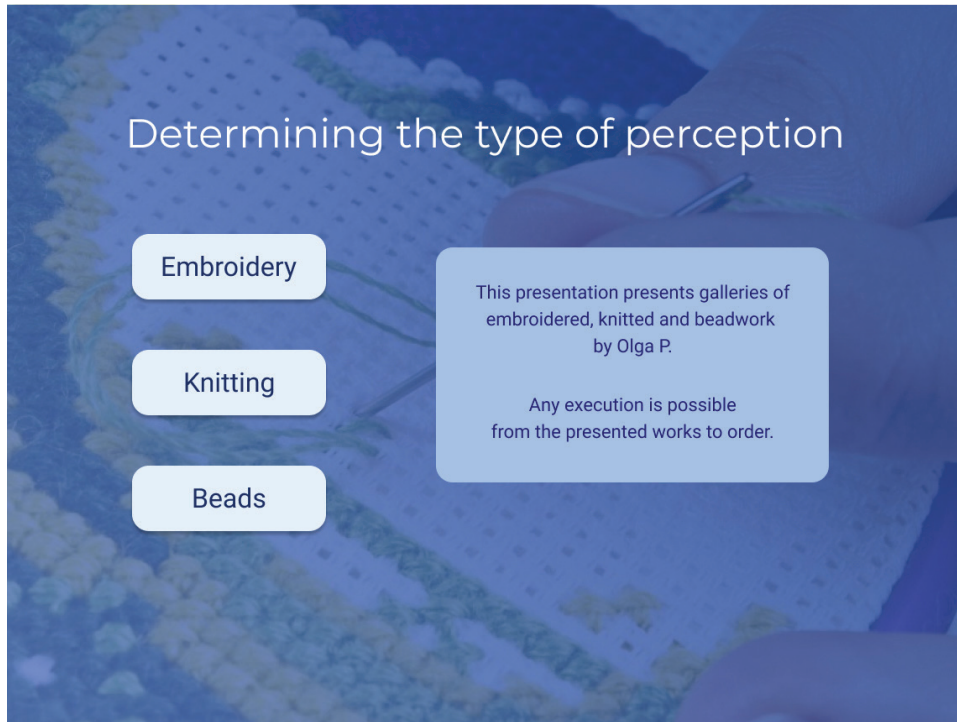


Fig. 7. Grouping menu items

In a multimedia presentation product for kinesthetics, the interface elements are dynamic. In the presentation for kinesthetics dynamic menus, it is possible to consider graphic images in more detail.

Conclusions. Modern theoretical approaches to the creation of adaptive user interfaces are analyzed. The tools that allow one to develop an interface for a multimedia product are explored. The choice of the technique of construction of the adaptive interface is substantiated. A presentation was created to display the results of the methodology. The practical result of the article is a multimedia presentation product, which includes a unit for collecting and processing user information.

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МЕТОДИКА ПОБУДОВИ АДАПТИВНОГО ІНТЕРФЕЙСУ МУЛЬТИМЕДІЙНОГО ПРОДУКТУ

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Метою статті є розробка методики побудови адаптивного інтерфейсу мультимедійного продукту. Гіпотезою дослідження стало таке припущення: системі легше адаптуватися, якщо існує деякий прототип користувача, особливостями якого є його здатності сприймати інформацію тими чи іншими способами. Модель користувача у даній статті ґрунтується на критерії первинної системи сприйняття інформації. Для вибору індивідуалізації інтерфейсу в роботі пропонується використовувати блок обробки інформації про користувача. Запропоновано програмну реалізацію адаптивного інтерфейсу в мультимедійному презентаційному продукті. В даній роботі побудова адаптивного інтерфейсу мультимедійного презентаційного продукту базується на зборі та аналізі інформації про користувача, складанні моделі користувача у відповідності з особливостями сприйняття інформації. У якості психологічно діагностики користувача у рамках даної роботи був розроблений тест, заснований на методиці визначення когнітивно-діяльнісного стилю. Методика орієнтована на визначення різноманітних когнітивних способів сприйняття, мислення, спілкування. Розроблено програмну реалізацію мультимедійного продукту з твердженнями згідно запропонованого тесту. Після закінчення тестування система сама аналізує отриману інформацію і виводить результати тесту. Система забезпечена контролем введення, тобто у разі якщо випробуваний не вибрав жодного варіанту відповіді, він буде попереджений спеціальним повідомленням. У розробленому мультимедійному продукті враховано специфічні риси роботи як візуалів, так і аудіалів. У презентації для кінестетиків створені динамічні меню, є можливість детальніше розглянути графічні зображення. Практичним результатом статті є мультимедійний презентаційний продукт, що містить у собі блок збирання та обробки інформації про користувача.

Ключові слова: інтерфейс, мультимедійний продукт, адаптивний інтерфейс, користувач, бібліотека інтерфейсу.

Стаття надійшла до редакції 20.09.2021.

Received 20.09.2021.