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DEVELOPMENT METHOD OF DESIGNING A TYPED UNIFIED USER INTERFACE

РАЗРАБОТКА ТИПИЗИРОВАННОЙ МЕТОДИКИ ПРОЕКТИРОВАНИЯ УНИФИЦИРОВАННЫХ ПОЛЬЗОВАТЕЛЬСКИХ ИНТЕРФЕЙСОВ

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Abstract. The main category of research is the “interface” to standardize and improve the efficiency of interaction of information systems and human - person.

The paper shows the author's classification of user interfaces. Defined standard-layout software projects and exemplary approach to the development of branded design techniques standardized user interfaces.

Developed a method of designing a typed unified user interface, which includes: development of a technique of classification interfaces, development of criteria for usability interface, an assessment of factors that determine the performance and effectiveness of the software in its design, from which were formed the basic principles and algorithms of the program tester.

A program-tester developed by students of the Web-user interfaces in preparation for the final qualifying works, which allows you to identify the key ergonomic characteristics: efficiency, reliability and performance.

Author's recommendations are given to improve the convenience of Web-based interface.

Аннотация. Основной категорией исследования является «интерфейс», его стандартизация и повышение эффективности взаимодействия информационной системы и человека – пользователя.

В работе приведена авторская классификация пользовательских интерфейсов. Определены типовые макет-проекты программного обеспечения и показан подход к разработке типизированной методики проектирования унифицированных пользовательских интерфейсов.

Разработана типизированная методика проектирования унифицированных пользовательских интерфейсов, включающая в себя: разработку методики
классификации интерфейсов; разработку критериев юзабилити интерфейса; оценку факторов, определяющих производительность и эффективность программного обеспечения при его проектировании, на основании которой были сформированы основные принципы и алгоритмы функционирования программа-тестера.

Разработана программа-тестер для проверки разрабатываемых студентами пользовательских Web-интерфейсов в рамках подготовки выпускных квалификационных работ, которая позволяет определять основные эргономические характеристики: эффективность, надежность и производительность.

Даны авторские рекомендации по улучшению удобства Web-интерфейса.

**Keywords:** ergonomics, the user interface, information system, reliability, information modeling.

**Ключевые слова:** эргономика, пользовательский интерфейс, информационная система, надёжность, информационное моделирование.

Ergonomics and design play a key role in any professional activities that are considered as a central element of the mechanism of economic development. Ergonomics before 1985 tried to bring to the industry of our country's approach to the novelty efficiency, quality and reliability that stemmed from a desire to put into practice the principle - the maximum attention to the man through the power tool, appliance, machine, system, and characteristics work or home environment. This is precisely the focus of ergonomics makes it effective in a market economy - because it significantly increases the use value of manufactured industrial products (including software), which must meet the needs not the one who designed and made them, and do to others for consumption, certain categories of customers with their requirements and preferences.

In the development of software applications (software) in an intensive and competitive development of information technology remains an urgent challenge of providing quality (and ergonomics) user interface (UI).

The concept of quality of the SU set the international standard ISO DIS 9241-11 - the so-called usability - usability interface, which includes information performance, efficiency and reliability of the interface as well as user satisfaction with the work performed. [1]

Effective user interface design - is a dialogue between developers and users. It is based on a clear understanding of what the other side of the user interface are real people and that the correct design involves intensive communication with them. Unfortunately, software developers and users are not in the same room, and often speak different languages. The only instrument of communication for them is the user interface itself. [2]
Interface (joint, the interface device) provides human interaction with the technical device at the reception and evaluation of information, information preparation and decision-making, executive actions and communications. [3].

Technology of the UI and the funds instrumental that are used to implement it, form a coherent whole. The next step in the development of any of these components gives rise to the further development of other. [4].

There are many recommendations for ergonomics at each stage of software development. However, due to the tight schedule of graduate design does not have time for an ergonomic study. In this regard, need to simplify unified method of creating software with ergonomic software.

In developing own methods of classification interfaces need to pay attention to the communication aspect of information exchange.

In this case, you must identify the following assumptions:
- the response of the interface (reflected in its information system) to use the action is communication - the response - the basis of communication;
- more complete, faster and more completely this response - the higher the interface usability characteristics, indirectly, the fuller and more effective communication.

Thus, arguing classification adaptation communication processes the classification UI (Figure 1 and 2).

<table>
<thead>
<tr>
<th>The base communication efficiency - the ratio of the result obtained from the organization of communicative figures...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective</td>
</tr>
</tbody>
</table>

Reason - forms of communication

<table>
<thead>
<tr>
<th>Imitation - a two-way process</th>
<th>Management - information translates one subject</th>
</tr>
</thead>
</table>

Reason - function of communication

<table>
<thead>
<tr>
<th>Information and communicative</th>
<th>Regulatory and communicative</th>
</tr>
</thead>
</table>

Figure 1. Author's classification of UI-based communication process-similar
An analysis of 300 subjects of diploma papers issued by the department for 10 years, engineers and bachelors showed [5,6] that a large proportion (83%) is the software traditional document-type.

At the stage of technical design than the structural, functional, information and logic are selected or calculated SEI. Stage design engineering - build and compile the project finishes testing and measurement of achieved values of SEI. [7] Naturally, this three-stage design in the educational process is compressed to 3 - 4 months and actually being in the same stage together.

To test the efficiency of program complex was taken functioning online store elbravo.com.ua - Internet shop of souvenirs. It is an online store with a medium-scale production of about 5,000 titles.

The program combines the tester:
- a single algorithm of actions the user in the framework of the above-mentioned software environment consists of a set of actions.
- each action is recorded tester program and writes the statistics file.
- on the basis of analysis and comparison of fixed actions for each test the following information:
  1) Productivity;
  2) Efficiency;
  3) Reliability.

![Figure 2. Author's classification of UI-based usability](image)
Evaluation Performance (productivity) is often performed in the terminology model GOMS, or to the laws of Hick's and Fitt’s for each function or sub-task of UI. In general, the Performance assesses how quickly the user reaches the target. If the interface is bad, then the user is studying it for a long time before you commit another act tends to his goal.

Therefore, according to how much time the user spent on the goal, can judge the performance of the interface.

Effectiveness evaluation should take into account the degree of influence of the interface on the completeness and accuracy of the achieve user targeted results.

The accuracy and efficiency of the goal can be understood as the number of transactions of a type for which the user reaches the target. If one interface allows you to achieve the goal of 3 clicks and the other for 5, the first interface is more effective. Although in terms of performance, you can quickly make 5 clicks than 3. But that is another option.

Evaluation of reliability must take into account the random nature of user activity, the possibility (probability) of logical fallacies and violations of the right sequence and timing of user actions in relation to the characteristics of the interface elements - its layout, brightness, contrast, coding principles, alphabet, font settings, and the like.

A functional model of the program, the tester is shown in Figure 3 and 4.

Figure 3. Functional analysis of the quality of the interface model
Figure 4. Decomposition of the Level 1
Program Description usability tester.

The program is designed for usability tester interface internet resource assessment, whether an online store, or another site.

The basic principle of the tester is as follows:
1) An expert on the program server records the standard of the site;
2) The clients connect to the server and get the job;
3) Clients perform the task;
4) The client sends the server the job;
5) The server compares the results with reference customers and makes the assessment in terms of performance, efficiency, reliability;
6) Under construction site on the final assessment of this test.

The tester is arranged so that multiple sites can be created. Each site can have multiple tests. Each test can have a lot of standards, but the active benchmark for this test can be only one.

When writing a reference expert set the initial coordinate of the cursor to the same browser scrolls up and left. So, for all customers will be set for the same initial conditions.

In addition to the initial conditions were the same required to monitors the same screen resolution (because the interface site to different resolutions will be differently displayed, will have different distances of move the mouse to the components, etc.) and installed on computers testers Microsoft Framework 4.0.3019.

At the beginning of the construction of the report, the program checks the presence of standards derived from the client for this test and the availability of reference, which will be compared the totals.

If you found the standard, but did not have the results from the clients, or have the results, but there is no reference, then the test is not included in the final report.

Then the report is generated. At first check whether the client has reached the target event recorded in the standard. If the client did not reach its target result event, the indicators are set to 0. Test failed.

Performance - how quickly the user reaches the target. This is the time in milliseconds taken by the user to achieve user goals. The smaller the index is, the better the test passed. For comparison with the standard the relative value required Percentage. The relative performance of client (with respect to a reference) is obtained by dividing the standard of performance to the performance of the client. If the relative performance of less than 1, then the client passed the test less rapidly than the expert, and vice versa.

Effectiveness is assessed on the following parameters:
- The number of keystrokes keyboard clicks on the links, the number of mouse clicks, number of double mouse clicks, mouse movement distance in pixels, the number of page loads, the number of spins with the mouse wheel, the number of mistakes JavaScript.
Less than these figures, the better the test passed. These performance indicators are calculated for the standard and taken as 100%. Then, these same measures are calculated for each test from the client.

When calculating each indicator takes into account its weight in the overall assessment. Weight indicator is set by the expert. Weight can not be zero or greater than 1. Then the figures are compared with the standard client.

**The numerical and experimental studies. Preparation of test items.**

The basis of the test tasks is "Tests program"

Key elements:
- The number of operations - "the way to achieve the goal" - the spectacular information exchange - in the case of an online store, making a purchase, may vary when writing a new standard, as well as during the test client;
- There is a target event, installed an expert in the preparation of the standard. If the client is in the process of passing the test reaches the target event (and may never reach), the program considers taking a test conditionally successful and proceed to the calculation of productivity, efficiency, reliability:
  - The number of cycles:
    a) A - reference (the most efficient sequence of actions to complete the purchase - 0 errors: user-judge the shortest way to the goal came. time between operations (total time) is minimal - the standard set for each test individually);
    b) B - base - correlating the results obtained with a first cycle;
    a) C1 - Advanced - includes interface changes, then there is correlation of results obtained from the first cycle;
    g) C2 - Advanced - includes the following interface changes (or combination of effective changes and new), after which the correlation results are a first cycle;
    d) C3 - Advanced - includes the following interface changes based on the direct responsibility of the person - the principle of the transfer of the input cursor to the next field when you enter (the end of the previous entry);
    e) 1A - a new group of cycles for new information environment or C2 or C3, as better and more close to the optimum usability, and then going on to relate the results to the first cycle.

Under the error means:
- An error the JavaScript web interface; occurs when a click with the mouse did not lead to the page loads; a situation when scrolling the mouse wheel scrolling does not lead to a web document; a situation where pressing character keys did not result in entering information into a text input element.

The same terms and conditions for online resources are:
- The starting page and the coordinates of the mouse cursor on the screen; the keyboard layout (Russian); monitor resolution.

Given the above, we formulate the task:
Description of the method of testing.

The methodology of the test site [9] is quite simple and involves five basic steps:

1) Registration of a new test system. When you click "Add" in the "Sites" are prompted to add a site, there are introducing “elbravo.com.ua”.

Then, under "Tests" press the button "Add" and add a new test. Fill in the field assignments, the initial URL. Add a new pattern to this test.

If multiple standards, by clicking the mouse on the standard he is automatically assigned to active, so the program can, depending on the needs of easily change the active standards, as well as to designate as a result of the active reference sent by the client (this is done in the 'Building report’);

2) Record the expert reference for this test. After entering the name of the standard program automatically switches the user to the tab "Pre-recording standard".

Automatically loaded front page specified when creating the test. Now you need to set the keyboard layout to Russian. Then click the right mouse button on your browser to the starting position. You can also manually enter these coordinates in the X and Y.

In the task was given to the initial coordinates were 100:100.

The program is now ready to record a reference. Click on the button "Start Recording". The program locks the keyboard and mouse to the user is not brought down the initial conditions (the input focus on the "Stop Recording", that is, pressing Enter, the expert will stop recording and unlock the keyboard and mouse), and a timer for 5 seconds, after which the program will fixing and recording all user actions in the browser.

When the judge reaches the goal, you need to click on the "Stop Recording" and confirm saving standard. After that come standard on the tab "Create / edit / select test";

3) Set a target event for reference. The target event - an event at which a user - the tester program considers that the purpose of the test is achieved.

The target of the event can be:
- Clicks on some element in the browser, release the mouse button on some element in the browser, press the key on the keyboard when the focus is on a specific item in the browser, click on the link, obtaining input focus to the browser, double-click on an item in the browser; loading a new page in the browser.

When you click the tab "Goal Setting for standard" is an automatic loading start page. In this tab, the program will select one expert from the appropriate events as the target of the event. To do this, click on "Download standard". Will load in the standard, recorded in step 2.

Then select one of the following:
- a) Stop playing standard;
- b) Losing by one step;
- c) To lose track of next possible target;
- d) Automatically lose to the end;
- e) To return to the top of the standard;
- f) Maintain the current target in the standard.

It is best to use the command "c", then the program will automatically play the model before the event, which potentially can be set target. The button "->x" allows you to run many times one of the selected events from a) to f). Thus, you can play manually for each transaction, but you can use the command "c".

The command a) stops auto play model. Team e) overload model of the beginning. Team f) allows to save the current target in the standard.

The meaning of the process is as follows: the model will be played, performing all the same, he was following expert manually, but now the program. The program is possible when the target event will signal this by semaphore "? target".

During playback, the model can be displayed on-screen error message «html-element is not found." These errors are not critical if the event should not be a target. They mean that the program fails to uniquely identify html-element. If this event should not be a target, you have to press the "OK" button and resume playback of the model. To ensure the success of such events should not be where the program was not able to identify the html-element to make the target.

You can use the action of the b) and lose the step up to the moment when the input field does not appear the text "hello".

In the box also displays the Shift and Alt - it was produced by switching the language keyboard layout from English to Russian. The program is recorded and these actions.

To set up the event to the target, select the action e).

Click "OK". Now the standard is written in the target event.

4) Start the server, and receive statistics from the customers. Go to the fourth tab of the "Start / Stop the server." The idea is this: on the users' computers Testers are copies of the "tester program - the client."

Judge starts the server in the "tester program - SERVER". Clients connect to the server, get set for the test. Then they perform the test and send statistics to the server. The server collects the statistics from clients.
When you click "Start Server" start up the server for the site and test selected on the "Create / edit / test selection." Did you select the standard for this test, the server does not matter. His task is to distribute tasks and collect results.

Note that because the target client event is not transmitted, in principle, the client can not access it. The idea is this: the client receives a verbal task for this test. He does not have to know that there is a target event. Client stops recording their test in his car when the client finds that they completed the assignment. And if he actually hit a target event, it is already in the program will check the section "Building a report." Thus, if good web interface, the user reaches a target event itself.

Let's go back to the server. The tab IP-address displays the current IP-address of the machine running the server program. To guarantee the performance should be using the commands Windows "CMD -> IP-CONFIG / all" to make sure that the IP-address - is the IP-address of the adapter that is connected to the LAN. The port can also be changed, but it is better to leave this as is.

At server startup, the server is waiting for the customers. When a client connects, the server sends him the job for the test and enters MAC-address of the client in the list to "Get the Task." The server has no control over whether to perform a real client job or not. When a customer completes the task, it automatically to the specified server IP and port sends statistics. Server receives the statistics, check it for errors (coding standards compliance of operations and the number of parameters in each operation.) If the errors in the statistics is not found, the server carries MAC-address of the client from the list to "Get the Task" in the list of "Run Test" It then notifies the successful reception of the client, and the client message is displayed to the user that the statistics submitted successfully.

Thus, the list of "Get the Task" and "Run Test" allow the expert control of the passage of test customers. In addition, there is a window “CONSOLE”, where messages from the server about connecting customers and progress with them are recorded.

When all clients have moved from the list to "Get the Task" in the list of "Run Test", the expert presses the "Stop Server". He can stop the server, even when customers still pass the test, and then turn it on and accept the results. But there is a violation of the output lists of information to "Get the Task" and "Run Test".

If the client is not able to send the statistics, it will be so in the list to "Get the Task." Then the expert will simply stop the server.

This is possible because the client and the server are running asynchronously. Here is the interface of the client. It is simple - two tabs: “To connect to the server” and “Pass the Test”.

It is necessary to enter the IP-address of the server manually each time you start the client! When you click "Connect and Get the Task", the client receives from the server task. Button “Pass the Test” to become available to the press.

Clicking on the "Pass the Test" will allow the client to perform this test. Note that the parameters of the client (especially the resolution of the monitor) must coincide
with the server. Client automatically installs the initial position of the cursor and the initial URL, received the settings from the server.

When a client considers that he performed the test, he will click "Stop Recording".

5) Construction of the report. Report constructed for all test site if the test is found for a particular active model and at least one result from the client.

For each test, the program is looking for an active reference. For the active reference rates are calculated. From the active reference is also extracted the target event. Then, for each file statistics, successfully obtained from each customer, the operations are performed:

- Check whether the client has reached the target of the event. If not, then all totals (productivity, efficiency, completeness) for the test set to zero. That is, the test is not passed.

Evaluates Performance, calculated Efficiency; calculated Reliability; final grade is calculated as the average of the Performance, Efficiency, Reliability.

Thus, based on these indicators can be compared with the standard of customer results and check the quality of the interface of the site (Figure 5). Because the expert knows so well interface and works it quickly, efficiently and without errors. But the new customer, if the interface is poorly built, will spend more time, will make a lot of mistakes, and will spend more basic operations to achieve the goal, or do not reach it.

That is, we have a universal methodology to assess the interfaces of any web-sites.

Consider the bottom of the report table (Figure 5) - extended report on each test. It is loaded when you click the mouse on the top line of the main table. Advanced report shows information of each customer, and the main report (table top) shows summary statistics for all tests in comparison with the reference of the expert.

Note that the reference parameters are set to 1, it means 100%. If a client passed the test better, its performance will be less than 1, that is, he spent less resources to achieve the goal. Conversely, if, for example, client performance «00104B44D633» 1.74, it means that the client longer reached target 74% of the time.

If, for example, the efficiency of customer «006008750D7A» 0.88, this means that the client spent achieving a minimal average number of basic operations than recording expert reference.

Regarding the assessment of the overall impact, it can be seen from the figure that the customers «00104B4994E1» and «006008750D7A» pass the test more efficiently than the expert. Hence, these results add to the standards appropriate to this test. Then, on the "Create / Edit / Select Test" can be established benchmark «006008750D7A» as an active (and standard expert is no longer active.) Adding a client to the list of the standards for the test is done by double clicking the mouse on the appropriate line in the extended table (below). In this case, click 'Create / Edit / Select Test " should be selected test.
In general, as a result of testing we get an array of digital data, conclusions on the basis of which depend on the dynamics of change between the base (extended), and the standard version, and for change in the architecture of the interface at the time of comparison, custom algorithms.

Tester program is written in such a way that abstracts the user's subjective assessment and consider the interface in terms of the amounts of Performance, Reliability and Efficiency. These figures are calculated by the system based on the recording of user actions or expert.

The following events are recorded:
- Pressing the button "Download" or Enter in the menu; pressing “Backward” in the menu; pressing “Forward” in the menu, pressing the "Update" in the menu; move the mouse on the browser; press the mouse button on the browser; release the mouse button on the browser; scrolling the mouse wheel on the browser; onScroll click on the browser; press the keyboard keys; click on the link; error JavaScript; receive input focus html element, double click on the html element, uploading a new URL; moment before moving on to a new page.

Copyright recommendations to improve the convenience of the interface of web applications.

Rating ergonomics.

As part of the study were implemented argued UI changes, those aimed at improving ergonomics following:
  a) functional completeness; b) stylistic flexibility (individualization, customization of the interface); c) the optional flexibility (scalability, customization no style but functional components of the interface); d) aesthetics; e) the focus of attention (to contribute to the concentration of the user due to the ergonomic tools).
The studies lead to the following recommendations:

- Functional completeness of the user interface. It should be seen as a major component in the overall interface. As ergonomic index - a measure of the adequacy of interface operations to describe the behavior of an algorithm program. For example, a web page has a functional completeness, if it meets the requirements of the user;

- The style interface flexibility. The smaller the user interacts with the interface, the smaller role in this process is the active component. Need is defined as the ratio of time spent on styling, the total time of interaction with the interface, which is incorporated by the developer as a ratio of 1/15. For example, if the interface styling takes a minute, the total interaction with the resource should be 15-20 minutes or more, given the repeated cycles;

- Optional flexibility (scalability, customization no style but functional components of the interface). Here the need is determined by the ratio of time spent on scaling or changing the functional components of the interface to the total time of interaction with the interface, which is incorporated by the developer as a ratio of 1/2. So, if the adaptation of the interface takes a minute, the total interaction with the resource should be 2 + minutes or more, given the repeated cycles. The standard version - a hidden adaptation options - a compilation of the relevant browser settings, other open sites;

- Aesthetics. Aesthetics UI component should prevail over parameters such as: effective structure data location, speed, economy of resources, and even competition for the traffic channel user experience. Despite the subjective nature of perception ergonomic component of the UI is important to maximize the chances of user satisfaction in this parameter:
  a) the identity of aesthetic interface structure; b) the prevalence of the symbol on the text; c) the predominance of pictures over the symbol; d) the prevalence of animated images on a static; e) the ability to effectively interface styling; f) the general concept of aesthetics of the interface is to select instruments and styles based on representations of a beautiful and harmonious way of textual information.

- The focus of attention (to contribute to the concentration of the user due to the ergonomic tools)
  a) the user can immediately see the next step (after a completed transaction); b) the cursor - an indicator of the mouse and keyboard - the main means of user input automatically switches to a new field - to the next step; c) the general concept of interface should be a "long, narrow corridor" information interaction with the user, without branching, in which this same user gets the desired result in the absence of multiple overlapping operations and operational chains, leading to the overall results embodied by programmer.
Evaluation of usability.

The main criterion for evaluating usability - the subjective perception of the effectiveness of its user experience of information exchange through a particular user interface.

**Ease of use is necessary to fix the two most relevant factors:**

- Completion of a cycle - information purpose usability and interface design as a whole;
- User satisfaction - the emotional goal of usability and interface design as a whole.

Without parallel achieve both objectives - the interface is not effective exchange of information is not complete, usability is not optimal.

The best option - when a user creates an interface for itself, bypassing unnecessary link (the developer), because, in fact interface attempt to reflect the psychology of the user in the information space.

When designing the interface requires:

- Continuous feedback from the user in the course of its activity (at the level of individual transactions);
- Minimization of all groups of components (functional, style, etc.) - each extra element - the ability to "do not like" the user that will stop the exchange of information and return to the usual (but less effective) familiar interface;
- The maximum management of the user within his chosen direction (which is determined by the fact of appeal to the interface);
- Conservatism - save as many familiar elements (similar to typing with two fingers against ten - the first option is not effective, but the user owns it is much better than the second and with his position, he is familiar and effective.)

On the basis of the tester follows that:

- Not even the most effective option (information environment, a set of user interface components, the selected reference level, etc.) with each new use is much more effective - the user experience increases:
  a) improvement - a new version of the interface, even with better efficiency and usability will yield worst case up to the user gaining the necessary experience.
  b) Usability is directly dependent on the content (information) that it reflects - the ratio of form and content:
    a) improving the quality of information is more effective than a minor modification of the interface (an increase of the multiplicand and the multiplier in the equation);
    b) the scheme by which the information is formed before the formation of the interface, apart from the later "overlay" usability modification is wrong;
    c) first formed an effective interface, "seeks" to unify all information systems, then it is filled with informational content.
- The rejection of important categories of "mistakes" and "good practice" user - any user action:
  a) must be brought into contact with the ultimate goal;
  b) shall not violate the positive emotional background - waiting, discomfort, failure, aggression, failure to understand what is happening, the expected result of inadequate even incorrectly formulated and implemented the algorithm and so on, and
  c) for example, the minimum functionality - 1-to-1 interface eliminates the error - as the user has a way to "correct" - the planned method of solving algorithm.
- The inability of the user error - negates the category of reliability of the system, since in any case the algorithm is the user does not violate the stability of the system and algorithms (if properly written code interface platform game involves numerous variations of the action for the user (including those not initially pledged by the developer), but none of them is wrong (even the "bad" player - user only part of the total vector to its purpose).
- The category of time, as a measure of effectiveness must be in the ratio of the slave system to psychological factors, with the facts and the repetition of the cycle:
  a) a base is that the user can violate the standard time interaction at times, and dozens of times and still be happy, to assess the usability of both high and implement an information exchange;
  b) based on the perception of the time factor becomes a subjective plane and, if not other factors, usability is reduced to zero.

Findings

Developed a method of designing a typed unified user interface, which includes: development of a technique of classification interfaces, development of criteria for usability interface, an assessment of factors that determine the performance and effectiveness of the software in its design, from which were formed the basic principles and algorithms of the program tester.

Algorithm is developed and written (in the language C #, among Microsoft Visual C # Express Edition 2010), the program tester UI websites enables you to test all kinds of information resources on the Internet that can be presented as a web page.

Investigations UI Web sites, as with the original interface, and with the changes. The interface was evaluated by indicators such as productivity, efficiency, and reliability. A feature of this software is that here the author tried to move away from the most subjective evaluation of the interface from the user, reducing the interface to the evaluation of mathematical calculation of the many indicators that characterized the actions of a real user, who worked with the system.

An assessment of the usability of UI and copyrights developed recommendations to improve the convenience of a web-interface applications that have affected the characteristics such as: functional completeness, stylistic flexibility; optional flexibility, sound, aesthetics, the focus of attention.
The developed methodology and software can be used in the field of outsourcing companies to test the real usability of websites. The software can also be used in schools to verify that the sites developed by students as part of the course and diploma projects (works).

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