INFORMATION INTEGRATION OF THE REPOSITORY OF SOFTWARE UI COMPONENTS WITH THE DATA STRUCTURE OF USER INTERACTION

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The structural model of information integration data about the software UI elements (different graphic representations, properties and parameters, and multi source code implementation in various programming languages, etc.) with the structural modules of tracking and storing data about interactions of user interface is proposed.

Key words: information system, user interface, UI, database, repository, user interaction, usability.

Problem and actuality

While designing the user interface of software and automating these processes for software development what we need is not only to research range of interface elements [1] and these visual and source code parameters [2] but also to have reliable and various information about the timing and quantitative particulars of interaction of the end users with a finished software screen interface. These data will be used to form a probability of selection criteria for alternative interface forms, for specified software functionality. That is why developed information models of the repository [2] interface elements are necessary to complement with a statistical data of their usage [3, 4].

Purpose of research and designing

The integration of data about how the end users use windows graphics interface and these parameters of the interface (that is used by programmers and designers) will help to speed up the process of design, choice of the possible alternative solutions and help to form new implementation and new versions of software user interfaces.

Information structure

The subsystem of collecting and storing parameters of informational user activity [4] performs:

- automated tracking of user interaction with interface controls of CAD Software;
- recording mouse or pen tablet movement coordinates and vectors;
- recording press, clicks, selections, highlight etc.;
- recording time that user spend reading some text or studying user interface controls variants.
Fig. 1. Data storage subsystem for interactive user interaction with the software

Fig. 2. The visualization subsystem of statistically processed data of user interactions
Main features of the tool architecture:

- Multi-user access;
- Standard web-browser and special software tracking tool for the client part;
- Cross-platform compatibility;

All architectural components physically are placed on one Internet server, which works as a Web-server and handle numerous clients of the system. For the remote work with the tracking processor a standard Web-browser is sufficient, such as Internet Explorer, Firefox, Opera or Google Chrome with Scalable Vector Graphics support for better visualization. All information exchange between the user and the server is being by standard HTTP protocol and SSL.

The main modules:

- module of the Web-portal administration allows access control and management over accounts of a portal on the part of users and general portal resources;
- module of the experiments organization of the Web-system allows to keep a records of hooked user’s activities, to keep a records of the UI controls session tracking, statistical modeling;
- security module of Web-system carries out a mechanism of all system user’s and tracking identification;
- module of export / import of the design data in / from the system provides the functions of forming design information in text, formal XML, bitmap, vector and polygraphical layouts;

The system architecture is built on the HTML5, Ajax, CSS, XML, PHP, MySQL, SVG, C# technologies. General server architecture of the proposed Internet/Intranet-oriented tool is shown on fig. 3.

![Fig. 3. The server part of tool](image)

User experience research tasks and results are being saved to the central relation database. Recorded local tracking data is send to server vie post request as XML data. On server data from XML is parsed to DB fields for last processing by SQL (Structured Query Language) requests.
Fig. 4. The relational data model integration of data from the UI controls repository with the storage data of user interface interaction
Conclusions

The proposed information model of data integration of the user interaction and data used by software developers will help to form additional criteria for choosing structural elements of the interface and build variants of interface design for different groups of users based on the statistical processing of data and interactive use of these interfaces.