

Postupak ocjene doktorskog rada

DOKTORAND/ICA:	Snježana Ivančić Valenko, dipl. ing.
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NASLOV RADA na hrv. jeziku:	Evaluacija percepcije parametara oblikovanja u svrhu unaprjeđenja funkcionalnosti rubnoga dijela grafičkoga korisničkoga sučelja
NASLOV RADA na engl. jeziku:	Evaluation of the perception of design parameters in order to improve the functionality of the peripheral part of the graphical user interface

SAŽETAK:

Korištenje multimedijских sustava, posebice digitalnih i internetskih sadržaja koji se svakodnevno upotrebljavaju u procesu informiranja, komuniciranja i učenja dovodi do potrebe za optimizacijom parametara oblikovanja radi unaprjeđenja korisničkog iskustva. Vizualna percepcija sadržaja uvelike ovisi o nizu parametara oblikovanja, ali i o njegovoj poziciji na ekranu. Sadržaj smješten u središnjem dijelu zaslona vizualno je puno uočljiviji s obzirom na hotimičnu fiksaciju promatrača na taj dio zaslona. Vizualna razlučivost objekata opada prema rubnom dijelu zaslona te stoga treba ispitati mogućnost povećanja funkcionalnosti tog dijela.

U ovoj doktorskoj disertaciji istražen je utjecaj boje, oblika, vrste i veličine tipografije te animacije (brzine i smjera kretanja) na vizualnu percepciju objekata u rubnom dijelu ekrana u trenutku kada je primarna pažnja korisnika fokusirana na sadržaj u sredini ekrana. Istražena je kvaliteta percepcije sadržaja u rubnom dijelu ekrana prilikom smislene konzumacije sadržaja u središnjem dijelu čime je simulirana realna situacija u kakvoj se prosječno nalazi korisnik.

Optimalnim oblikovanjem elemenata (poruke, informacije, ...) u rubnom dijelu ekrana, taj prostor bi trebao postati funkcionalniji i uočljiviji. Eksperimentalni dio rada je podijeljen u tri faze, pri čemu je svrha prve faze istraživanja bila između deset kombinacija pronaći najuočljiviju kombinaciju boje teksta i boje pozadine za stimulus koji se pojavljivao u rubnom dijelu ekrana. U drugoj fazi trebalo je ispitati utjecaj serifnog odnosno sans serifnog fonta te različitih pismovnih veličina na uočljivost riječi u rubnom dijelu ekrana. Cilj treće faze ispitivanja bilo je uvidjeti kako različite brzine kretanja stimulusa utječu na vizualnu percepciju stimulusa u rubnom dijelu grafičkoga korisničkoga sučelja.

Eksperimentalni dio disertacije dao je kvalitetnu definiciju parametara koji utječu na željenu vizualnu percepciju objekata u rubnom dijelu ekrana uz uvjet da je pažnja ispitanika fokusirana na sadržaj u središnjem dijelu ekrana. Analizom dobivenih rezultata potvrđeno je da različite kombinacije boje teksta i boje pozadine utječu na brzinu percepcije ispitanika. Riječi koje se pojavljuju u rubnom dijelu uočljivije su ukoliko su oblikovane sans serifnim fontom i većom pismovnom veličinom. Također je vidljivo da su stimulusi koji imaju najveću brzinu kretanja, prije uočeni od stimulusa koji se sporije kreću. Time su potvrđene sve postavljene hipoteze istraživanja i definirane su smjernice za stvaranje kvalitetnog sadržaja u rubnom dijelu grafičkoga korisničkoga sučelja.

Ključne riječi: boja, tipografija, brzina kretanja, grafičko korisničko sučelje, vizualna percepcija

EXTENDED ABSTRACT:

The use of multimedia systems, especially digital and Internet content that is used daily in the process of informing, communicating and learning, calls for the need to optimize design parameters in order to improve the user experience. The visual perception of content largely depends on a number of formatting parameters, but also on its position on the screen. The content located in the central part of the screen is much more noticeable taking into consideration the deliberate fixation of the observer on that part of the screen. The visual resolution of objects decreases towards the peripheral part of the screen; therefore, the possibility of increasing the functionality of that part of the screen should be investigated.

This doctoral dissertation investigated the influence that color, shape, type and size of typography, and animation (speed and direction of movement) have on the visual perception of objects in the peripheral part of the screen in the moment when the primary focus of the user's attention is on the content in the central part of the screen.

The quality of the perception of the content in the peripheral part of the screen was investigated during the meaningful consumption of the content in the central part, which simulated the real situation in which an average user can find herself or himself. By optimally shaping the elements (messages, information, etc.) in the peripheral part of the screen, that space should become more functional and noticeable.

The experimental part of the work was divided into three stages. The purpose of the first stage of the research was to define which of the ten combinations was the most noticeable combination of text color and background color for the stimulus that appeared in the peripheral part of the screen. The second stage of the research examined the influence of serif or sans serif fonts and different font sizes on the visibility of words in the peripheral part of the screen. The aim of the third stage of the research was to see how the different speed of the stimulus movement affects the visual perception of the stimulus in the peripheral part of the graphical user interface.

Methodology

The measurements that were carried out as part of this research were preceded by a preliminary stage of testing in which 174 respondents participated. The purpose of the preliminary testing was to examine the influence of color and shape on the identification of moving objects in the peripheral part of the screen. The results were presented in the scientific article [8]. Based on these results, a plan for further research was made, parameters for new measurements were defined, and necessary changes were made in the web-application developed for the purposes of preliminary measurement to enable access to testing via a unique URL (Uniform Resource Locator) link.

Later, upon analyzing the data of the preliminary stage, the application was upgraded and modified in several segments, and it was used in all stages of the research as part of this doctoral dissertation. The research was conducted in three stages and in each stage different respondents participated, with a total of 378 respondents with no previous experience with this type of testing. The transition from the first to the second stage, or from the second to the third stage, was possible only when the data from the previous stage was processed. The test results were processed in Excel and Matlab.

The experimental part of the dissertation provided a quality definition of the parameters that influence the desired visual perception of objects in the peripheral part of the screen with the condition that the participant's attention is focused on the content in the central part of the screen. The analysis of the obtained results confirmed that different combinations of text color and background color affect the speed of the participants' perception. The words that appear in the marginal part are more noticeable if they are designed in a sans serif font and in a larger font size. It is also evident that the stimuli that have the highest speed of movement are noticed earlier than the stimuli that move more slowly.

In the third stage, the results of the accuracy of quiz answers – the tasks that appeared in the central part – were analyzed. It was analyzed how different speeds of movement of stimuli in the peripheral part of the screen affect the attention of participants whose focus is on the central part. The results show that the accuracy of answers in the quiz is equal for all stimulus movement speeds, with the exception of stimuli that move at a speed of 840 px/s, where it is slightly higher. Thus, different speeds of movement of the stimulus in the peripheral part do not significantly affect working on the task in the central part.

In line with this, all the research hypotheses have been confirmed and the guidelines for designing quality content in the peripheral part of the graphical user interface have been defined.

Keywords: color, typography, movement speed, graphical user interface, visual perception