

# Evaluation of User Experience by Eye Tracking and Emotions Analysis

Mária DRAGÚŇOVÁ\*

*Slovak University of Technology in Bratislava  
Faculty of Informatics and Information Technologies  
Ilkovičova 2, 842 16 Bratislava, Slovakia  
xdragunova@stuba.sk*

Evaluation of user experience is complex aggregate of many aspects. Since it is difficult to evaluate all of these aspects together, we focus only on the aspect of target findability on a website. Findability determines the simplicity of finding the content, which is assumed to be present on a website [2]. Efficiency and speed of the search can be measured by various visual search tasks. They are based on identifying the presence or absence of a target among several distracters. In standard laboratory search tasks, the reaction time (RT) and/or the accuracy is measured.

In our study, we examine how user's results in a visual search task are related to his results in measuring findability of an element on a website. We focus on the process of target localization on displayed screen. We assume that an accuracy of the target findability measures can be improved by taking into consideration an evaluation of visual search ability of the user.

Our aim is to create special visual search task and use it as kind of a calibration before the start of a UX testing. Our hypothesis is that the worse result in this visual search task would indicate worse visual search ability of a participant. We have to complete the following steps to prove our proposal:

1. Implementation of visual search tasks and tasks for measuring findability on the websites.
2. Realization of the controlled quantitative experiment in eye tracking laboratory using the implemented visual search tasks.
3. Evaluation of the participants' visual search abilities according to the results from the experiment.
4. Verification of the connection between participants' evaluations of their visual search abilities and their results in measuring findability on websites.

---

\* Supervisor: Mária Bielíková, Institute of Informatics, Information Systems and Software Engineering

The quantitative experiment is planned for the UX Class laboratory<sup>1</sup>, which has the capacity of 20 participants and all the work stations are equipped with Tobii X2-60 (60 Hz) eye trackers. Besides the eye tracking we use the recording of the mouse and keyboard events and also the events of displaying and hiding of the stimuli during the visual search tasks in our web application.

We use two measures. First, RT is a standard measure used in majority of existing visual search tasks. The second is the number of fixations prior to the indicating the end of the search. The fewer fixations to the first fixation on the target the user makes the quicker and more efficient the search is [1].

The experiment is composed of three parts, which are included in our developed web application. The two of these parts are the visual search tasks. The created standard visual search task a conjunction search for a blue triangle among blue squares and red triangles and squares. The second visual search task is our developed search task, in which participant searches for a blue round icon of the Google among other colourful icons of companies known from the web. The third part consists of the tasks on measuring findability of elements on different websites.

Collected data serve for evaluation of the visual search abilities of participants. We assume that the great range of RTs achieved on a stimulus indicate appropriateness for the purpose of evaluation of the human visual search ability. Therefore, we arrange stimuli in descending order according to the calculated ranges and we pick first N stimuli to the final visual search task (and we try to minimize N). We calculate elementary evaluations of participant for all the stimuli from experiment. These elementary evaluations express how good the participants' result on a stimulus is in compare to other participants in experiment. Median from these elementary evaluations is taken and used as a final evaluation of the visual search ability of this participant.

The better visual search ability the participant has, the higher weight is assigned. If our hypothesis is confirmed, we will be able to take participant's weight into consideration when evaluating the results of a user study. If the participant's weight is low and his results in the user study are worse than the results of people with higher weights, we will be able to suppose that his worse results are the consequence of his worse visual search ability, not the consequence of the bad usability design.

*Extended version was published in Proc. of the 12th Student Research Conference in Informatics and Information Technologies (IIT.SRC 2016), STU Bratislava.*

*Acknowledgement.* This contribution was created with kind support of ČSOB Foundation and is partial result of the project University Science Park of STU Bratislava, ITMS 26240220084, co-funded by the ERDF.

## References

- [1] Bojko, A.: *Eye Tracking the User Experience*. Rosenfeld, (2013).
- [2] Cardello, J.: *Low Findability and Discoverability: Four Testing Methods to Identify the Causes*. [Online; accessed March 28, 2016]. Available at: <https://www.nngroup.com/articles/navigation-ia-tests/>

---

<sup>1</sup> <http://ux.fiit.stuba.sk/>