

Gaze-tracking Programmers' Activities in Web Browser: Revisitation and More

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The current development of gaze-tracking methods enables us to enrich data about user work in web browser with in-depth gaze-tracking information, such as what user tracked on the screen before using some action, what were his main areas of interest, which parts of web browser he or she paid attention to and others. This missing part of information gives us new closer information about user behaviour and work in web browsers.

In our work, we have proposed and carried out an experiment with 9 participants, third and higher year bachelor students at FIIT STU, representing the sample of programmers observed while working in a web browser. In this experiment, we have found out how much time programmers spend with searching on the web while programming, which web pages they visit the most and what is the number of visited web pages while programming. We have also found out that revisitation rate corresponds with the revisitation level measured in other studies focused on common users.

The new method of measurement for revisitation in paper [1] shows, that more precise revisitation measurement and overall user activity observation can be achieved by gaze-tracking. The application of gaze-tracking brings new, more precise methods for user activity observation in compare with computer mouse and keyboard based or time observation methods which were mostly used in the past. We found that our revisitation values are approximate similar to revisitation rates in past studies. However, Figure 1 shows that revisitation values of participants who actively searched the web are higher than values in the past studies, and revisitation value level of 55% is caused by calculated average value, which includes two participants, who solved the task by heart and did not search the web a lot. Values of three remaining participants are higher because they compared two and more pages (their written code and existing solution found on the web) and revisited the pages after they had analysed the task closely. These two major causes show that revisitation values are dependent on developer's ability to solve specific task, which means the less is developer able to solve specific task, the

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more he or she searches the web and his revisitation values are higher than revisitation values of developer, who solved specific task by heart or regular user, who searches the web more exploratively and compares less.

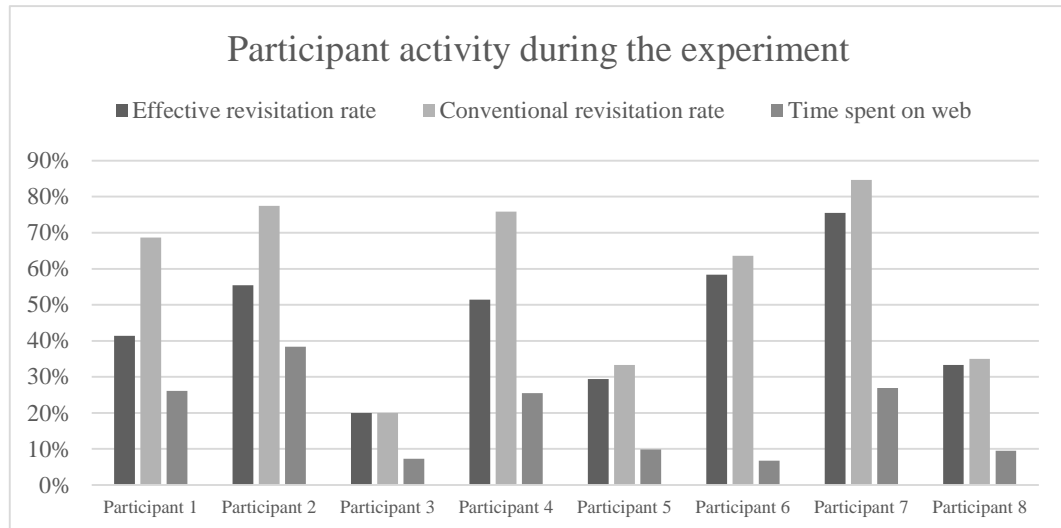


Figure 1. Revisitation rates and searching values of individual participants.

We further focus on research of revisitation mechanism method usage, supplement of revisitation method value computation and comparison of programmers with standard users. We also want to focus on web browser tabs and back button usage. We want to compare browser tab usage between regular users and developers and to focus on usage rate of back button in modern web browsers.

This analysis provides us the necessary base insights into user activity and can help in web browser course of development in the future in the field of revisitation mechanisms such as tabs, back button, and the new ways of navigation as essential part of web browser usage.

Our results could also help in simplifying and speeding up user work in a web browser by offering detailed user behaviour analysis in web browser. This analysis can contribute to development and result in feature implementations focused on speeding up or simplifying web browser usage by providing information related to web browser components, namely revisitation mechanisms.

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References

- [1] Zhang, H., Zhao, S.: Measuring web page revisitation in tabbed browsing. In: *CHI '11: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, USA.ACM, New York, (2011), pp. 1831-1834.