Automatic Evaluating Usability of Applications with Eye-tracking Technique

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Nowadays working with computers is part of our lives. Every day we check new emails, read the news or find useful information for school or work. We visit the big amount of websites with different purpose. Some of them are better than the others. We can assess how good the website is by testing usability. It is very discussed topic nowadays. Applications with better usability are more interesting and useful for people. There are several ways how to test usability. Evaluating of these methods are mostly manual thus unsuitable for big experiments. One of the new techniques for testing is to track where the people are looking on screen. Eye-tracking is relatively modern technology and it is used in a lot of different areas in research. According to eye movements we can assess quality of interface, identify usability problems or diseases and a lot of more. Eye-tracking is also very promising for disabled people because they can control the user interface only by their eyes.

There are a lot of studies connected with usability testing. Researchers use a lot of different metrics to assess the application. These metrics differ a lot from one study to another. Researchers try to find connections between metrics and usability problems. It can be hard to find the right explanation. For example if the user is looking on the certain object for a long time it can mean that this object is important for him [1]. But this also can mean that this object is only hard to understand for him.

Other studies are focused on connection between eye movements and reading the text. Our work is focused on finding if the users read the text or not. From the perspective of eye-tracking reading is sequence of fixations on words linked by saccades from left to right (in some languages reversed) [2]. Difficulty of the text can be assessed by three eye-tracking metrics: fixation duration, saccade duration and number of regressions. Generally, long fixations, short saccades and many regressions signalize that the text is difficult for readers [2]. Related studies are focused on different reading comprehension tasks or impact of highlighting or alignment of text to eye-tracking metrics. According

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to study [3] users are not reading. They are only pass their eyes through text and scanning for important information.

One of the goals of this work is to find new model of connections between eye-tracking metrics and reading text.

Pilot experiment is designed. It is focused on testing user behaviour during reading instructions. People usually do not read them. Even if there is an manual for product, game rules or instructions for filling questionnaire or doing an experiment people firstly try to do it on their own without reading instructions. They go back to them only if they do not know what to do. The goal of our research is to find if people read instructions. We suppose that eye-tracking metrics indicate that users read them.

The experiment consists of four tasks. For each task we can find if participants read instructions or not. For collecting data we plan to use eye-tracking technique. During experiments and also in real life users often don't read instructions. When they are doing experiments it can skew results and the experiment is discarded. The main goal of this experiment is to find if users read given instructions. It consists of four parts with different simple tasks. Before every part there are instructions. Tasks are well-known for people so they are able to do them also without reading them. The first one is Brick Breaker game in which users should move the paddle horizontally to the left and to the right in order to hit the ball. The second one is non-verbal reasoning test with 10 tasks. The third one is the crossword where users should mark only horizontal words. The last task for users is to play Snake where they should take 15 points and end the game. Results from this experiment can help researchers to identify biased results and achieve higher quality of them.

In our experiment we would like to find eye-tracking metrics which help us to identify if users read given instructions. For our experiment there is one hypothesis to confirm: Eye-tracking metrics indicate if users read given instructions. Because of eye-tracker produces the big amount of data we plan to find way how to process them automatically. According to results we would like to find an automatic way how to assess difficulty of instructions. Since we have two variants of experiment (with and without highlighted text) we can compare these variants and find if highlighted parts help people to read and understand instructions.

References

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