



Eye-Tracking

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Introduction

Eye-Tracking is a technology which can track the optical attention of a user while using an application.

This is possible through the usage of sensors that have the user's eyes in sight.

Attention is visualized like in the heatmap on the right side for example. There are different visualization methods than have different purposes.

There are quantitative as qualitative metrics to measure the eye-gaze of users and the information that can be gathered through that.

Design Phases



Introduction

The purpose of Eye-Tracking with regard to software usability, is to test and analyze how users engage with applications.

Occuring problems while using the software should get visible through the user's point of view. Usability engineers can provide better solutions grounded on the findings of the usability testing method Eye-Tracking. There should be a measurable increase of ease of use as a result of the testing and improvement of software artifacts.

Interests and duration of the user's gaze get analyzed so the product owners get an insight what is perceived as useful and important by their product's users.

Introduction – Types

Screen-Based Eye-Tracking

The Eye-Tracking device is a camera that is built into the monitor. The user needs to sit in the right position so that the device can track the user's eyes

Only stationary tests are possible with this setup

Eye-Tracking-Glasses

The user wears glasses that provide a mobile possibility to track visual attention

Also usable in real life activities like shopping outlets

Eye-Tracking with Virtual Reality Headset

Helpful tool for 3D-Eye-Tracking

Usability test also for Videogames and other 3D Animations like 360° virtual meeting room software

Instructions

4 Techniques for Visualization



a) Live observation/Recorded Video

- Users are observed live by the usability engineer and by product owners
- Direct support can be given if the user struggles with a task
- Reactions of users can be seen while usage or afterwards in the recorded video
- Facial expression can be caught too

B) Scan path/ Gaze plot

- The user's gaze is visualized through the metrics of sequentiality and duration
 - A dynamic gaze plot can be provided
- It is a snapshot of a situation during the test which gets recorded
- Gaze duration/position and eye movement is monitored

c) Heat map/Hot spot

- Heat maps show where a control group of users watched the most intensely
- A quantitative instrument to measure differences and similarities among users
- Differences between age, gender and socioeconomic status can be seen at some occasions

d) Area of Interest

- An application can be parted in different areas which all have a different function
- For example: search function, menu function
- number of fixations, fixation duration and other measures are of interest for each area
- Each area of interest is categorised and user behaviour within each area is analysed

Instructions

Evaluation



To evaluate the results the usability engineer should analyze the before mentioned recordings of the test. For an analysis the engineer should question and evaluate following aspects:

- Where did the user struggle? (Use scan paths/gaze plot to find out from where to where the eyes jumped, what was read and how long the user's eyes remained there)
- See which texts are read by the user and how he/she read it. Which where the important parts, which where read twice etc.
- Is there a problem? What is the cause? Is it technical/related to content or related to eye comfort/mental comfort?
- How is it related to eye comfort? e.g. confusion, visual overflow, readability (for example yellow texts are hard to read, the user's mental model how he/she felt during the test is important at this point)

Instructions

Evaluation



- Heat map/Hot spot analysis: On which spot is the most user attention of the particular control group? Where is the best position of a Logo according to the group of users.
- Areas of interest: Is the order of visual items correct? (should be also analyzed with scan paths because of the sequential order of looking at different items) could the user be distracted and lose interest because of a non suitable order? Which area has the most views and duration per view?
- While seeing the live video take notes to consult with the product owners later on, the video should be recorded so there gets nothing lost.

Instructions Improvement



- After spotting the weaknesses of the tested application according to eye-tracking they should get improved
- For improvement it is necessary to apply the laws of "Gestalt theory/psychology".
- After the attempted improvements are made the eye-tracking session should be repeated
- The whole process is gone through again and the next evaluation shows if any improvements were done
- Repeat the process until the application fits the requests of the product owner/s



Strengths:

User-centered problem analysis, which can show deeply rooted design problems.

Weaknesses:

Needs a lot of expensive technological equipment.

Links

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Contact

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