Introduction to eye tracking

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What is eye tracking?

- Infrared cameras in an eye tracking device pick up the reflections from the cornea.

- The gaze path of the user and the attention time can be recorded and directly mapped to areas of the screen.

- Eye trackers need to be calibrated for each user.

- Some users can't be calibrated. Some eye conditions, anti-glare coatings on glasses, people with very small eyes will create calibration problems.
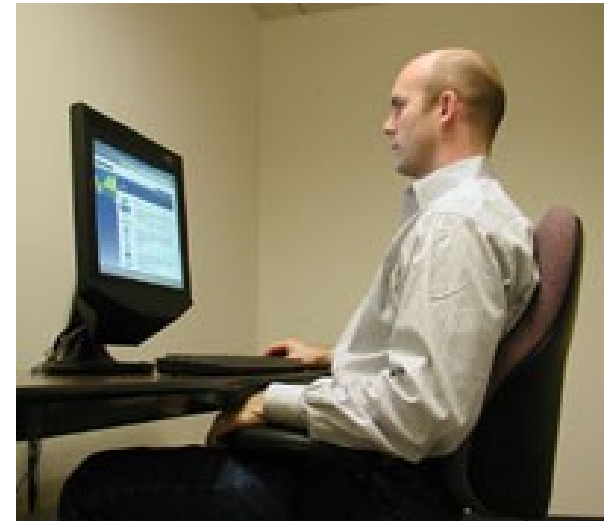
What tools are available?

- There are a variety of eye tracking devices on the market. The industry leader at the moment is Tobii.

- Tobii provide eye tracking devices with built in screens that can be used for any PC based interface or website such as the T60.

- Devices such as the Tobii X120 are also available that enable eye tracking on paper medium or mobile device, television or any physical object or scene.

Tobii T60

Tobii X120

What are the usability benefits?

- Enables the collection of more quantitative and objective data about user behaviour. Users comments which may be subjective can be validated or challenged by using eye tracking data.

- Eye tracking data can tell you where the user is looking on a screen and for how long.

- It is particularly useful when assessing page layout, navigation and branding

- Eye tracking data has the ability to 'wow' usability stakeholders and help back up usability arguments.

Case study –search forms

- A study by UXMatters* demonstrated how users behaviour varied depending on their level of experience .

- Test participants were categorised according by experience as rookie, intermediate or pro.

- Test results revealed different patterns across the user categories.

- The 'rookie' users were seeking validation and they looked at the input field and then all the other elements of the search component.

- More experienced users only looked at the input field.

Scan path of 'Rookie' user

* http://www.uxmatters.com/MT/archives/000068.php
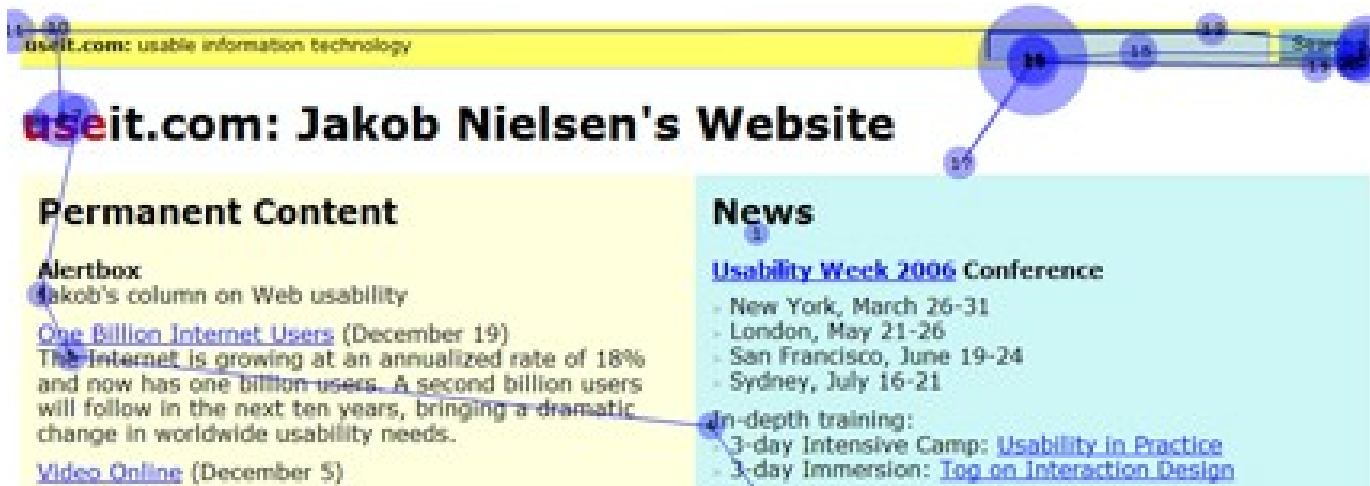
Gaze Plots

- Gaze plots – where the user is looking and where they are not looking.

Heat Maps

- Heat maps are an aggregation of all users gaze plot data.

Analysing Eye tracking data

- Using Tobii's analysis tools you can filter data according to any variables you have defined. for example "Display only the data for test participants who are over the age of 40."

- Data can also be broken down according to areas of interest (AOIs) which are can be defined by the researcher.

- Analysis of *Fixation points and **Saccades shows what users are really attending to.

- Eye tracking data needs to be triangulated with data from other sources – eye tracking doesn't tell you 'Why'?

*Fixation – looking at specific point i.e. a graphic for a period of time.
**Saccade – jumping between fixation points, more of a scanning activity

Accessibility benefits

- Identify the web behaviour patterns behind users with different access needs.

- Dyslexia – How do factors such as weak short term memory and directional confusion impact on how dyslexics navigate on the web*.

- Deafness – How do Deaf people whose first language is a visual language (sign language) navigate the web?

- Autism – Understanding patterns of social interaction**.

*Dyslexia and web interaction: Seeing through dyslexics' eyes, Areej Al-Wabil
http://www.slideshare.net/secret/dZ6lRJ09BvhtNL

 **New insights into the social cues used by those with autism
http://www.the-ba.net/the-ba/PressOffice/PressReleases/_Norbury_BAPressRelease06Sept07.htm

Practicalities

- Eye tracking is:
    - Expensive
    - Has a steep learning curve
    - Analysis can be difficult and subjective

- Structure and focus of user tests may need to change to optimise the use of this tool.
    - Retrospective as oppose to concurrent think aloud protocol
    - Possible redefinition of tasks.
    - Less time available with the user due to time spent calibrating and technical setup and trouble shooting issues.

Industry Opinions

- Jakob Nielsen is a keen advocate of eye tracking, He has conducted extensive studies into how users look at and read web pages using over 200 participants.

  http://www.useit.com/eyetracking/

- Jared Spool has yet to be convinced and although recognising the demonstrative value of the tool is concerned that set up time takes time away from data collection, can't be used with all participants and data analysis can be very taxing.

  http://www.uie.com/brainsparks/2006/06/13/eyetracking-worth-the-expe

Any Questions?