Commercial uses of eyetracking

www.amber-light.co.uk/HCI2005/eyetracking/index.htm

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Eyetracking is now an almost standard offering from commercial HCI analysts. However, what are the best ways to exploit the strengths and minimise the weaknesses of this technique? This workshop aims to gather individuals who have an interest in eyetracking for the evaluation and design of digital interfaces such as websites, games, iTV, mobile phones and more. The outcome of this workshop is through sharing ideas and experiences to define best practice and highlight unanswered questions about eyetracking in both its scientific and practical sense, and especially as applied to commercial UCD practice. Please note interactive eyetracking such as eye typing is not within the focus of this workshop.

Eyetracking, Commercial User Centered Design, Cognition, Attention, Design, Evaluation

1. INTRODUCTION

Eyetracking has been around for a number of years and its popularity has steadily grown as a commercially available service for User Centred Design (UCD). However, questions remain how best to maximise the use of this technique both in terms of exploiting its power and being aware of its limitations. The aim of this workshop is to bring together best practice, experiences, ideas and discussion around the best ways to use eyetracking, especially as applied to HCI in commercial settings. The end goal of the workshop is to create a summary of best practice in eyetracking which practitioners can take away and apply to their own practice. Also for academics an opportunity to share ideas and gain better understanding of the uses and issues of applied eyetracking which may in turn stimulate further research.

2. RATIONALE FOR WORKSHOP

Eyetracking in HCI is by no means an area completely understood. There are a number of questions that remain for analysts when applying this technique to HCI problems. It is anticipated that the workshop will bring up issues such as the following:

1.1 Cognition and visual attention

Eyetracking forces us to make assumptions on how cognitive processes and foveal attention are linked. Attention can be separate to the foveal direction of gaze; i.e. the difference between covert and overt attention. However we assume when analysing eyetracking data that our attention is indicated by the direction of our eyegaze. Does this assumption have any implications for our analysis? Or are the implications task dependent; for example, Findlay & Gilchrist (1998) view that covert attention has no place in search processes and hence measures of overt attention such as eyetracking are valid (in Duchowski, 2003) [1]

Even if we assume that foveal focus demonstrates attention, how do we tease out the differences between attention and perception? A gaze trail shows what was 'looked' at, but not necessarily what was fully perceived (Duchowoski, 2003) [1]. When a person spends a long time looking at an object, does this indicate the object is important or the person is puzzled at what the object means? How can we tell the difference between initial fixation due to visual impact (colour, size etc) versus the importance of the object to a person's goal. (e.g. Rudmann, McConkie & Zheng, 2003) [4]

Bottom-up views of visual processing, such as the visual impact of an object, are focused on feature driven aspects of attention. However, as analysts we are often interested in top down issues, for example; the participant is searching for specific information. How can bottom-up and top-down views be integrated? Or if the theory isn't there yet, is it better to use eyetracking for bottom-up processing of stimulus rather than infer too much from the data?

1.2 Behaviour, emotion and visual attention

Connected to understanding cognition and visual attention is understanding behaviour and visual attention. Does user behaviour or feedback give us the means to diagnose eyetracking data? Also, how can emotion be inferred from eyetracking data; for example, trust (Riegelsberger, Sasse & McCarthy 2002) [3]

1.3 Eyetracking metrics

What are the best metrics and under what situations? A number of metrics exist such as total duration of all fixations within an area of interest, gaze path or first fixation duration. Certain metrics may be best for certain situations. For example, it is suggested that fixation is longer on objects that are semantically inconsistent in a scene. But it is unknown whether this is due to figuring out what the object is, integrating the object into the understanding of the scene or simply because the user finds it amusing (as per Rayner 1998, in Duchowski, 2003) [1]. (For additional papers on metrics see also: Renshaw, Finlay, Ward and Tyfa 2002, 2003, 2004a, 2004b)

1.4 Commercial issues

There are a number of commercial issues ranging from scientific to practical. Firstly, how can we leverage academic research for both methodological improvements and design implications? e.g. Hornof, Halverson, 2003 [2]. In terms of commercial constraints; what kind of analysis is 'do-able' in the typically short turn around of client projects? What is most compelling and useful for clients? As mentioned previously, do we need to use eyetracking in parallel with other techniques such as usability testing in order to understand eyetracking data? At what times is eyetracking best used within the wider scheme of UCD?; e.g. interaction design of menu systems.

3. WHO SHOULD ATTEND?

This workshop is aimed at both practitioners and academics:

- Practitioners who use eyetracking in their work for design and evaluation purposes
- Academics who are interested or involved in eyetracking and in applying research to commercial domain

Prior to the workshop interested parties should submit a position paper (maximum 2 pages), which outlines their understanding and usage of eyetracking, and define what they specifically want to address or discuss within the workshop. Template for position papers will be posted on the workshop website. Position papers should be submitted by 15th June to both workshop co-ordinators, acceptance to workshop will be given by 1st July. Due to time limitations there will be maximum of 15 attendees. Position papers from all attendees will be posted on the workshop website prior the workshop.

4. WORKSHOP PROCEDURE

- Morning session (3 hours plus break)
  - Introductions
  - Presentation of position papers followed by Q&A
- Lunch (1 hour)
- Afternoon session (3 hours plus break)
  - Co-ordinators lists the recurring points, themes and questions from position papers.
  - Workshop is broken up into smaller groups to discuss these issues.
  - Groups report back to the entire workshop on their conclusions, hypotheses, questions etc
  - Conclusions from the workshop are documented:
    - Best practice guidelines for use of eyetracking; purposes, metrics, processes
    - Conference poster; summating workshop conclusions and areas for further research

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