Real World Eye Tracking - Course Outline

Aims

- To enable participants to link fundamental cognitive science theory to real-world eye tracking paradigms.
- To provide participants with the tools to design and run their own experiments and be able to analyse the results and interpret the results in a meaningful way.
- To develop an understanding that can be applied by participants in a “platform-agnostic” manner.

Mini-projects:
The hands-on mini-projects are designed for different levels of experience and with different areas of interest in mind. The mini-projects are carried out in small groups and are led by experts who will provide guidance based on content from the taught lectures.

Systems to be demonstrated (with possible further systems): Tobii Glasses 2, TX300 (screen based, using real world examples), EyeLink, Ergoneers, Tobii HTC Vive Eye-tracking VR HMD
Eye tracking specific software demonstrated: Tobii Studio, Tobii Pro lab with VR Integration

Timings: 9am 8 April – 5.30pm 9 April
Please note: Day 1 is a full day with an invited talk 6-7pm by Dr Jo Van Herwegen and evening social activity running until 9pm.

Staff:
Dr Szonya Durant, Royal Holloway, University of London
Dr Tim Holmes, Royal Holloway, University of London
Additional Tobii Pro Insight eye tracking research experts
Prof Johannes Zanker, Royal Holloway, University of London
Invited talk: Dr Jo Van Herwegen

Day 1:

Introduction to eye tracking principles and applications

The underlying theory behind using eye tracking to inform us about mental processes such as attention and decision making. Using theories of eye movements it will explain how the interpretation of measures such as eye position, fixation frequency/duration/location/trajectory/dynamics and pupil size can tell us about how people pay attention. It will explain the terminology used and discuss the implications of theories of attention for interpreting eye tracking data.

Practical considerations for different systems and software

In particularly in terms of the limitation in doing ‘real world eye tracking’ - the capabilities of remote and mobile devices and associated software. Considering the ease of extracting data using ‘off-the-shelf’ vs bespoke software. We will discuss applications from shopper research, web design and...
print advertising for example. Participants are encouraged to contribute their own questions thinking about their own areas of research. Aspects relating to integration with other technologies such as virtual reality and separate biometrics measurements will also be explored in this session.

Design and recruitment

This session will discuss the importance of criteria for participants and considerations in designing and eye tracking experiment as well as ethical considerations in recording and handling data. It will address some important considerations for avoiding basic confounding factors in your design, by building on previous psychological research and discuss appropriate metrics for answering specific questions and address some of the problems in dealing with data collection in the real world, building on the extensive knowledge and experience gained over the years working with many companies as well as publishing scientific articles.

Mini projects set up and initial data collection

Before the start of the course, using the registration website we will collect information on. Participants will be split into small groups for the rest of the day according to their interests and level of experience, to run their own experiments. There will be four groups, which limits how well we can match participant’s individual focus, but they will get experience of all paradigms and platforms and the focus is on learning non-platform specific application. Each project is led by a different member of staff teaching on the course (Dr Tim Holmes, Prof Zanker, Dr Durant and Tobii Pro Insight researcher) to further enrich the student-senior expert interaction.

Each group works with one of the expert course tutors to set up and run an experiment on members of the group. The aim of this session is to provide hands-on experience in developing an eye tracking experiment to answer a given question, to gain some insight into issues of design and optimal development as well as an introductory experience using a particular eye tracking software and hardware set-up. Example past projects running in parallel include product placement in cinema, real world shopper behaviour, art appreciation and user experience.

Project feedback, demos with Q&A

Each group will explain their experimental set-up and data collection to the other groups and the equipment and set up for each demonstrated to all. Additional systems will be demonstrated in this session. This is the chance for participants to ask the course leaders about questions specific to their own interests.

Invited lecture

Dr Jo Van Herwegen: - an overview of research using screen based and mobile eye tracking to look at Williams Syndrome and autism, as well as mathematical development an education in infants and children.

Followed by pizza and wine.
Day 2:

**Data preparation**

This session is particularly relevant for mobile eye tracking and covers how to extract data in such a way as to be able to interpret it relative to real world regions of interest. The latest developments in automated coding will be demonstrated and evaluated as well as methods for creating dynamic regions of interest in the recorded sequences. This aspect of applied eye tracking is not trivial, but lies at the heart of effective use. This is also the part of the course that is most likely to be updated with new software developments.

**Analysis in groups**

Returning to mini-project groups to get hands-on with the data collected, putting it together to a final presentation of results, guided by the group leader from the expert course staff. The aim is to gain familiarity with analysis packages and to understand which measures might be used to answer what questions. This part forms most of Day 2 as we have found that it is worth investing the time to understand what the steps are in analysing data and this is best done by allowing participants to carry this out themselves with enough time.

**Presentation and discussion with Q&A**

Each of the groups presents their results in turn and there is group discussion about issues arising from the mini-projects. The aim is to demonstrate understanding of the issues and to have built confidence in using eye tracking to get results out. This is also a further chance for participants to ask the course leaders about questions specific to their own interests.

Supported by the [BBSRC](#)

This course is accredited by the Market Research Society and counts for 12h CPD award.

**Useful reference books:**
Useful articles: