Cluster	Subject Title	Instructor	Credit	Semester
S-P	Eye Tracking Research Methods and Applications	A/P Jilung Hsieh	2	Summer 2016

Subject Description

- Introduction to eye tracking technology and its application on learning behaviors.
- Eye tracking research design: Between-subjects and within-subject design, constraints and gaze-related indicators.
- Conducting experiments: recruiting participants, designing instructions, eye tracking equipment and environment settings, pre- and post-questionnaires.
- Lab: using EyeTribe and Ogama (an open source software)

Objective

Students are guided

- To understand the physiological and cognitive knowledge of eye racking,
- To know current eye tracking applications on different fields,
- To know why eye tracking can benefit educational or learning researches,
- To design and conduct eye tracking experiment,
- To do statistical analysis on gaze patterns

Learning Method

1. Lecture
2. Case study: including eye tracking on multi-model learning behavior, webpage design evaluation, and daily life applications.
3. Group work and presentation: interested topics, proposal, and final report

Content

1. **Introduction and Lab**
   - Physiological and cognitive knowledge of eye tracking
   - Eye movement and analysis. Fixation, saccades, and AOIs.
   - Applications: webpage, e-map, programming, multimodal reading, video clips, computer games, .
   - Lab: Using Eyetribe and Ogama
   - *Heatmap and gaze path overview*
2. **Lab and application on education research**
   - Lab: Eyetribe and Ogama setting
   - *Environment settings*
   - What eye tracking can benefit education research?
   - Overview of online resources: how to find an interested topics
3. **Gaze analysis and interested topic reports**
   - Lab: gaze data analysis
   - *Ogama: AOIs analysis*
   - *Ogama: Output data*
   - Student report: Students must form group and select/report one interested topic by 10 slides.
4. **Experiment designs**
   - Between subject design
   - Within subject design and order effects: applications on web as examples
   - Requirement of proposal
5. **Proposal**
   - 10 slides for presenting related studies
   - 10 slides with clear experiment illustrations
   - Comments
6. **Analysis**
   - Gaze indicators and actual/efficient analysis
   - AOIs and sequential analysis
   - Qualitative analysis
7. **Call-for-help and advanced topics of eye tracking**

- Call-for-help to solve any problem of your experiment (You MUST finish at least 10 cases)
- Advanced topics including gaze as input, eye+mouse coordination, VR application

8. Final report

- 20 slides presentation with topics, motivation, related studies, methods, results, and conclusion

Requirement

Students are expected

1. To find interested topics for eye tracking,
2. To know why eye tracking can benefit educational or learning researches,
3. To understand the physiological and cognitive knowledge of eye tracking,
4. To design and conduct eye tracking experiment,
5. To do statistical analysis on gaze patterns

Evaluation

- 15% for overall participation
- 20% for sharing interested topics
- 25% for proposal presentation
- 40% for term project presentation

Textbook and Reference

The course has not specified textbooks. The following books, documents, papers, and links can provide an overview on eye-tracking researches, methods, and applications. Recommended Books and Documents:

- Pernice, K. and Nielsen, J. (2009) How to Conduct Eyetracking Studies.
- http://www.nngroup.com/reports/how-to-conduct-eyetracking-studies/ (free)
- Nielsen, J., & Pernice, K. (2010). Eyetracking web usability. New Riders.
- Adam, P. S., Quinn, S., & Edmonds, R. (2007). Eyetracking the news: a study of print and online reading. Poynter.