

Advanced Seminar Eye Tracking



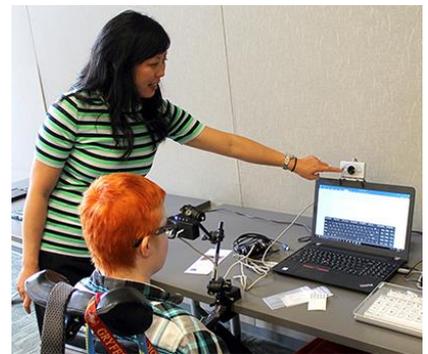
Universität Stuttgart

Description:

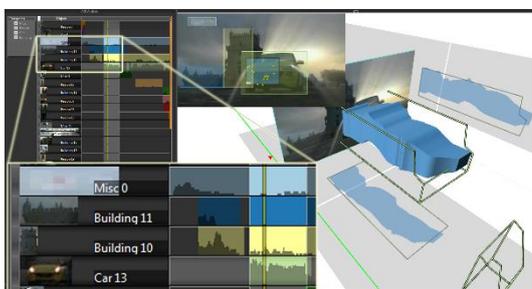
Eye tracking is becoming commonplace, given that hardware is widely available and also increasingly affordable. In general, there are two different ways of working with such data: either the data is collected over multiple subjects and experiments and analyzed later on, or it is used in real time to influence rendering or replace conventional input devices, which is highly relevant in immersive settings and for users with disabilities. Given that eye tracking data can be sampled at frequencies up to 2KHz, especially cohort data sets are very large and pose an interesting challenge for post-hoc analysis. In this seminar, we will discuss the fundamentals with regard to devices and data processing and then look at the different scenarios that work with the resulting data.

Potential topics:

- Eye tracking devices
 - Remote eye tracking
 - Mobile eye tracking
 - Eye tracking in AR/VR
- Algorithmic fundamentals of eye tracking
 - Measures and metrics
 - Image processing and computer vision methods
- Eye tracking as data source (offline)
 - Usability studies
 - Perceptual studies (attention guidance)
 - Visualization and analysis of cohort eye tracking data
- Eye tracking for input (online)
 - Gaze-based interaction
 - Quality/resolution steering/prioritization for image generation
- Analysis of Eye Tracking Data
 - Statistical analysis
 - Visualization/visual analytics approaches
 - Scanpath trend analyses (STA)
- Eye-tracking for offline training
 - Applications of eye tracking

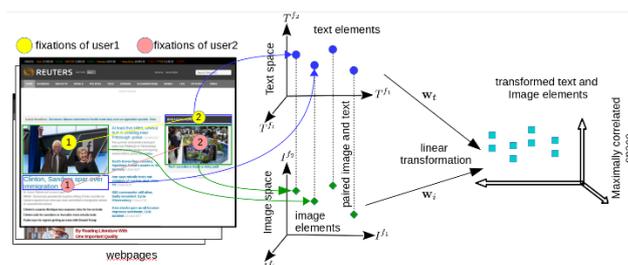
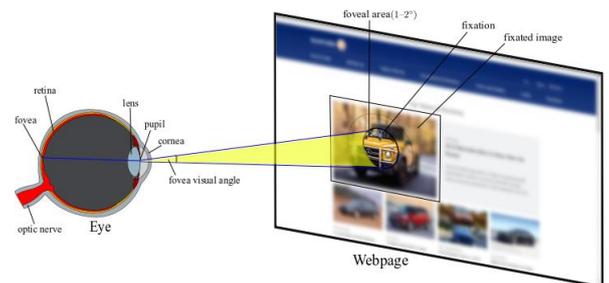


▲ Low Cost Eye Tracking for Computer Access and Speech Synthesis
[<https://www.washington.edu/doit/book/export/html/8010>]



▲ Space-time cube visualization to analyze how multiple participants watched a video stimulus. [K. Kurzhals, F. Heimerl, and D. Weiskopf. ISeeCube: Visual analysis of gaze data for video. Proceedings of the ACM Symposium on Eye Tracking Research and Applications, 2014]

► Illustration of eye-gazing towards a web image element. [Ph.D. Thesis Dissertation, S. Vidyapu, "Computational Modeling of Free-viewing Attention on Multimodal Webpages - A Machine Learning Approach"]



◀ Unifying text and image elements on webpages based on fixation-indices based correlation [S. Vidyapu, V. Saradhi Vedula & S. Bhattacharya, "Fixation-Indices based Correlation between Text and Image Visual Features of Webpages", ACM Symposium on Eye Tracking Research & Applications, 2018]

Coordination:

Coordination and topic assignment will take place in the first week of classes of the winter term

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