Analysis of Eye Movements in Situated Natural Interactions

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Abstract

Studying and analyzing eye movements in natural interaction situations in the field – as opposed to restrictive laboratory settings – is a dream coming true with recent developments in hard- and software. Areas of interest include situated communication, sports, economics or human factors. These new opportunities, however, also challenge current methodological approaches in basic research. Traditional eye-tracking parameters as indices for visual attention processes and established methods for scientific visualization, such as heatmaps or scanpaths, have to be carefully reconsidered when everything is dynamically in motion – as it is often the case in natural interaction situations. Many measures do not consider variations in applications fields, stimuli types, environments and multi-modal recordings, such as 3D object occlusions. The analysis of situated eye movements is even more challenging, as the flexibility gained with mobile eye tracking goes along with a significant increase of annotation time and complexity.

Based on our own experiences drawn from various studies using mobile eye tracking, the talk discusses the (new) challenges and reviews state-of-the-art approaches for the analysis of eye movements in natural behavior, including manual and automatic annotations of situated eye movements, as well as combinations of eye tracking and motion capturing both in the field and lab.