ETH zürich

Bachelor's thesis or other student work at the group of Human Factors Engineering, Chair of Consumer Behavior (D-HEST)

**Eye-tracking for the HoloLens**

Augmented and Virtual Reality (AR & VR) opens fascinating perspectives in consumer behavior research and other disciplines by enabling to control experimental settings beyond the feasible in reality and by saving time and money to set up and run behavioral experiments. In combination with eye-tracking, AR & VR enable an efficient assessment of a broad variety of factors of interest, like preferences, disgust or information needs of consumers. For popular VR devices, such as for the Oculus Rift or the HTC Vive, various eye-tracking add-ons have been developed. Due to technical reasons, developments of eye-tracking instrumentation for AR devices has started only recently and have not yet attained a satisfying level.
In this project, we would like to demonstrate feasibility of recording eye movements in users wearing a popular AR device, Microsoft's HoloLens (see Figure 1, left), by combining an established eye-tracking technique with the HoloLens. For this purpose, users are equipped with an electrooculagraphic (EOG) eye-tracker (Fig.1, middle). The combination could, for example, enable investigators to assess consumer's areas of interest as shown in Fig. 1, right.

Figure 1: Left: see-through display in Microsoft HoloLens (https://www.microsoft.com/de-de/hololens). Middle: Recording eye movements by means of electrooculography (Cambridge Res. Systems). Right: Heat map of eye fixations.

**Tasks**

The aim of this student work is to test the functionality of the combination of the EOG and the HoloLens for assessing eye movements in AR. Your tasks are:

- Familiarize with the HoloLens and with the EOG device
- Investigate programs for recording EOG (with the help of the supervisor)
- Designing and run an eye-tracking experiment aiming to evaluate usability of the techiques
- Report findings in a written report and in an oral presentation

**Requirements**

- Motivated to work with augmented reality and eye-racking, and to learn techniques and methods of fascinating research with humans

**Support and contacts**

The Human Factors Engineering group provides a broad interdisciplinary technical and scientific support and has a solid experience in the many disciplines required to run the project. For further information please contact: mmenozzi@ethz.ch or call: 044 632 39 81 (M. Menozzi).