

Investigating factors that influence human visual attention on city car rides

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By the use of realistic virtual reality environments, the immersion of the subjects is considered to be favorably close when compared to naturalistic ones. Moreover, VR experimental setups can bring the controllability of the lab anywhere they are placed.

Our study makes use of the large amount of data (~26.000 participants) acquired during a VR experiment conducted at the MS-Wissenschaft and Bundesministerium für Bildung und Forschung (BMBF) exhibitions between May and December 2019. The experiment consists of a 90 seconds car ride on a highly realistic 3D city built upon the Westdrive project of the Institute of Cognitive Science at the University of Osnabrück.

Each subject was randomly presented with one of the three experimental conditions of the design. The ride and the events that occur in the simulation were exactly the same in all conditions, except for the audio cues and the driver avatar shown.

The original study aimed to investigate the acceptance of self-driving cars on the German population with a technology acceptance model (TAM) questionnaire passed after the completion of the VR task. The current on-going study goes beyond that by exploring the relationship between possible different factors (e.g. condition/context, demographics, task, trust, usefulness, ease of use, usefulness, expectancy, perceived danger, critical events, etc.) that can influence human visual attention and the categories of objects gazed in the given situation.

In order to achieve that, we make use of the TAM questionnaire answers on the one hand, and the projection (ray casting technique) of the nose (direction) vector from the head tracking data, on the other. In this way, we can estimate the objects faced during the ride and compute the gaze events that possibly occurred to finally compare them with the TAM scores and other relevant factors.

The total number of unique objects casted was around 1100, grouped in different categories (dynamic and static pedestrians, dynamic and static cars, traffic lights, traffic signs, buildings, roads, street objects, nature, road paths, etc.), then further on rearranged between traffic relevant (TR) and non-TR stimuli.

Studying task-driven situations in visually simulated contexts

We hypothesize that participants with lower TAM trust scores should have gazed at more TR stimuli compared to those with higher ones.