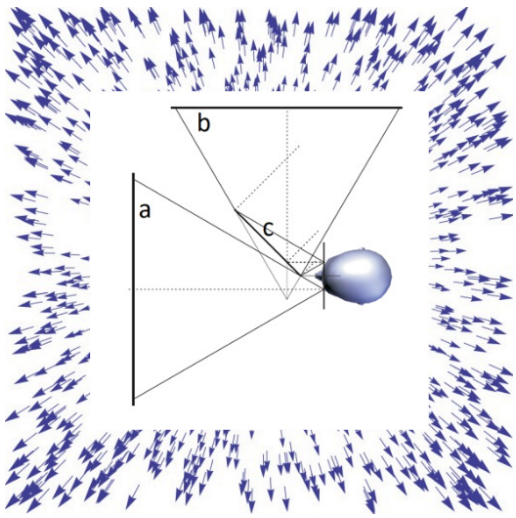
STUDENT PROJECT offered at the Institute for Neurobiology

EBERHARD KARLS UNIVERSITÄT TÜBINGEN

Student project in Spatial Perception

Interplay between monocular vs. binocular visual depth cues in the perception of heading direction through optical flow.



Background. Accurate and efficient control of self-motion is an important requirement for our daily behavior. Visual feedback about self-motion is provided by optic flow which can be used to estimate the direction of self-motion ('heading') rapidly and efficiently (Lappe et al., 1999).

In this project, the candidate should measure and quantify the accuracy of human heading estimation in different optic flow fields (Warren et al., 1988). Here, the flow density, the flow speed as well as the presentation format (monocular vs. binocular) will be manipulated in a within-subject design. The main question is about the role of stereoscopic depth cues in the perception of heading (Ott et al., 2016).

Project(s).

- Utilizing and extending an experimental setup (3D optic flow & mirror stereoscope) by using the 3D-engine Unity and MatLab.
- Learn to use psychophysics and to program flow fields to investigate the stereoscopic performance in heading estimation.
- Learn to run a psychophysical experiment and data processing (curve fitting, point of subjective equality calculation…) by the use of MatLab.
- Analyze behavioural data empirically and graphically and perform statistical tests to extract meaningful effects.

Methods. Visual psychophysics, statistics, and MatLab/Unity programming of the experiments and the scripts for analysis.

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Level. The project is planned as BSc-project but can be extended to a MSc-project.

References.

Lappe, M., Bremmer, F., & Van den Berg, A. V. (1999). Perception of self-motion from visual flow. *Trends in Cognitive Sciences*, 3(9), 329-336.

Ott, F., Pohl, L., Halfmann, M., Hardiess, G., & Mallot, H. A. (2016). The perception of ego-motion change in environments with varying depth: Interaction of stereo and optic flow. *JoV*, 16(9), 4-4.

Warren, W. H., Morris, M. W., & Kalish, M. (1988). Perception of translational heading from optical flow. *Journal of Experimental Psychology: Human Perception and Performance*, 14(4), 646.

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