

Eye movements and mobile electro-oculography

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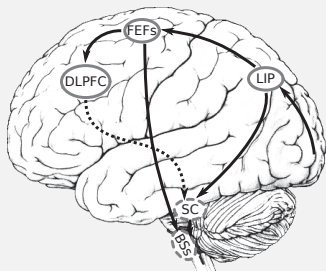


The movements of the eyes

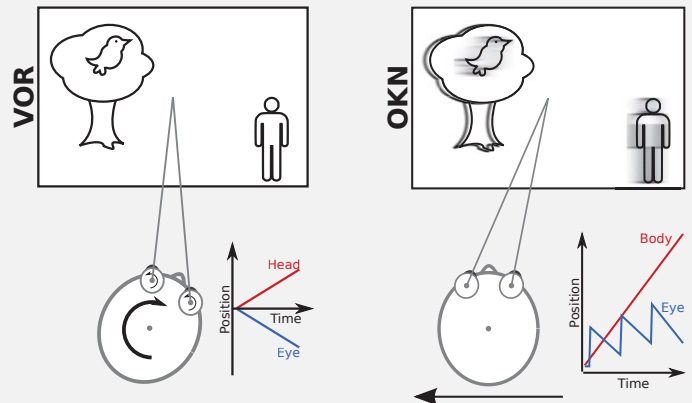
The oculomotor system is one of our most used motor systems. During wakefulness and even during sleep, our eyes are constantly moving. Under normal circumstances, we execute three to five eye movements per second! Despite this high frequency, we are barely aware of our oculomotor behavior, which highlights the strong degree of automation involved in the control of eye movements.

While riding a bike through the woods, looking out the window of a moving train or sitting in a cafe and watching people passing by, very different challenges have to be handled by the oculomotor system: *Compensatory eye movements* assure that vision is stabilized in the presence of body or external motion. *Goal-directed eye movements* project important aspects of the environment into our central field of view (*saccades*) and keep them there if they start to move (*pursuit*). Especially saccades are an interesting system to examine, since they involve a brainwide control network and are closely linked to attention.

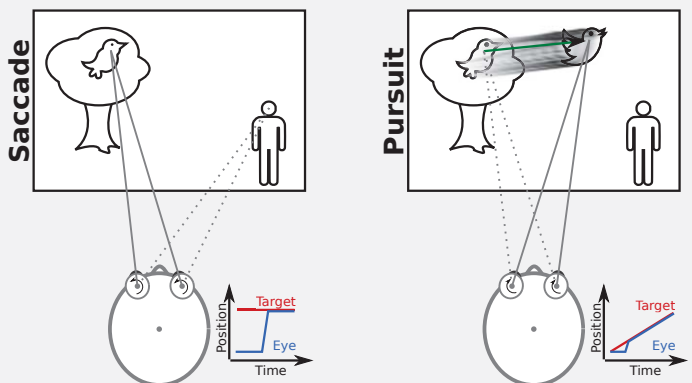
THE SACCADIC NETWORK



COMPENSATORY (REFLEXIVE)

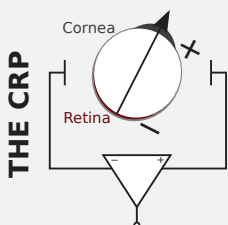


GOAL-DIRECTED (VOLUNTARY)

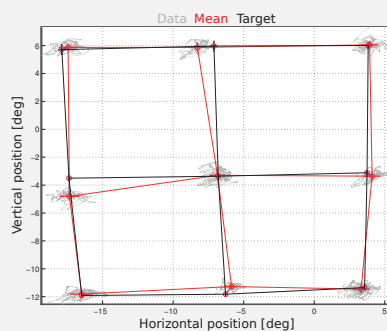


Mobile eye tracking with electrooculography

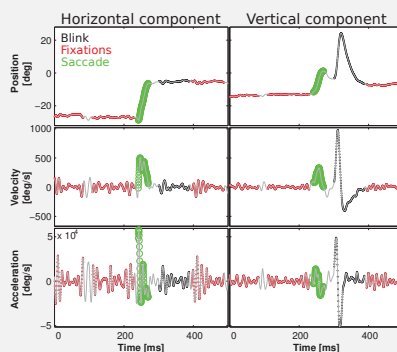
Electrooculography (EOG) measures differences in the corneo-retinal potential (CRP) arising from the difference in charge between the positive front (*cornea*) and the negative back (*retina*) of the eye. Deflections of the eye from the straight-ahead direction cause changes in the measured potential proportional to the amplitude of the eye movement. Using the Cerebro with a two-channel EOG and a small scene camera, very lightweight and cheap mobile eye tracking can be achieved.



CALIBRATION



EVENT DETECTION



SETUP

