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Artifact-like eye movements but not artifact

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The type of eye movements are categorized into several ones such as saccades, smooth pursuit eye movements, fixations, micro-saccades of tremor, drifts, etc. The discussions have been focused on how the vision and motor control are cooperated each other and managed by the central motor commands. Uncontrollable artifact-like eye movements during strong fixation concentration and rather big artifact-like rapid eye movements during eye blinking are found by the corneal reflection methods together with high speed motion camera. Small but rhythmical eye movements are related with the heart beat originated blood vessel volume change around the eye ball. Upward movements during eye blinks come from eye ball shift toward the sagittal direction and eye ball deformations by the eye lid.

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Real-time gaze-tracking for freely-moving observers

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We have developed a real-time mobile gaze-tracker, by combining a high-speed eye-tracker (Eyelink II, 500Hz) with head- and body-tracking (VICON, 200Hz). The position of the observer's gaze on the screen can be measured continuously with an accuracy of <1.0 deg as they walk around and make head movements in a natural way. The system is modular, i.e. individual components can be easily replaced (e.g., different eye and head tracking systems can be used).

The system is primarily developed for interaction in front of wall-sized displays. For validation, the system has been tested with displays of different sizes (from 2.2x1.8m to 5.2x2.5m), and several applications, including psychophysical experiments and a multi-resolution gaze-contingent display.