

Eye Tracking as a Perceptive Interface and Assistive Technology

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Perceptive Interfaces provide the computer with human perceptive capabilities, such as sight and hearing. Vision-Based Perceptive Interfaces, in particular, use one or more cameras to allow the computer to acquire implicit or explicit information about users and their environment. Eye tracking pertains to this category, and finds important applications in the fields of assistive technologies.

Eye tracking applications can be considered under two points of view: in the former, the eye tracker is a passive sensor that monitors the eyes to determine what the user is watching. In the latter, the eye tracker has an active role that allows the user to control a computer.

Following the strong eye-mind hypothesis when a subject looks at a word or object, he or she also thinks about. Current consensus is that visual attention is always slightly ahead of the eye: as attention moves to a new target, the eyes saccade mechanism is prompted to follow.

In HCI the gaze-contingency paradigm is a general framework for techniques allowing a computer screen display to change in function depending on where the viewer is looking: the eye-tracker is used as an input device and the computer interfaced responds to the observer's fixations and interacts with him.

The gaze-contingent technique is then the basis of a variety of different applications, such as: web usability ('attention' to test information); market analysis (point-of-sale and online marketing); education and e-learning (where students look and their efforts); game design (game developers can see from the eyes of their users); package design (distinctiveness, attractiveness of the package); automotive engineering (driver attention and workload).

Finally yet importantly, eye tracking is used in communication systems for the benefit of users with disabilities.