

## Emulation of a game console for vision-based eye-gaze tracker

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<b>Area of specialization</b>	<b>Embedded Systems</b>	

### Abstract

Human computer interaction (HCI) has become an integral part of daily life particularly due to progress in multimedia gadgetry. A perceptual HCI employs communication channels that humans routinely use to interact with each other. One of these channels is vision where computers can actively track, understand and respond to the posture, gesture or facial expression of the user. If the position of the eyes can be detected in a stream of frontal facial images captured by a camera and the movement of the eyes can be tracked in real-time, many interesting new applications may be realized. The movement of the user's eyes provides a convenient, natural and high-bandwidth supplementary source of information to make HCI more powerful. By tracking the direction of the user's gaze, the communication bandwidth between user and computer can be increased.

The goal of this project is to develop a graphical tool kit consisting of different applications such as hands-free text entry or simple games like "Frog'N fly demo" that can be played by an "eye-mouse" commanded by gaze, blink, and movement of eyes. The development of a demonstrator prototype allows simulation and evaluation of future HCI real-time systems.

The students will apply some interesting games and re-design the programs and graphical objects such that the console can be controlled by the gaze direction and eyes clicking of e.g. a handicapped person sitting in front of the monitor. In the absence of the real-time camera mouse, the students shall find means to process the off-line data captured by a video camera. The extracted information can be used to test and vividly demonstrate the functionality of the HCI system which incorporates a full mouse replacement computer console. A configurable solution for testing different eyetracking algorithms is desired.

