A 99 Dollar Head-Mounted Eye Tracker

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Abstract

Head-mounted eye-trackers are powerful research tools to study attention processes in various contexts. Most existing commercial solutions are still very expensive, limiting the current use of this technology. We present a hardware design to build, at low cost, a camera-based head-mounted eye tracker using two cameras and one infrared LED. A Playstation Eye camera (PEye) is fixed on an eyeglasses frame and positioned under one eye to track its movements. The filter of the PEye is replaced by another one (Optolite 750nm) that blocks the visible light spectrum. The focal length of the PEye needs to be re-adjusted in order to obtain a sharp image of the eye. This is done by increasing the distance between the charge coupled device (CCD) and the lens by a few millimeters. One IR-LED (Osram SFH485P) is installed near the PEye lens to impose an artificial infrared lighting which produces the so-called ”dark pupil effect”. This is done while respecting the Minimum Safe Working Distance. We positioned a second camera on the front side of the eyeglasses frame. Preliminary applicative tests indicate an accuracy of approximately one degree of visual angle, which makes this tool relevant for many eye-tracking projects.