On the Edge: The Eyes Have It

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I know that look." It's an undeniable part of being human. We telegraph our feelings to our kids and spouses, to friends and strangers, with a flash of our eyes. Why not communicate the same way with our phones, PDAs, and computers?

Ted Selker, an associate professor at the Massachusetts Institute of Technology's Media Lab, has spent more than 25 years watching our eyes. While gender and cultural influences affect patterns of eye behavior (women blink more often than men, for example) there are absolute commonalities. When we are nervous, we all blink rapidly. When we are interested in something, we periodically glance at it.
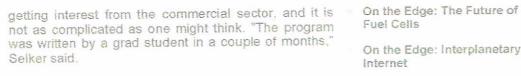
Combining eye-pattern behavior research and technology, Selker formed a group in the 1990s at IBM's Almaden Research Center that, among other things, put the "red-eye" effect to good use. They developed a compact video camera that determines where a person's eyes are pointing by using an infrared device to track light reflected from the retina. The cameras are now considerably cheaper, Selker noted, and in some of the devices his MIT team has developed, "the most expensive thing is the battery."

Selker's lab is filled with devices that are controlled via eye input. Lying in the Eye Bed, for example, you can bring up the lights or turn off the alarm when you wake up (open your eyes), turn on the radio by winking at it, and change the station by blinking rapidly. An aid in caring for ambulatory patients, like paraplegics and quadriplegics, Selker said it is one of several devices

getting interest from the commercial sector, and it is not as complicated as one might think. "The program was written by a grad student in a couple of months," Selker said.

Selker admits some of the devices are novelties. Eye-Are glasses, which feature an external infrared device mounted on an earpiece, is a prime example. In tests, Eye-Are wearers chatted in social groups while the glasses collected information about their gazes and nonverbal exchanges. When the Eye-Are wearers downloaded the information at a computer base station, they accessed Web pages of people based on the wearers' interest in them.

But even Eye-Are glasses have a practical side. The blink-and-gaze detectors could be used in cockpits and cars, sounding an alarm to alert a sleepy pilot, driver, or equipment operator before the operator falls asleep at the controls.

With a variety of working prototypes and collaborators like Saab, Chrysler, and Motorola, we may see commercial products making use of Selker's eye-catching research soon.

Look Busy, the Phone Is Watching

Roel Vertegaal controls his desk phone just by looking at it. He and several colleagues at the Human Media Lab (HML) at Canada's Queen's University in Kingston, Ontario, have attached the eye-input device Eye Proxy to their phones. When Eye Proxy sees a person engaged in work or conversation, the phone won't ring; when the person is glancing about, it sees him or her as available to take a call.

In an age of electronic information overload, Vertegaal wants computers that "know when we are busy, when we are available for interruption, and when to wait their turn."

In their quest, HML researchers attach eye contact sensors to "almost everything we can get our hands on." Like Selker, Vertegaal believes that once eye-controlled devices are more widely recognized, they will find a market. In testing at HML are eye contact sensors that track when a person looks at a device (consider an attentive TV that automatically pauses when no one is watching) and home appliances that recognize eye contact and voice commands.

So, when the day comes that you can rise and tell the toaster, "I'd like mine crispy today," don't be surprised if it responds, "You look like you need some coffee first." Attentive indeed.