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APPLICATIONS INSIGHT

GUY HARRISON

The Future of Application Interfaces

In the cyberpunk future depicted by science fiction authors such as William Gibson, the mouse, monitor and keyboard have given way to virtual reality interfaces and heads-up displays built into stylish sunglasses or even via direct neural interfaces. These ideas might seem impractical, fanciful or possibly frivolous. However, the development of similar alternative interfaces is actually progressing very rapidly. And the motivations for the research are far from frivolous - indeed much of the research is driven by the humanitarian imperative of relieving the human cost of serious disability.

Consider the story of Stephen Hawking, probably the best known physicist of our time. ALS (Lou Gehrig's disease) has left him able to communicate only through the limited movement of just one finger. The open source application (eLocutor) that Professor Hawking uses to communicate has highly optimized algorithms that allow the narrow theoretical bandwidth allowed by a single finger movement to generate rich language output.

As impressive as this is, it represents only a fraction of the possibilities presented by some of the next-generation human computer interfaces. Brain-computer interface systems are under active development and many have demonstrated practical applications. By monitoring brain waves and employing bio-feedback training, individuals have been able to control a screen cursor or control a robot toy. Another idea that has become reality is the bionic eye. Researchers have developed special glasses that can transmit signals from an in-built camera directly to the optic nerve, restoring some degree of sight to the otherwise completely blind.

Eyes can do more than just see: technology for controlling a computer by monitoring eye movements has been available for over a decade and is available in several commercial implementations. The cursor can be moved simply by looking at an area on the screen and mouse clicks simulated by blinking.

Technologies more applicable to the mainstream user include such innovations such as the virtual keyboard, in which the image of a keyboard is projected onto a surface while a sensor measures finger movements allowing the user to "type" on this non-existent keyboard. "Heads-up" displays that allow images to be projected directly to the special glasses or even directly into a user's retina have also been demonstrated. Indeed, Microsoft has patented a heads-up display system for automobiles that includes traditional dashboard displays as well as GPS data and - believe it or not - virtual fuzzy dice!

Collectively, this research raises the possibility of fully functional human-computer interaction without the use of mouse, keyboard or monitor. Perhaps the future depicted in science fiction is not that far off. Or, as William Gibson famously stated, "The future is already here - it is just unevenly distributed."

Guy Harrison is a chief architect for database solutions at Quest Software, and is a recognized expert with over 15 years of experience in application and database administration, development, performance tuning and project management. He is the author of "Oracle SQL High Performance Tuning" (Prentice Hall) and "MySQL Stored Procedure Programming" (O'Reilly), and is a regular speaker at trade shows and events.