New Products

Editors: Eyal de Lara ■ University of Toronto ■ delara@cs.toronto.edu
Keith Farkas ■ HP Labs ■ Keith.Farkas@hp.com

This month we say farewell to Guerney Hunt, who has served as served as coeditor of this column since its inception in the October–December 2002 issue. At the same time, Eyal de Lara is joining the editorial team. Thank you, Guerney, and welcome, Eyal.

EDITORS' INTRODUCTION

This month we review a Bluetooth-based proximity broadcasting system and a Wi-Fi watchdog system, both of which raise some privacy issues. We also review a video display that projects into thin air, technology enabling 3D TVs, and a production-quality two-way display, which is similar in spirit to the prototype we reviewed in the last column. Finally, we examine a virtual computer, an ultraportable personal server, a novel keyboard, and a bionic arm that suggests the future of human-computer integration. Please continue to send pointers to upcoming products with exciting possibilities, your feedback on existing products, and your personal experiences with them (your name will be included with your review). Email us at pvcproducts@computer.org.

—Eyal de Lara and Keith Farkas

APPLICATIONS

DON'T TAP, TRACE

Researchers at IBM Almaden Research Center are working on a new method for entering text into a mobile device. Rather than tapping out letters on an onscreen keyboard, you trace words by connecting the letters shown on the virtual keyboard (see figure 1). To spell "word," for example, you would place the stylus on "w" and then trace a path to "o" to "r" to "d." This method is called ShapeWriter and distills the entering of common words to a fluid gesture, which, with practice, you can do with few visual cues. Users can reportedly achieve up to 50 to 60 words per minute.

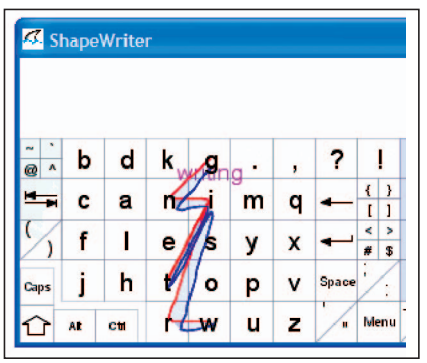

Figure 1. The ShapeWriter technique.

WI-FI WATCHDOG

Newbury Networks recently introduced an expanded version of its enterprise software security product, Wi-Fi Watchdog (see figure 2). Wi-Fi Watchdog is a server-based software system that can monitor and safeguard a wireless local area network. By tracking the physical location of every nearby Wi-Fi device in real time, Wi-Fi Watchdog limits network access to devices within a predefined area. Furthermore, the system can locate any unauthorized access points, ad-hoc networks, or soft access points and, if it finds them, cut off network access. Additionally, Wi-Fi Watchdog can detect common attacks that threaten client devices, including preventing docked laptops from becoming open ports to the outside world. It also detects MAC spoofing and man-in-the-middle and denial-of-service attacks. Finally, the system can be used to prepare reports on

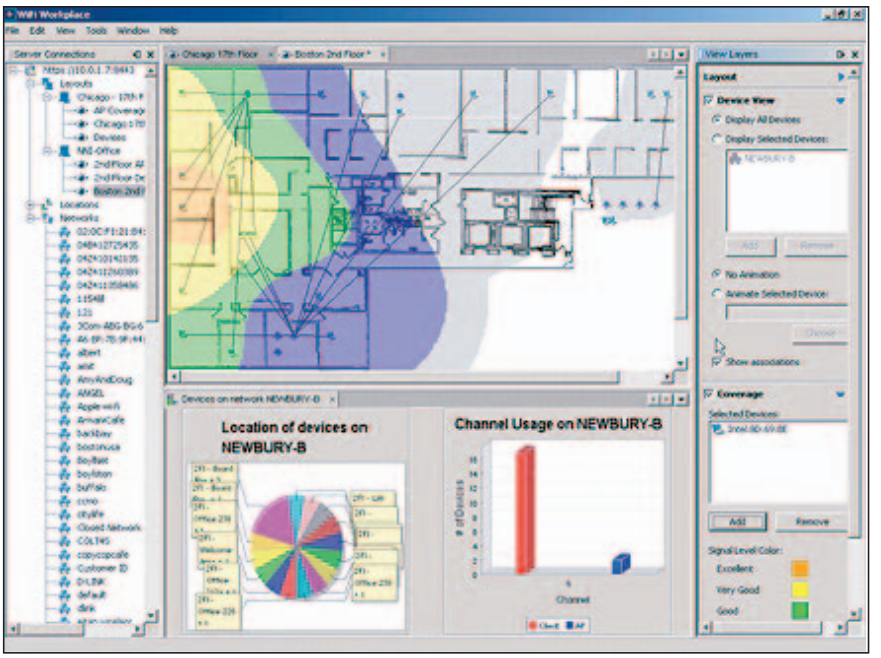

Figure 2. Newbury Networks' Wi-Fi Watchdog enterprise software security product.

Published by the IEEE CS and IEEE ComSoc ■ 1536-1268/05/$20.00 © 2005 IEEE

activity by location, user/device movements, WLAN hotspots, and device histories. Wi-Fi Watchdog integrates and interoperates with existing network management systems such as HP Openview and CA Unicenter.

PORTABLE COMPUTING ENVIRONMENT

IBM Research has developed SoulPad, which combines USB portable storage, virtual machine technology, and an autoconfiguring operating system, to enable you to take your computing environment with you without carrying a laptop. SoulPad stores in a small USB device (such as a portable hard drive or an Apple iPod) a copy of Knoppix (a Linux variant with support for autoconfiguration), a VMware virtual machine monitor, and an encrypted virtual machine that encapsulates the user's data, applications, and personal settings. Users access their computing environment by plugging their SoulPad into a USB port in any PC. Initially, the PC boots Knoppix from the USB-attached device, which autoconfigures to the mix of resources available on the host computer. The PC runs the VMware virtual machine monitor and decrypts and resumes the user's virtual machine. Users can then resume their task from where they left off using the host's computer CPU and memory. The USB-attached device provides persistent storage and swap space. When the user suspends the session, SoulPad encrypts the serialized state of the user's virtual machine and stores it on the USB-attached device. No trace is left on the host PC. Booting a SoulPad takes about two minutes, whereas shutdown takes only 20 seconds.

DEVICES

VIDEO IMAGES IN THIN AIR

IO2 Technology's Heliodisplay displays video images in thin air, projecting a 2D 22- to 42-inch diagonal image (depending on the model) that floats above the device. The system accepts most 2D video sources including PC, TV, DVD, HDTV, and video game consoles. The image is displayed in a 2D (that is, planar) space. Heliodisplay images appear 3D when viewed from more than a few feet away because there's no physical depth reference. Viewing requires no special glasses or background/foreground screening. Although the Heliodisplay uses lasers, the images aren't holographic. The display is interactive, and no special glove or pointing device is required. You can use your finger or hand to move images around in the air as if you were grabbing a tangible object (see figure 3). Possible uses include advertising, collaborative decision making (for example, presentations, design or board meetings, and teleconferencing), and simulation and training, as well as consumer applications such as video games and home theaters. You can purchase or rent the Heliodisplay from IO2 Technology.

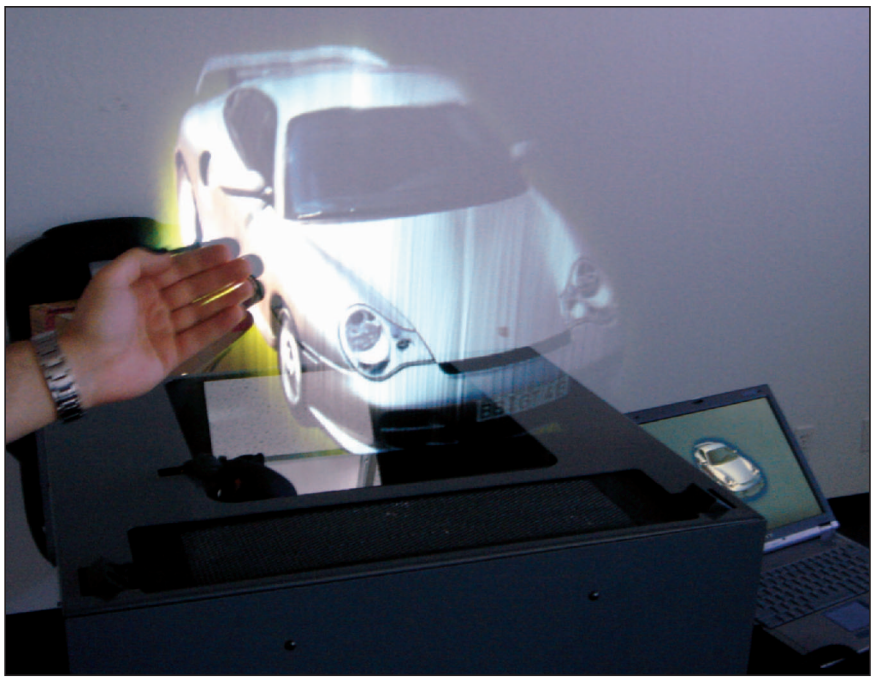

Figure 3. IO2 Technology's 3D Heliodisplay.

3D TV

ATTEST (Advanced Three-Dimensional Television System Technologies), a multinational research project funded by the European Union, has developed an advanced 3D TV system (see figure 4). ATTEST addresses all parts of the video pipeline including content generation, coding and transmission, and display. ATTEST provides two approaches to content generation. First, the ATTEST team modified a range camera to provide full-resolution 3D video. The 3D camera delivers higher depth and pixel resolution. Second, the research group developed algorithms to convert existing 2D video material into 3D. The ATTEST team has also developed MPEG-2 compliant coding schemes that support the transmission of depth information and 3D displays for single and multiple users. A.C.T. Kern is marketing the single-user display under the Free2C name. The Free2C uses a fine matrix of lenses that are applied to the front of an LCD display to generate the stereographic images. To limit stereographic separation, the display continually monitors the position of the user's eyes and adjusts the lenses accordingly. It offers a usable resolution of 1200 × 1600 pixels and a stereographic image resolution of 600 × 1600 pixels. The

NEW PRODUCTS

Figure 4. The Free2C 3D display.

viewing angle is 60 degrees and the stereo cross talk is less than 2 percent.

TWO-WAY DISPLAY

Sharp has developed an LCD that can simultaneously display different image content in its right and left views (see figure 5). As with the prototype display we reported on in the July–Sept. issue, the Sharp LCD can provide different content tailored to specific users depending on the angle at which they view the screen. The display uses a superimposed parallax barrier on a standard thin-film transistor LCD to cause the light from the backlight to separate into right and left directions, making it possible to show different information and visual content at the same time. Toyota has incorporated this display into a navigation system for its special edition of the Alphard minivan, which is available only in Japan. If customers react favorably, Toyota will consider incorporating the navigation system into other models. Other possible applications include point-of-sale displays that offer information to clients on one side while revealing internal data to sales personnel on the other and advertisement monitors that tailor ads to the direction that passersby approach the display.

Figure 5. Sharp's dual-view LCD.

ULTRAPORTABLE PERSONAL SERVER

BlackDog by Realm Systems is a self-contained personal server that packs in a small form factor (0.5 × 1.75 × 3.5 inches and 1.6 oz.) a 400-MHz PowerPC processor and 64 Mbytes of DRAM (see figure 6). It also offers a built-in fingerprint reader for user authentication and a secure digital expansion slot that can accommodate up to 1 Gbyte of Flash or a 20-Gbyte hard drive. BlackDog runs Debian-based Linux with a 2.6.10 kernel. To access the BlackDog server, you simply plug it into any PC with a USB port.

BlackDog launches an X Windows System server, a windowing system for bitmapped displays, on the host PC and takes over the monitor, keyboard, mouse, and Internet connection. The

Figure 6. Realm Systems' BlackDog self-contained personal server.

users can then exploit the host's I/O devices to interact with applications running on their BlackDog or access back-end servers through an encrypted virtual private network tunnel. When BlackDog is unplugged, the host PC returns to its original state. BlackDog is powered through the host computer's USB port and doesn't require an external power adapter. BlackDog support for intermittent connectivity lets users stop writing in mid-sentence in their word processing or other application, unplug, and go. When the user plugs in at another location, the cursor will be waiting in the same place—no long boot-up required.

COMPONENTS

PROXIMITY-BASED BROADCASTING

Filter UK, a company specializing in bringing marketing to mobile devices, has developed a proximity-based broadcasting system called BlueCasting. Directional Bluetooth transmitters broadcast content to nearby Bluetooth-enabled mobile phones. If the BlueCasting server discovers a phone, it attempts to identify the phone's Bluetooth ID. If it obtains an ID, the server checks the device's transmission history and transmits tailored content to the device. This content can be a simple text message, an audio or video clip, or a Java application. When a phone receives such a transmission, unless configured otherwise, it will prompt the user to accept the download. The broadcasts can be configured using a rule-based framework, thus letting the server's owner tailor the media delivery. For example, the owner might choose to deliver a given ad every 100 times the server identifies a phone or to deliver a different ad each time it identifies the phone. BlueCasting transmitters are available in ranges of 25 to 250 meters. While BlueCasting servers currently support individual coverage (for example, in the vicinity of a billboard), Filter UK is developing versions for use in mass-audience coverage, such as sports venues. The BlueCasting system is available in the UK.

Figure 7. Filter UK's BlueCasting system broadcasts content to nearby Bluetooth-enabled mobile phones.

BIONIC ARM

Todd Kuiken at the Rehabilitation Institute of Chicago at the Northwestern Feinberg School of Medicine has developed a thought-powered bionic arm. The arm is based on a pioneering muscle reinnervation procedure that takes an amputee's nerves and connects them to a healthy muscle. Doctors take nerves that used to go to the arm and connect them to chest muscles. The nerves grow into the chest muscles and can contract the muscle when the patient thinks, for example, "close hand." Electrical signals from the chest muscles drive the arm. Surface electrodes sense these impulses from the pectoral muscle and carry them through to the arm, causing it to move. Jesse Sullivan, a high-power lineman who had both of his arms amputated after being severely electrocuted, is the first patient to be outfitted with bionic arms. The arms have enabled him to do daily activities such as put on socks, shave, eat dinner, take out the garbage, carry groceries, and vacuum. Future generations of the arm will incorporate the sense of touch and feeling.

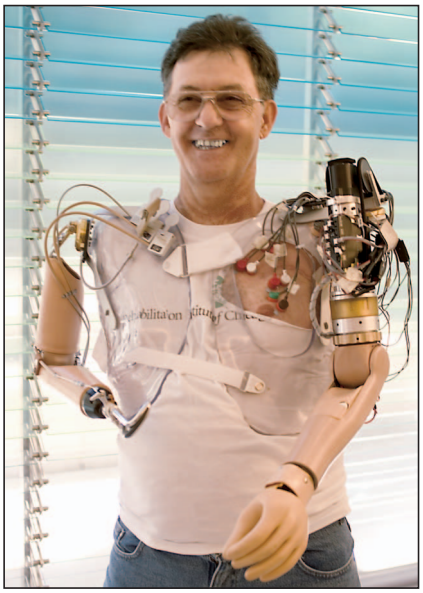

Figure 8. Jesse Sullivan is outfitted with thought-powered bionic arms, developed by Todd Kuiken at the Rehabilitation Institute of Chicago at the Northwestern Feinberg School of Medicine.