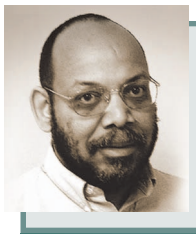

New Products

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EDITORS' INTRODUCTION

This month we review the newest version of the Microsoft Windows Mobile operating system, technology that can improve cell phone cameras' depth of field, a cell phone that reminds us that usability is an important design principle, and a new mobile computer from Nokia. We also review two research projects that offer promising technology: dual photography and a many-to-many display. 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.

—Guerney Hunt and Keith Farkas

APPLICATIONS

MICROSOFT WINDOWS MOBILE 5.0 NOW AVAILABLE

Microsoft recently released a new version of its operating system for mobile devices. Windows Mobile 5.0 introduces new features, customizations, and improvements—most notably persistent memory storage, a feature that will significantly improve the OS's usability.

Figure 1. The HTC Universal mobile computer.

This version also offers QWERTY keyboard support and landscape as well as portrait display orientation. Microsoft has also updated the Excel Mobile and Word Mobile productivity applications; the new versions let you create and view charts and edit documents with graphics. Also included is a PowerPoint Mobile application, which lets you view and rehearse presentations. Windows Mobile 5.0 includes additional support for hard drives, USB 2.0, 3G, and Wi-Fi. The OS includes Microsoft's Media Player 10 Mobile and supports digital-rights-management plug-ins. Windows Mobile 5.0 will be the basis for HTC's 3G Windows mobile computer, the HTC Universal (see figure 1). Among other features, this combined mobile computer and phone offers a built-in keyboard, a 180-degree pivot screen, and a user interface that automatically selects between portrait and landscape modes.

WHAT THE LIGHT SOURCE SAW

Stanford University and Cornell University researchers have developed a novel technique called *dual photography*, which can generate a picture of a 3D scene from the light source's viewpoint rather than the camera's. The technique uses one or more cameras and a projector that projects patterns of black and white pixels. Software analyzes the light patterns the cameras observe to determine the complete set of light paths between the projector and the cameras. So, by positioning a projector incident to the face of a playing card hidden from the camera's view (see figure 2) and a camera incident to the book's cover page, you can determine the card's face. In addition, because the technique identifies the complete light transport between the projector and the camera, you can use it to relight the scene using a synthetic light source. With additional cameras, you can obtain the com-

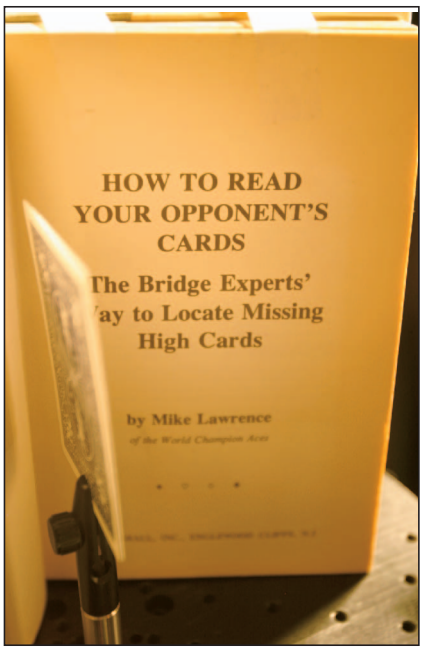

Figure 2. By positioning a projector incident to the face of a playing card and a camera incident to the book's cover page, you can determine the card's face.

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plete light transport of the scene, letting you relight it with arbitrary light sources and synthetically change the perspective. Furthermore, you can introduce synthetic objects into the scene and light them accordingly. While other techniques exist for such alterations, dual photography has the potential to do them much faster.

COMPONENTS

BETTER DIGITAL PHOTOS

In late April 2005, OmniVision Technologies acquired CDM Optics, bringing together a major supplier of CMOS-based camera chips and technology that can increase a digital camera's depth of field without using moving parts. CDM Optics is the exclusive licensee of Wavefront Coding, developed by the cofounders of CDM Optics. CDM Optics' technology provides a mechanism to encode the light rays that form an image, which a special surface captures at the optical system's focal point. The technology digitizes and modifies the encoded light rays to improve optical performance or provide ranging information. One type of modification allows extension of the depth of field at large apertures, facilitating the design of camera chips that use signal processing rather than optomechanical mechanisms to focus the camera. Another allows correction of aberrations, while a third lets the camera sensor provide a passive ranging of objects in the image (figure 3 shows an existing OmniVision sensor). OmniVision expects to start selling camera chips with the Wavefront Coding technology in 12 to 18 months.

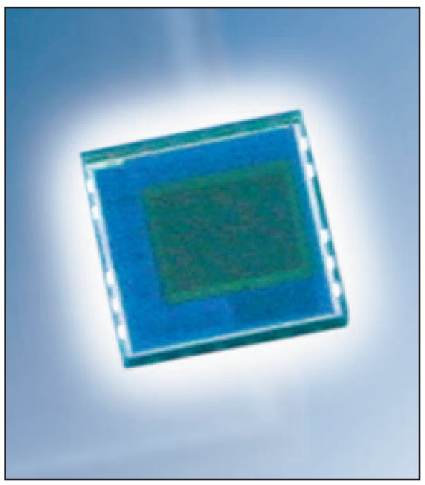

Figure 3. Existing OmniVision sensor (1/7″ lens size).

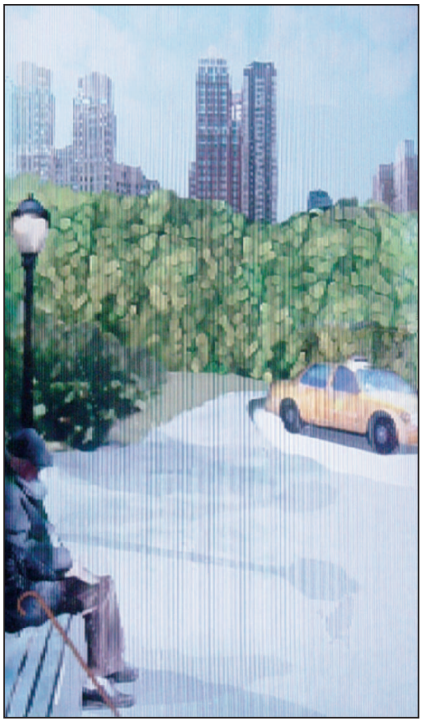

Figure 4. A many-to-many display using a lenticular lens.

MANY-TO-MANY DISPLAY

Addressing the need for a display that can simultaneously provide multiple views to multiple viewers, Jeremy Newton, a New York University student, demonstrated in his master's thesis how to build a many-to-many display using a lenticular lens (see figure 4). A lenticular lens is a plastic lens comprising an array of optical elements, called *lenticules*. These lenses, used to flip images on items such as trading cards, magnify a different area of the underlying image when viewed at different angles. Newton's prototype positioned a lenticular lens over an LCD driven by a laptop on which two scenes were interlaced and precisely aligned with the lenticular lens. Newton coupled a microphone and camera to the laptop to make the scenes interactive. Although the multiple images were somewhat pixilated in the prototype, the trend of increasing dots per inch for LCDs could allow future use of finer lenticular lenses or other techniques, yielding higher-quality images.

DEVICES

SIMPLE MOBILE PHONES

Reminding us that simplicity is an important design attribute of any pervasive device, Vodafone recently launched a new series of simple-to-use mobile phones. Vodafone conducted research that indicated a customer desire for phones without many of today's mobile-phone features and with large, clear screens, simple service plans, and built-in help messages. Working with Sagem, Vodafone developed the Vodafone Simply Sagem VS1 and VS2 (see figure 5). Both phones offer large screens with legible text and symbols (with accompanying text), three dedicated buttons (for main menu, contacts, and messages), a dedicated volume button, and a key

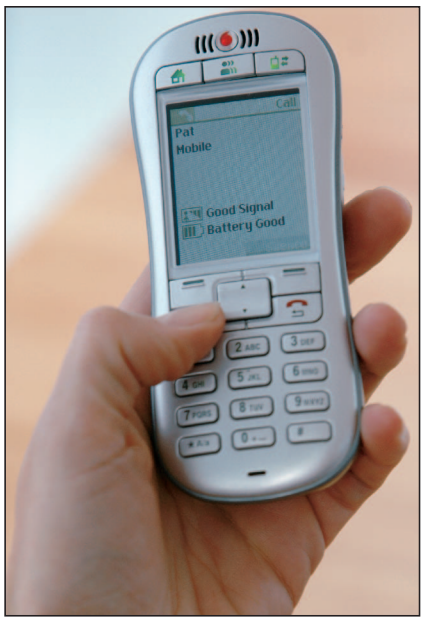

Figure 5. The Vodafone Simply Sagem VS1 mobile phone.

Figure 6. The Nokia 770 Internet Tablet pocket computer.

lock switch. The message button lights up when the phone receives a call or text message; the user only has to press the button to listen to or read the message. If you miss a call or a caller doesn't leave a message, the phone gives an on-screen notification. The phones will reportedly be available in Q2 of 2005 and have a four-hour talk time and a 320-hour standby time.

INTERNET TABLET

Nokia has introduced the Nokia 770 Internet Tablet, a pocket computer with a four-inch diagonal 65K thin-film transistor touch-screen display and a resolution of 800 × 480 pixels (see figure 6). The device is based on Linux, for which an update is due for release in the first half of 2006, supporting Voice over IP and instant messaging. Moreover, Nokia has a specialized site for those wishing to develop applications for the Internet Tablet (www.maemo.org). The computer includes 802.11b and 802.11g radios, Bluetooth 1.2 connectivity, a USB port, a reduced-size multimedia card expansion slot, and applications including an email client, a Web browser, Internet radio, a media player, and an Adobe Acrobat viewer, which users interact with using the touch screen. The device uses a Texas Instruments ARM processor and has 64 Mbytes of RAM and approximately 64 Mbytes of flash memory. It measures 141 × 79 × 19 mm and weighs 230 g. It has an in-use battery lifetime of three hours and a standby battery lifetime of seven days. It will be available in Q3 of 2005 in select countries in the Americas and Europe.