

THOMSON
COURSE TECHNOLOGY

11th Edition

Understanding Computers

TODAY AND TOMORROW

DEBORAH MORLEY
CHARLES S. PARKER

New Expert Insights
from Industry Leaders!

COMPREHENSIVE

TREND

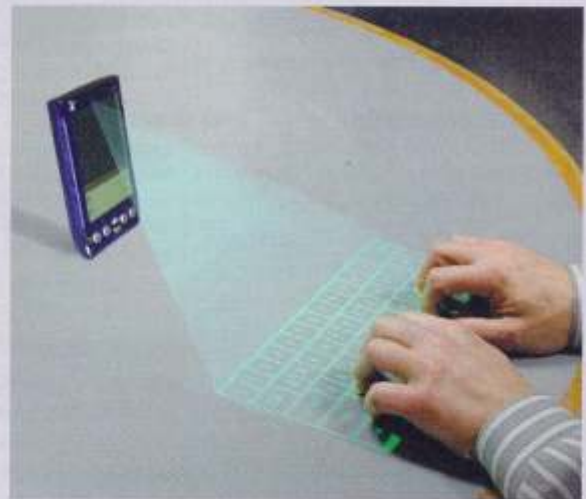
Virtual Input Devices

There is an ongoing trend to continue to make input methods and devices easier and more natural to use. Voice recognition is one strong possibility. Other possibilities include more *virtual*, less physical, devices that use projections or gestures instead of more conventional methods of input.

One emerging input device being developed for use with portable PCs and mobile devices is the *virtual keyboard*. A virtual keyboard uses a projector and camera—the projector projects a keyboard image onto a flat surface and the camera translates motion on that projected image back to the computer as input. Virtual keyboard capabilities are expected to soon be built into cell phones, portable PCs, and other portable devices to allow input via a standard keyboard layout without requiring actual keyboard hardware (see the accompanying photo). A related emerging application is the use of projected images for consumer kiosks. Instead of requiring floor space, kiosk images are displayed on a wall or the floor using a wall-mounted projector and a camera tracks the user's interactions with the projected images as input.

Other possibilities for the future are *gesture-based input devices*—input devices that are controlled by gestures, such as hand movements. One example of a gesture-based input system is the EyeToy system used with some Sony PlayStation games. This system uses a special video camera in conjunction with software to enable the player to control the game using only body movements. For computer input, some companies are working toward a noncontact gesture interface, similar to the one used by Tom Cruise's character in *Minority Report* to

change the images on his display by just gesturing with his hands. Although such an interface might be far in the future, more than one company has already developed a *motion-controlled* interface for mobile devices, in which users can rotate a smart phone or other device to change the orientation of the display image, tip the device forward or backward to zoom in or out, tip the device left or right to change songs on a music playlist, tilt the device to scroll, and more, allowing the user to operate the device with one hand. One interface even enables users to "write" in the air with the phone and have the phone recognize and input the letters or numbers being written.



A virtual keyboard.

While most mice sold with PCs connect via a serial, USB, or PS/2 port on the computer's system unit, *wireless mice* are also available. Similar to wireless keyboards, wireless mice are powered by batteries and communicate wirelessly with the system unit via a receiver plugged into the computer. Conventional, wireless, and small travel mice can all be used with desktop, notebook, and tablet PCs, as desired, as long as an appropriate port is available.

For a look at emerging *virtual input devices*, see the Trend box.

> **Electronic pen.** An input device that is used to write electronically on the display screen; also called a **stylus** or *digital pen*.