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Increasing Your Security: Fingerprint Readers and Facial Recognition

One of the issues faced when dealing with an ever-increasing number of personal computing devices, and software applications on those devices, is security. When we access an application or an online service, we want to ensure that the system knows who we are and that there is no chance of others stealing our identity or our data. Although there is no such thing as absolute security, we can apply some techniques to safeguard our security and our privacy. These techniques typically fall into access control, authentication, and encryption. The username and password has been the mainstay for authentication, but for sensitive applications, it can be insufficient as the only security mechanism.

Recent techniques for improved authentication include what is known as biometrics. These offerings support the recognition of a variety of human physical attributes such as voice recognition, facial recognition, fingerprinting, hand geometry, and iris recognition. As we conduct more and more of our personal and business time online, these improved authentication offerings can help us feel more secure

about using these applications and services and conducting electronic transactions.

Facial recognition and fingerprinting are two of the most widely deployed biometric techniques currently available for consumers and businesses. Companies in the facial recognition field include Viisage Technology and Identix. On the fingerprinting side, a number of hardware companies, including Compaq, Key Tronic, Targus, Toshiba, and Identix, make readers. By adding these low-cost devices to your list of personal computing accessories, you can substantially increase your level of protection from unwanted access.

How It Works

Viisage's technology was originally developed at Massachusetts Institute of Technology and translates facial characteristics into a unique set of numbers that they refer to as an "eigenface." Their technology can be applied for one-to-many identification processes that search large databases of millions of faces for a rapid match within seconds. It can also be applied for one-to-one verification of identity processes such as verification at automatic teller machines. Viisage has the world's largest installed facial recognition database of over seven million images. Their current customers include federal government agencies; casinos; and local and state police, corrections, and social services departments.

Identix offers a number of biometric solutions including their FingerPrinter CMS live-scan fingerprinting system and FaceIt face-recognition technology. Within the public sector, the FingerPrinter CMS system can capture, print, and transmit fingerprints electronically to the Office of Personnel Management, where they are submitted for searching against the FBI's Integrated Automated Fingerprint Identification System database. The system can be used for a variety of background investigation purposes. For example, the Transportation and Aviation Security Act of 2001 mandated fingerprint background checks on all airport employees by the end of October 2002. A number of airports, including Los Angeles International Airport, have adopted the Identix FingerPrinter CMS systems for this purpose. The FaceIt face-recognition technology has been deployed in casinos, soc-

cer matches, and town centers, and the U.S. Army military police has used it as part of a wearable, hands-free, facial surveillance system.

Biometrics is also starting to find more mainstream applications. IBM offers the FaceIt face-recognition software when customers purchase their UltraPort Camera for ThinkPad A, T, or X Series laptops. The software is part of a screensaver that can restore access to the laptop when the authorized face appears in view of the camera.

On the fingerprint side, Targus makes a fingerprint authenticator that can be plugged into the Universal Serial Bus (USB) port of a desktop or notebook for improved authentication. Other manufacturers, such as Compaq, Identix, Key Tronic, and Toshiba, offer fingerprint readers that use PC cards or can be plugged in to your parallel port. Plate 5 shows an example of the Identix BioTouch PC Card Fingerprint Reader.

Benefits

These types of systems are relatively inexpensive and provide a higher level of security for your computing devices, whether they are desktops, laptops, or personal digital assistants. This is because the strongest form of authentication occurs when systems combine techniques in order to achieve what is known as "three-factor" authentication. This technique combines what a person knows (such as a username and password) with what they have (such as a hardware key fob) and who they are (obtained via biometrics).

However, not all security applications require this three-factor authentication or even a two-factor authentication. Facial recognition by itself can be applied to a wide variety of scenarios ranging from the identification of known criminals in public spaces like airports and shopping centers to being used as part of a broader verification mechanism for high-security corporate or government applications. If you want to move beyond one-factor authentication using just a username and password, the best bets are either to add a hardware key-fob, which comes with many virtual private networking products such as RSA SecurID, or to add biometrics.

Features and Considerations

If you're looking for a personal security solution for your various computing devices, look for something that you will use on a regular basis. If you buy something that is too large or too heavy to carry around in your laptop case, the likelihood is that you won't use it. Many vendors offer PC card fingerprinting systems that simply slot into one of your PCMCIA slots on your laptop. The reader actually pops out when you're ready to be authenticated and can be pushed back into the slot when you're finished. These devices typically work on Windows operating systems such as NT 4.0, 95, 98, and ME.

Contact Information

Compaq, *www.compaq.com*

Identix, *www.identix.com*

Key Tronic, *www.keytronic.com*

Targus, *www.targus.com*

Toshiba, *www.toshiba.com*

Viisage Technology, *www.viisage.com*

15

In-Car Safety and Security: OnStar

One of the first words that comes to mind when we think about in-car safety and security is OnStar. The company is a wholly owned subsidiary of General Motors and is the nation's leading provider of in-vehicle safety, security, and information services using the Global Positioning System (GPS) satellite network and wireless technology. The service was launched in fall 1996 and is now available on all Cadillacs, Buicks, Saabs, and Saturns, all GM minivans and sport utilities, and a large range of midsize sedans from Chevrolet, Pontiac, and Oldsmobile. In fact, for 2003, GM is offering OnStar services in 44 out of its 53 models. OnStar currently has over 2 million subscribers and has handled over 10 million responses since 1996.

The service provided by OnStar includes automatic notification of air bag deployment, stolen vehicle location, emergency services, roadside assistance with location, remote door unlock, remote diagnostics, route support, OnStar concierge, and convenience services. Two additional services, introduced in 2001, include Personal Calling, which provides hands-free, voice-activated phone calls, and Virtual Advisor,

which provides access to personalized Web-based information in a hands-free, voice-activated manner. We'll look at Personal Calling and Virtual Advisor in more detail in the following section on in-car information and entertainment, but for now we'll focus on the safety and security aspects of the service.

How It Works

The OnStar service works by combining GPS satellite and wireless technology with personal assistance from OnStar advisors. The advisors work in the OnStar Center, which runs 24 hours a day, 365 days a year. In situations such as an air bag deployment, an advisor is automatically notified and will call you in your car to see if you need help. If you don't respond, they'll immediately dispatch emergency assistance to your vehicle and provide them with your vehicle's exact location.

Inside a vehicle equipped with OnStar, all you'll really notice from the front seat are the three buttons located just below the rear-view mirror, on the overhead panel, or mounted on the dashboard (Figure 15-1; Plate 9). These buttons are the blue OnStar button for connecting to the OnStar Center, the red emergency button for emergencies, and the white dot button for OnStar Personal Calling or for access to the Virtual Advisor service.

Once activated, the buttons all work in a hands-free manner. An integrated microphone picks up your voice, and an OnStar advisor can speak to you through your audio system speakers. There are no displays that could distract you from driving.

Sample Scenario: In Case of Accident

1. Driver presses OnStar red emergency button, or OnStar is automatically notified in the event of an air bag deployment.
2. An OnStar advisor is notified at the OnStar Center via a wireless call from your vehicle.
3. Advisor calls you in your car to see if you need help.
4. If you request assistance, or if you don't respond, OnStar advisor dispatches emergency assistance to your vehicle.
5. Your exact location is determined by GPS positioning, which is part of the OnStar service.

Figure 15-1   OnStar Service (Source: OnStar).

Benefits

The benefits of the OnStar service over traditional mobile phone usage for emergency or roadside assistance calls are obviously safety and ease-of-use. Pushing one button is a lot safer than fumbling for a mobile phone and trying to dial for help in the event of an emergency.

The GPS satellite technology means that the OnStar advisors will know exactly where you are and will be able to remotely unlock your car doors or remotely perform diagnostics on your vehicle as necessary. The automatic notification in the event of an air bag deployment is another benefit to the system. The stolen vehicle tracking feature means that OnStar can inform the proper authorities of your car's whereabouts in the event of theft. Roadside assistance and accident assistance are two other features that can also help to bring added peace of mind.

The OnStar MED-NET service allows authorized medical personnel access to your personal medical history so that they can get infor-

mation such as your physician's name, your blood type, allergies, and medications. This information is kept secure and confidential and is made available only in an emergency.

Features and Considerations

One of the considerations when evaluating the OnStar service is the type of package you want to select. Three packages are offered based on your interests. The Safe & Sound Plan offers the safety and security features, the Directions & Connections Plan offers everything in the prior plan plus some informational services, and the Luxury & Leisure Plan offers everything in both prior plans plus concierge services. The Personal Calling and Virtual Advisor offering are available with all three plans.

According to OnStar, the Safe & Sound plan costs $199 per year or $16.95 per month. The Directions & Connections plan costs $399 per year or $34.95 per month. Luxury & Leisure costs $799 per year or $69.95 per month. Signing up for a two-, three-, or four-year plan will lower those yearly payments.

Safe & Sound Plan	Directions & Connections Plan	Luxury & Leisure Plan
• Automatic Notification of Air Bag Deployment • Emergency Services • OnStar MED-NET • Roadside Assistance • Stolen-Vehicle Tracking • AccidentAssist • Remote Door Unlock • Remote Diagnostics • Online Concierge • Remote Horn and Lights	• Safe & Sound Plan plus: • Route Support • RideAssist • Information / Convenience Services	• Directions & Connections Plan plus: • Concierge Services

Contact Information

OnStar Service

OnStar, *www.onstar.com*

OnStar Subscriber Assistance, 1-888-4-ONSTAR

OnStar General Information, 1-800-ONSTAR-7 (1-800-667-8277), or visit your nearest General Motors Dealer.

OnStar Availability

Buick	Chevrolet	GMC	Oldsmobile	Saab
Century	Avalanche	Envoy	Aurora	9-3
LeSabre	Impala	Envoy XL	Bravada	9-5
Park	Monte Carlo	Sierra	Intrigue	
Avenue	Silverado	Sierra Denali	Silhouette	**Saturn**
Regal	Surburban	Yukon		VUE
Rendezvous	Tahoe	Yukon Denali	**Pontiac**	
	TrailBlazer	Yukon XL	Aztek	
Cadillac	TrailBlazer EXT	Denali	Bonneville	
CTS	Venture		Grand Prix	
DeVille		**Hummer**	Montana	
Eldorado		H2		
Escalade				
EXT				
Seville				

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Tracking the Kids: Wherify GPS Personal Locator

H ave you ever wanted a way to track your kids? A LoJack for kids perhaps? Well, this very type of device is on the market today. Wherify Wireless makes a GPS personal locator for children that is a wearable tracking device (Figure 18-1; Plate 12). Kids wear the device around their wrists, like a wristwatch, and parents can track them by either calling a telephone number or using the Internet. The locator relies on GPS technology for position determination plus a wireless network for transmission of that location information to the Wherify location service center. Beyond being a locator, the device also functions as a pager and a watch. The device is designed for children who are four to twelve years old and comes in two colors and two wrist sizes.

Figure 18-1 Wherify Wireless GPS Personal Locator (Source: Wherify).

How It Works

Sample Scenario: Locate Function

1. Go to WherifyWireless.com, enter your user ID and security code, and click on Locate.
2. Click on Locator Functions.
3. Select the locator (the device you want to track).
4. Select an action to perform (this can be Perform Locate, Perform Breadcrumb, View Location History, or Send Page).

To locate someone wearing the device, Wherify provides two options. You can either call a special telephone number provided by Wherify when you sign up for the service, or you can use the Internet.

For the Internet option, you go to WherifyWireless.com and log in as described in the sample scenario. A series of menu options allow you to perform various locator functions on the device. If you select Perform Locate, you can view your child's location on either an aerial-photo-style map or on a traditional street map. A Locate means that the device is requested to take a GPS position fix and send that information over the wireless network back to the Wherify location service center, where it is made available via phone or the Internet; you're basically using remote control to request the device to take a position fix and send it back to you. This locate process typically takes about one minute to complete. On the Web page, zoom features allow you to pinpoint your child's location on the aerial map or the street map. The nearest street address, along with the date and time that the location fix was taken, is provided as part of the Web page.

A View Location History feature allows you to view a group of prior locates on the aerial map or street map. The system allows you to view up to 30 days of prior data that has been captured. A Perform Breadcrumb feature allows you to perform periodic, automatic locates instead of having to initiate each one manually. Finally, a Send Page feature allows you to page your child on his or her device by sending a short text message.

The device itself is lockable to ensure that it won't get lost, and is also tamper and cut-resistant to make it harder to be removed forcefully. The device can be unlocked remotely either over the phone or over the Internet. A button on the device can be pressed in order to lock it, and a key fob can be used to lock or unlock the device in a manner similar to the way you lock and unlock your car.

Benefits

Obviously, the main benefit of this device is that it helps ensure your child's safety. With a variety of features on the device, you're able to locate people remotely and allow them to send out their own distress signals in case of emergency. The user can simply press two buttons on the locator simultaneously for three seconds to have their location and direction passed on to the Wherify emergency operators. Once

they have validated the emergency, they can dispatch local authorities directly to the wearer's location. In this regard, the device functions much like the emergency call button on the OnStar system that we looked at in an earlier profile.

Features and Considerations

If you're contemplating this type of device for your children, there are a number of things to consider. If the cost and monthly service fee are not an issue, then the next consideration is whether or not your kids are willing to wear the device, and then how effective and reliable it will be in everyday use. Wherify seems to have thought about most of the practicalities concerning the use of these devices by young children. For example, if you are worried that your young child may accidentally set off the emergency response request, you can deactivate this feature as part of your preferences setup on the Internet. If someone tries to cut or tamper with the wrist band when the device is in locked status, an alarm will be activated at the Wherify location service center. The device is water resistant, but should be removed for swimming.

The only apparent weakness for the device, in terms of its reliability in case of emergency, appears to be the wireless network coverage itself. This, of course, is an issue even with standard wireless phones. If the device is inside a building or in a poor wireless coverage area, it may not be able to send a locate request back to the location service center. The wireless connection is a vital part of the entire solution; without it, the service does not work. Another consideration is battery life. The built-in battery enables the device to work for close to 60 hours of standby time, and to perform up to about 40 locates when fully charged.

If you intend to purchase this or a similar device, check that you have good cellular coverage in the areas where your child typically frequents. Wherify provides a way to check for coverage by inputting your zip code on their Web site. You'll also want to spend some time training your child on how to use the device and ensure that you have the discipline to keep the device regularly charged. Although it is obviously not a guarantee of safety—and should not be used to leave

your child unattended or as a virtual babysitter—this service can provide vital information about your child's location in the event that they require assistance.

The GPS Personal Locator sells for $399.99 plus a monthly service charge. The monthly charge is for the wireless service to the device plus the various locates, pages, and remote unlocks that you perform. A variety of plans offers varying numbers of locates and pages per month. For example, the base plan offers up to 20 locates and pages per month, whereas the highest level plan offers up to 80. If you go over the limit for these locates and pages, you pay a per-use fee, which is typically under a dollar. Live operator-assisted locates, pages, remote unlocks, or 911 panic alerts are charged at a higher fee of $5 to $15.

Contact Information

Wherify Wireless, *www.wherifywireless.com*

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Digital Video Recording: TiVo, ReplayTV, and UltimateTV

D igital Video Recorders (DVRs) are the digital equivalents of VCRs but without the tapes. They work by storing the programming on a digital hard disk inside the unit instead of on video cassette tape. These digital hard disks often can store up to 80 hours of programming, thus eliminating the need for a large number of bulky cassette tapes.

Being digital, they are capable of much more functionality than a traditional VCR. They can record live television just like a normal VCR, but they can also pause, rewind, slow-motion, and instant replay live TV. What's more, they have advanced features for recording content based upon your favorite actor, director, genre of show, keywords, or show titles.

For example, if you want to skim through the commercials in a 60-minute "live" program, you can sit down 20 minutes past the start time and then use the remote control provided with the unit to skip through the commercials (already recorded on disk) at a variety of

fast-forward speeds. By the end of the show you will have caught up to the "real" live portion of the program.

On the content side, you can set up the DVR to record your favorite shows every week, even if the time slots change from one week to the next or from one show to the next.

How It Works

DVRs work by plugging into your television in much the same way as a VCR system. They can work with a variety of setups, including TV antennas, digital or analog cable systems, and satellite systems for the input video signal. They may also use your regular telephone line in order to download daily programming information for advanced recording functionality.

The DVR units themselves look much like traditional VCR units but have additional outlets in the back of the device for the phone line connection and ports such as Ethernet for broadband Internet connectivity. The audio/video ports are used for connection to your television and for optional VCRs, camcorders, and microphones which can be connected as necessary.

In addition to your DVR, a standard VCR system can be a useful additional device for storing your video content. Once you have recorded a show, you can either save it for a certain time on the internal hard drive of the DVR or you can transfer it to a normal video cassette for more permanent storage if you have your VCR system attached. Content management on the DVR itself is simple since to delete a show and free up your hard drive space you simply press a button on your remote control.

Benefits

The benefits of a DVR over a traditional VCR include convenience and higher levels of personalization in terms of the content that is recorded. The convenience comes from the elimination of VCR clutter

in terms of the physical tapes and the speed with which you can move through your recorded programming. An additional benefit, not found in VCRs, is the ability to watch a prerecorded program while your DVR is recording a live program. You may also be able to set parental controls, lock certain channels, or set ratings limits on programs. If you live with young children, this latter feature could be a strong plus.

Finally, for those of us who have struggled in the past with setting VCR timers to record shows, or whose parents or relatives have had these epic battles, the DVR technique for accomplishing the same objective is far simpler. You simply select your shows at the touch of a button—no clocks or timers to worry about!

Features and Considerations

There are typically two costs involved when purchasing a DVR. First, you have the one-time cost of the unit itself. These usually range $199 to $599, depending upon the manufacturer and the amount of hard disk storage capacity you decide to purchase. Second, there is the monthly service fee, which allows you to receive the daily programming updates over your phone line in order for the service to be highly accurate when searching for your preferred content.

These daily phone calls are made automatically by the DVR and do not interfere with your incoming or outgoing calls. You can use a standard phone line, and most DVRs come with an RJ-11 phone jack for easy connection. Monthly service fees are usually around $12.95 per month.

The TiVo DVR Series2 includes two USB expansion ports for future support of other forms of digital content from devices such as digital cameras, MP3 players, Internet radio, or even from other TiVo DVRs (Plate 27). The service is available in the United States and in the United Kingdom.

If you're a DIRECTV customer, there is a DIRECTV Receiver available that includes the TiVo unit built-in. This way, you have the functionality of both devices rolled into one convenient box. Another

advantage of this box is that you can record two shows at once and even watch a third prerecorded show, because the unit has a dual tuner feature.

Two other DVR products and services are the UltimateTV service from Microsoft and the ReplayTV service from SONICblue. The ReplayTV DVR features up to 320 hours of recording space. Since all of these products have different features and capabilities, the best way to make a comparison is to visit the various product Web sites listed below and to read some of the product comparisons.

Contact Information

Manufacturers

SONICblue, *www.replaytv.com*

TiVo, *www.tivo.com*

UltimateTV, *www.ultimatetv.com*

Retailers

Abt Electronics (U.S.), *www.abtelectronics.com*

Amazon.com, *www.amazon.com*

AT&T Broadband, *www.attbroadband.tivo.com*

Best Buy, *www.bestbuy.com*

Circuit City, *www.circuitcity.com*

DIRECTV, *http://directv.tivo.com*

Good Guys, *www.goodguys.com*

Tweeter, *www.tweeter.com*

Ultimate Electronics, *www.ultimateelectronics.com*

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Simplifying Convenience Payments: ExxonMobil Speedpass

I f you've ever wanted to fill up your car or truck with gas and make convenience-store purchases in a hurry, lines at the cash register and fumbling for change or for credit cards can be a real hassle. The ExxonMobil Speedpass can help you avoid many of these situations. It automatically links to a standard credit or check card that you specify during enrollment and allows you to make payments for gas and other convenience-store items. The Speedpass system uses a 1.5-inch tag that attaches to your key ring. It uses radio frequency identification (RFID) technology to communicate with a special reader mounted in the gas pump or near the cash register. To make a gas purchase, you simply wave the Speedpass tag at a reader on the pump, and then you're authorized to begin fueling. What could be simpler?

The interesting thing about the Speedpass system, and about RFID tags in general, is that they are starting to be utilized for customer identification to enable an even wider variety of convenience payments. The ExxonMobil Speedpass can also be used for making car wash payments at company stations in the Chicago and Orlando

Figure 32-1   Speedpass key tag (Source: Exxon Mobil Corporation).

area. At McDonalds, Speedpass can be used at more than 400 locations in the greater Chicago area (Plates 31 and 32). In addition, Stop & Shop Supermarkets will accept payments using the Speedpass and is linking its loyalty-card program to the Speedpass. This means that Stop & Shop customers gain all the discounts and rewards by using the Speedpass that they would by using their normal loyalty card within the store. Finally, Speedpass is also testing a Timex watch that contains a built-in tag. The watch can be used instead of the Speedpass key tag to make gasoline purchases and at the checkout counter or drive-through window at select McDonalds restaurants in the Chicago area.

How It Works

The Speedpass system uses radio frequency identification (RFID) technology from Texas Instruments. The tag is actually a computer microchip that stores a unique identification code. When the tag comes within the proximity of a reader, it is energized by the radio frequency transmitted by the reader and transmits its unique code back to the reader. No personal or financial information is stored on the tag, so there is no risk of interception while the tag is in use. If the tag is lost or stolen, however, you will need to immediately report it to ExxonMobil in much the same way that you would report a lost or stolen credit card. Transactions appear on your credit card statement in the same way that they appear for other merchants.

To sign up for the Speedpass, you can go to the Speedpass Web site and enter your name, contact information, and a suitable credit or check card for ExxonMobil to link with your account. At the time you submit your request, you can also select whether to have a receipt at the time of purchase, to not have a receipt, or to select a receipt on a case-by-case basis. This preference-setting at the time of registration helps to ensure a rapid transaction at the pump or at the checkout counter; the system knows your preferences and can act accordingly.

Sample Scenario: Purchase

1. Request and obtain the Speedpass key tag and/or car tag either online or via phone.
2. Once you have received the key tag and/or car tag via mail, call 1-877-696-6245 to activate your tags by using an automated system. You'll be prompted to enter your credit card number that you have associated with the Speedpass, plus your five-digit zip code.
3. If using a car tag, mount the tag in the lower inside area of your vehicle's rear window on the side nearest to the fuel door.
4. Pull up to a pump at a participating Exxon or Mobil gas station.
5. Wave the Speedpass key tag in front of the "Place Speedpass Here" panel, or drive up so that the car tag is within three feet of the pump in order to light up the Speedpass circle on the pump.
6. Select a fuel grade and begin fueling.
7. Once you've finished fueling, you can collect your receipt and be on your way

Benefits

One of the main benefits of the Speedpass is simply convenience. The Speedpass enables you to take the hassle out of fueling by allowing you to avoid the line at the cash register and to avoid having to search for a credit card to swipe at the pump. During the winter months, particularly in northern climates, this can be highly beneficial because you spend less time out in the cold and more time driving.

Beyond gasoline payments, the RFID technology in the Speedpass and similar systems promises a new level of convenience for making

purchases and is ushering in a new era in wireless commerce. Although this new approach is a simpler way of making payments, it's still vital to safeguard your tags and treat them as you would treat credit cards and cash.

The Speedpass system is particularly convenient at restaurants such as McDonalds. As you go through the drive-through, you can order your meal, pull up to the payment window, check your total, and then wave your Speedpass at the McDonalds logo on a special board placed just outside the window. This is much faster than fumbling for the right amount of money or waiting for change.

Features and Considerations

Speedpass is available in two varieties: a key tag and a car tag. If you elect to use the car tag, you can mount it on the rear window of your car on the same side as your filling cap. The car tag uses the same RFID process as the key tag and communicates wirelessly with the reader in the pump. One of the considerations to bear in mind when using the car tag is that you must place the tag in a position where the pump can read it; the tag must be within three feet of the pump for it to work. If the filling cap is at the back of your car by your license plate, you'll want to attach your tag to the bottom of the car's rear window. If the filling cap is toward the front of your car, you'll want to attach the tag to the bottom of the car's windshield. The main idea is to ensure that the tag comes into range of the reader on the pump when you pull up to fuel. Be sure that the tag is positioned on the correct side of the vehicle so that it is as close as possible to the reader when you fill up. If the tag is beyond the working range of the reader, your purchase cannot be authorized. Just watch for the red Mobil pegasus logo or the Exxon tiger logo to light up, and you know that you're within range; this happens as soon as you pull up next to the pump, and the light stays on until you replace the nozzle in the pump when you've finished fueling.

If you have trouble getting the Speedpass to work at the gas station, the cause is most likely one of the following reasons: The Speedpass is not activated, your credit or check card may have passed its expiration date, or the key tag or car tag is not pointed properly at the reader.

In terms of the life expectancy of the tags, the key tags themselves are passive devices that never expire because they are energized by the RFID readers in the pumps. The car tags, which are active devices with an internal battery, last three to five years, according to ExxonMobil.

One of the current drawbacks to Speedpass is that it has limited availability with regard to the types of retailers supporting it for wireless payments. You can use it only at ExxonMobil stations and some select restaurants, such as McDonalds. For price-conscious consumers, this may be a disadvantage because some of the lower-cost gas stations do not offer such a service and do not support Speedpass. In the end, you're making a decision between price or convenience. As the Speedpass becomes more widely available, however, it will become more beneficial for the average consumer and will definitely become a better way to pay!

Contact Information

Speedpass, *www.speedpass.com*

Speedpass Service Center, 1-877-696-6245

Business Speedpass Account, 1-87-SPEEDPASS (1-877-733-3727)

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Your Own Personal Robot: Honda ASIMO

P erhaps the ultimate consumer gadget that most people can imagine is a personal robot—a domesticated robot that can help around the house by doing chores and can also be a long-term companion simply for entertainment. We've seen precursors for the personal robot appear in the entertainment arena to simply have fun and in the utility arena to help you simplify your life. For entertainment, we've seen robotic pets such as the Tekno robotic puppy, Sony's AIBO robot puppies, and the well-known Furby pets. On the utility side, for practical assistance in and around the home, we've seen robotic vacuum cleaners such as the Roomba from iRobot and the DC06 from Dyson, and lawn mowers such as the Toro iMow and the Husqvarna Auto Mower.

All these early generation robots provide a glimpse into how personal robots may be able to serve us in the future. Another interesting and more humanlike robot is the ASIMO from Honda (Figure 45-1; Plate 15). ASIMO stands for Advanced Step in Innovative Mobility and was conceived to operate inside a typical home. The ASIMO

Figure 45-1   Honda ASIMO robot (Source: Honda).

robot is 1.2 meters in height, 43 kilograms in weight, and looks like a child wearing a spacesuit. In this profile, we'll take a look at ASIMO as an example of the current state of the art in personal robots.

How It Works

ASIMO, which first appeared in late 2000, is a successor to prior robotic prototypes from Honda called the P2 and P3, which debuted in 1996 and 1997, respectively. It is a working two-legged robot engineered to operate inside the home and designed to be easy to operate and user friendly. By creating ASIMO, Honda tackled and solved some of the complexities of autonomous walking using an intelligent,

real-time, and flexible design. Even simple things like getting a robot to be able to walk on carpet, turn around, or walk up and down stairs can be quite a challenge for designers. So, before getting to the complexities of actually doing real work on behalf of humans, some of these more mundane challenges had to be solved so that the robot of the future will be able to move around with ease in a typical home. For example, the P2 and P3 robot predecessors to ASIMO actually used stored walking patterns, whereas ASIMO can actually change its foot placement, stride length, and turning angle in real time based upon the feedback it receives from various sensors.

In addition to being able to walk with humanlike foot-and-leg articulations, the robot has humanlike joints for the head, arms, and hands. Its height allows it to operate light switches and door knobs and to communicate at the eye level of a sitting adult. The childlike size makes it less intimidating than having a six-foot-plus robot staring down at you.

In terms of functionality, ASIMO can be operated from a portable controller and can be requested to make a variety of movements by pushing buttons on the controller. These movements include familiar gestures such as grasping to shake hands, waving with both hands, waving goodbye, and responding with a bow.

A speech feature provides the robot with the ability to recognize and respond to 50 different calls and greetings in Japanese, and to move its body and arms to respond to thirty different action commands also spoken in Japanese.

Benefits

In the future, the benefits of robots such as ASIMO and its successors may well be the ability to perform a range of daily tasks to help humans around the home. For now, ASIMO is being used as a prototype to demonstrate its functionality and as an amusement for businesses and museums to rent as a personal greeter for their various events. The robot rang the opening bell of the New York Stock Exchange on February 15, 2002 to mark the 25th anniversary of

Honda Motor Company's listing on the exchange, and is also working as a receptionist for visitors at Honda's Aoyama Headquarters.

Robots are already proving themselves invaluable for conducting a range of military and scientific functions, such as helping to defuse unexploded bombs, helping to explore inaccessible areas within the ancient pyramids, or in undersea exploration and salvaging operations. In the home, the initial wave of robots are serving as amusing toys or are helping us vacuum the house or cut the lawn. In the future, these domestic applications may move from a curiosity for enthusiasts into more mainstream usage as their price point drops and their functionality increases.

Features and Considerations

Although humanoid robots may be too expensive for most people to own rather than rent, many of the utility-type robots, such as the robotic vacuum cleaners and lawn mowers, are definitely within reach. The Roomba Intelligent FloorVac, as it is called, can be purchased for a mere $199.95 from stores such as Brookstone, Hammacher Schlemmer, and Sharper Image (Plate 16). The Toro iMow Robotic Mower can be purchased for around $499 from a variety of retail locations, including certain Ace Hardware stores. If you want to try building your own robot and experiment with various scenarios, Lego offers a number of products under their Mindstorms range. Their Robotics Invention System includes a microcomputer together with CD-ROM software, numerous Lego elements, motors, touch sensors, and a light sensor and infrared transmitter. With these components you can build various "plug-and-play" robots including a Roverbot, which can move around, avoid obstacles, and follow a straight line, and an Acrobot, which can flip and dance. Additionally, you can write programs for your robot by using an RCX programming language from Lego and then upload these instructions to your robot by using an infrared transmitter. The RCX is the programmable Lego brick which is used as the basis for the models. The Robotics Invention System is aimed at children and adults of 12 years and up and is priced at $199.99.

Contact Information

Dyson, DC06, *www.dyson.co.uk*
Honda, ASIMO, *http://world.honda.com/robot*
Husqvarna, Auto Mover, *www.husqvarna.com*
Lego, Mindstorms, *www.mindstorms.com*
Roomba, *www.roombavac.com*
Sony, AIBO, *www.aibo.com*
Toro, iMow, *www.toro.com*