

Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Howard Baldwin

A Change of Interface

Speech recognition fosters better customer service through self-service

BY BILL ROBERTS

S EVEN OF EVERY 10 PHONE CALLS customers make to Sears, Roebuck and Co.'s 845 department stores are transferred to sales associates in specific departments. Sears used to need about 3,000 operators—three or four per store, with only one on duty at a time—to handle the calls. Customers might have waited as many as 20 rings before the operator answered, and one in four calls was misdirected.

To state the obvious, this was not good. And Manager of Store Operations Jim Dutton knew it. So last year Sears, based in Hoffman Estates, Ill., outsourced its call center operation, reassigned its operators and launched a speech-recognition system to handle most of the calls going to specific salespeople. Speech recognition, a technology whose time seems to have arrived, now handles 56 percent of 120,000 daily calls with a better than 90 percent accuracy rate, says Jan Drummond, a company spokeswoman.

Sears won't disclose what the project cost. Analysts estimate a price tag, including hardware, call center software and speech-recognition technology, of at least a half-million dollars. Drummond does say the project paid for itself in a few months. William Meisel, president of TMA Associates, a Tarzana, Calif.-based speech-recognition consulting firm, estimates that Sears saves about

\$96 million a year. He bases that estimate on potential savings from operators' salary and benefits. "Speech recognition is a fundamental change in the phone interface."

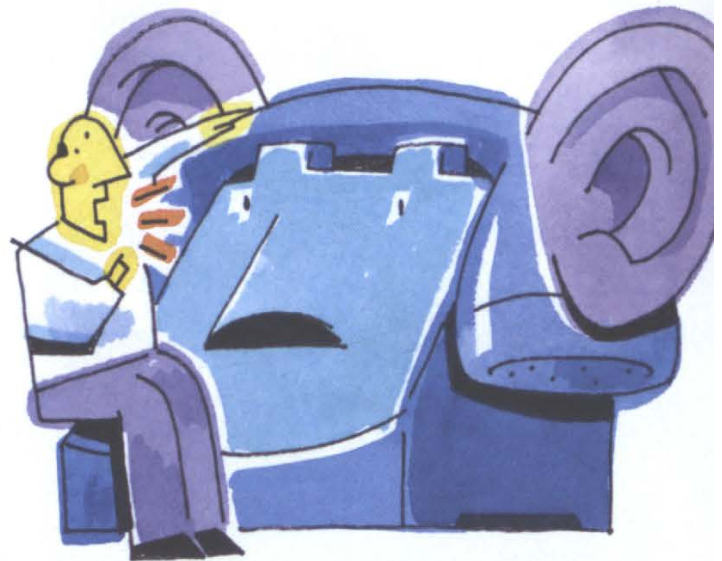
Companies have adopted speech recognition for internal use among employees or, like Sears, for customers. Department stores, stock brokerages, airlines, auto dealerships, phone companies and package deliv-

ery services use speech recognition for various self-service applications. The goal is better service. There's never been a friendlier user interface, says Bruce Parker, senior vice president and CIO at United Airlines Inc. in Chicago, which uses speech recognition for its employee reservations systems.

Speech recognition can augment or replace existing touch-tone interactive voice response (IVR) systems, whose lengthy menus can be frustrating to navigate. (For a related story on call centers, see "Holding Patterns," Page 54.) Some applications are simple—a basic off-the-shelf application directory can store up to 500 names. Applications like the one at Sears are more complicated, involving tens of thousands of words and phrases.

Supporting Self-Service Applications

Speech recognition first appeared in the 1960s when it was developed in university and corporate laboratories. Since the dawn of the personal computer era, using speech recognition to command and control the desktop has been a lofty goal. The ability to dictate documents was another promise. The technology is closer than ever to these goals,



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but speech recognition has really taken off in self-service applications.

Two things make this possible. The technology has become good enough for the limited vocabularies required by these applications. (*Limited* is relative: Some bigger applications have vocabularies of 50,000 words.) Second, computing power grew enough to handle the computational demands cheaply.

Details vary, but inside each product is a database of words and phrases that the system can understand when a caller speaks them, triggering certain actions: connecting a customer to a department, giving the status of a shipped package or letting the caller buy a stock. The more complicated the application, the bigger the database of words, phrases and pronunciation variations needed.

E-Trade Group Inc. in Palo Alto, Calif., which has an online trading Web site, also uses speech recognition to let clients buy or sell stocks over the phone. The application, called TeleMaster, has a vocabulary of more than 55,000 words and phrases. It recognizes company names and symbols and their synonyms. For instance, it understands IBM, International Business Machines and Big Blue. It also recognizes variations and synonyms for everyday words like yes—yup, yep, correct, right, affirmative. Colloquial expressions for yes such as uh-huh and OK and foreign affirmatives such as *si* and *oui* will be added as the application expands.

There's no shortage of developers offering products. Sears uses technology from Nuance Communications Inc. in Menlo Park, Calif. United and E-Trade use technology from SpeechWorks International Inc. in Boston. Nuance and SpeechWorks both offer tool kits and building blocks or objects for developing applications with large vocabularies.

Some developers aim solely at the telephone directory segment. Among them are Phonetic Systems Inc. in Burlington, Mass., and Registry Magic Inc. in Boca Raton, Fla. Phonetic Systems targets large—up to 250,000 names—enterprise directories. Registry Magic sells an automated operator, called Virtual Operator, that handles up to 500 names for \$12,000 or on a monthly lease for \$700. Other

The Personalized Desktop

Give employees access to the data and applications they use

IF THE INTERNET HAD A BUZZ-word of the month, the most recent one would be *portals*. Everybody wants to be the door to the Internet—apparently so that they can plaster the jamb, the panels and even the knob with advertising. But consider the idea of a portal for your employees, one they use to enter their workspace every morning. It starts with the browser, certainly, but you get to post what's pertinent to them—collectively or individually—in terms of projects, announcements or applications.



doesn't necessarily involve one or the other, but don't forget that Concur is coming from the perspective of a software developer that automates expense reports and purchasing (with its CompanyStore product). Nevertheless, the idea of a centralized entry point with a single sign-on password is compelling.

As for the buy-versus-build question of Employee Desktop, Neal Myrick, director of worldwide IT and facilities for software developer Visio Corp. in Seattle, scoffs. "I like to keep a lean IT staff. It's difficult when you build your own in-house systems to keep up with the pace of change. With Employee Desktop, employees can go one place, do all their administrative tasks with the company and get out of the sneakernet and paperwork-laden processes that every company has."

Myrick also believes that buying is simply much easier than building, especially when it comes to intranet applications. "Almost every week, I get somebody who says, 'Why do we need to spend money on this?' If anything'll kill a company wanting to do an intranet, it's executives who think that it's as simple as banging out some HTML code." When you consider the cost of getting database administrators who understand both SQL and building intuitive interfaces, Myrick says, buying your own portal is more economical.

—Howard Baldwin

PLETHORA OF PORTALS

Like most kinds of internal applications, you could probably have someone in IT build this to run on your intranet. But a couple of companies are tackling portal potential from different angles that sound interesting. One is Redmond, Wash.-based Concur Technologies Inc., best known for its Xpense Management Solution (see "Making Expenses Less Expensive," *CIO* Section 1, Jan. 15, 1999). It's expanding on the idea of a centralized place for administrative tools called Employee Desktop.

In a single Web-based interface, Employee Desktop consolidates a help menu and essential applications such as database access. It also includes four other sections: Approvals (a to-do list), Updates (progress reports on requests and projects), What's New (company news) and Tip of the Day (which could be anything from software tips to deadline notifications). You can also have links to corporate policies, training opportunities and a user profile so that employees can revise their own preferences.

How Updates and What's New are differentiated is a little confusing, especially if your business

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developers include Via World Network LLC, a Minneapolis-based subsidiary of Andersen Consulting LLC that targets the travel industry, and Parlance Corp. in Medford, Mass., which targets telephone directory services.

ROI Measured in Weeks

Although dozens of small and large companies have adopted speech recognition to save money, few applications actually produce revenue. One that might some day is under development at BellSouth Corp. in Atlanta. BellSouth worked with SpeechWorks to develop a Yellow Pages product called VAL (voice-activated link) now being tested in Daytona Beach, Fla. BellSouth customers can call and ask for restaurant listings, news, weather forecasts and sports information.

"We're trying to decide whether an electronic Yellow Pages is a product that consumers will pay for or is simply an access mechanism for our customers," says David Shipp, associate director of business development in the electronic publishing subsidiary of BellSouth. "I suspect it's a little of both. We don't have a business model yet."

But most companies are fully capable of justifying the investment in speech recognition by the money it saves. At United, for example, employees, retirees and their family members—415,000 in all—would call the reservations desk to ask for routes and availability for flying standby, which is a company benefit. That came to between 1.5 million and 2 million calls a year, about 5 percent of the total to the reservations desk. CIO Parker says the speech-recognition application now takes most of those calls. The big advantage has come from transferring nonrevenue calls to the automated application, which lets agents serve paying customers more quickly.

The next place Parker is looking to use speech-recognition tools is in the existing AVR (automated voice response) arrival-departure information system. He does not foresee putting the full reservation system on speech recognition because with all the fare possibilities "it would be too complicated."

E-Trade is just one of several brokerages using speech recognition. Another is Boston-based Fidelity Investments. Molly Geaney, vice president of technology in the personal investments group, says Fidelity has two applications based on Nuance's technology. In 1998 Fidelity introduced an application that allows anyone, whether a customer or not, to call Fidelity and get information on more than 3,400 mutual funds by speaking a fund name into the telephone. Fidelity customers can also get account balances and trade funds on the phone.

Fidelity also expanded the application to the

LEADING

EDGE

Wireless Ethernet

NETWORKING TECHNOLOGY IS PRETTY MATURE, WHICH IS WHY you don't see too much on bridges and routers around here. But Glenayre Western Multiplex of Sunnyvale, Calif., has developed something you don't see every day—a line of wireless Ethernet bridges called **Tsunami**. They use both microwave and millimeter-wave bridges to provide both Ethernet (10MB per second) and Fast Ethernet (100MB per second) connectivity between point-to-point wireless connections separated by 1 to 50 miles. Five models are available—two that require licensing of the space they use on the radio spectrum, and three that don't require licensing (licensing is required depending on what frequency bands you're using).

According to Glenayre, wireless bridges running Ethernet and IP can be used for voice-over-IP, videoconferencing and other applications and enable networks to be up and running without the need for setting up

leased lines or running fiber. The bridges are designed to maintain maximum bandwidth no matter what the distance. Prices for Tsunami bridges range from \$18,000 per link for the 10Base-T



wireless bridges to \$35,000 per link for the 100Base-T versions, or \$70,000 per link for a fully redundant link (dual systems in parallel, with one as standby). For more information, call 408 542-5200 or visit www.wirelessinterconnect.com.

Bid Time Return

IF YOU WORK IN APPLICATION DEVELOPMENT OR PUBLISHING, YOU know there are software packages that let you do what's known as versioning. In application development, it lets you return to a previous version of a program if you accidentally introduce a glitch; in publishing, it lets you revert to a previous version of a story should you want to start the editing process from scratch. Wild File Inc. in Plymouth, Minn., has taken this idea and applied it to Y2K with its **GoBack** software. When problems—such as Y2K glitches—occur, it lets the user revert to a previous time. According to the company, the program will also work after virus attacks and unsuccessful software upgrades.

The software stores information about files on your hard drive, using about 10 percent of the drive's capacity. It can revert the entire drive to a previous condition, or it can retrieve specific overwritten or deleted files, even if they've been removed from the Recycle Bin. The \$70 software runs on Windows 95, 98 and NT. For more information, call 612 551-0881 or visit www.goback.com.

<http://www.cio.com>

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company's existing Touch-Tone Express system. Now, instead of having to key in a symbol, Fidelity customers can get quotes and balances and place trades by saying the name of a security or fund. This application takes between 250,000 and 300,000 calls a day.

The company is rolling out a natural language application that recognizes and acts on customer orders spoken into the telephone as a sentence ("Buy me 100 shares of XYZ at the market," for instance). Geaney says ROI is hard to figure, but customer satisfaction has been high and now representatives can concentrate on adding value to their services, such as giving portfolio guidance.

United, Fidelity, Sears and E-Trade each spent hundreds of thousands of dollars on speech-recognition applications. Less expensive applications also yield results. JM Lexus, a Margate, Fla., subsidiary of JM Family Enterprises Inc., installed Registry Magic's Virtual Operator. Bill Dowd, the dealership's information systems director, says he was so impressed with a demo that he signed up the same day. Virtual Operator directs customers to the department or individual they request. It has saved JM Lexus at least \$40,000 a year, which is what it would have cost to add two operators. The application is about 94 percent accurate, Dowd says, depending on the user's familiarity with it. "The ROI is in weeks not months," he says. "It was realized the day I didn't have to hire somebody to answer the phones."

The Achilles' Heel

Companies using these systems say a big concern was whether customers would want to talk to a machine. Most successful implementations train customers the first time they call in. The early adopters agree that just like ATM machines, it may take time for the public to accept speech recognition, but it's hard to imagine that it won't become common enough to make consumers wonder why companies don't use it.

One factor that makes speech recognition so appealing is the Web. Because most companies have or will build Web self-service applications, the adopters say, they've already got the business databases that can serve double duty for the speech-recognition application. All they need is the speech interface, the vocabulary and a connection to the business database. "We're using some of the same data modules we built for our speech-recognition application for our intranet," says United's Parker. "You have a high degree of code reuse that way." **CIO**

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Marshal Dylan

SAY WHAT YOU WILL ABOUT APPLE COMPUTER INC. CONSISTENTLY snatching victory out of the jaws of defeat (or is it the other way around?), some of its research projects recently made strides in terms of usability and productivity. The Dylan programming language, for instance, was created to simplify programming. Cambridge, Mass.-based Harlequin Inc. has licensed Dylan and created **Harlequin Dylan Enterprise Edition**, a development environment designed to be as easy to use as Java but as scalable as C++. It incorporates support for Corba and the Internet InterOrb Protocol (IIOP); another Harlequin product, **Harlequin Dylan**, provides the development environment for Com applications (if you're unaware that one group of vendors, headed by Microsoft Corp., supports Com, and another, headed by Sun Microsystems Inc., supports Corba, consider yourself lucky).

According to Harlequin, Corba's neutrality lets applications written with it interoperate with C++, Cobol and Java. The new Enterprise Edition product contains a complete set of Corba features, including Corba 2.0 and parts of Corba 2.2. It also includes an object-request broker that can be redistributed free of charge; the price is \$799. For more information, call 617 374-2400 or visit www.harlequin.com/products/ads/dylan.

Take Two Tablets

ONE OF THE HARDEST THINGS ABOUT USING COMPUTERS outdoors is the glare. Fujitsu Personal Systems Inc. in Santa Clara, Calif., has tackled this problem with a "transflective" 8.4-inch display for its new **Stylistic 2300** pen tablet computer, offering SVGA (super video graphics array) resolution that reduces glare and enables outdoor use. The computer is designed to work with both 16-bit and 32-bit pen support, so it can create faster mission-critical applications while still supporting older applications. A 56Kbps modem



is built in, along with two Type II PC card slots (or one Type III PC card slot). The 2300 runs Windows 95, 98 or NT Workstation 4.0 and features a 233MHz Pentium MMX processor, a ruggedized 4.1GB hard drive, up to

96MB of memory and multiple connectivity options (infrared, serial, monitor, parallel, audio, keyboard, mouse, USB, floppy drive and port replicator). Single-unit list price is (gulp) \$4,485.

At the same time, Fujitsu has announced the availability of its **Point 1600** pen computer, a \$3,375 unit featuring a 10.4-inch SVGA display, dual pen support and ruggedized construction. For more information on either computer, call 408 982-9500 or visit www.fpsi.fujitsu.com.