



VOICE)))

USER INTERFACE DESIGN

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◆◆Addison-Wesley

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Michael Cohen has a variety of roles in the Nuance Professional Services group, where he deploys applications and manages the user interface for various products (including SayIt, which is used in such as Voyager). Before founding Nuance, he spent years at SRI International, where he worked on speech technology development and natural language understanding. Michael Cohen is a speaker at speech and vision trade shows. He is on the board of directors and received his Ph.D. In his spare time, he plays in his band, the

1.2 Why Speech?

Given all the challenges we have cited, why bother with speech interfaces?

To answer that question, let's begin by looking at the Schwab deployment (the application referred to in the opening story). The Schwab application was a big success, from the points of view of the business and the end users. Schwab's original motivation for deploying a speech system for stock quotes was that a large percentage of callers to Schwab's touchtone system immediately pressed 0 on their touchtone keypad to get a live agent. Those callers were the primary target for the new speech system.

Most of those callers ended up very happy using an automated speech application, despite their reluctance to use the touchtone system. The primary reason was that they no longer had to enter stock symbols using complex two-keystroke sequences for each letter, as they did with the touchtone system. Now, they simply said the company name and got their quote. Many customers actually expressed a preference for talking to the speech system rather than a live agent. They were no longer hesitant to ask for a large number of quotes, or even to ask for the same company twice in the same call if they had forgotten the result or were curious to see whether there had been movement in the price.

Charles Schwab & Company was also pleased with the results. The firm saved a lot of money and was able to reassign live agents to deal with more complex user requests, and caller satisfaction was high. Schwab reinforced its reputation as a leader in providing innovations that bring value to their customers.

Since the Schwab deployment, there have been thousands more.⁵ You can now talk to automated systems to trade stocks, check airline schedules and book flights, access your bank account, track packages you have shipped, rent a car, check on weather and traffic conditions, get driving directions, check bus schedules, find out what movies are playing nearby, and make restaurant reservations. You can have your own automated personal agent (discussed shortly) to handle your phone calls, calendar, e-mail, and voice mail. You can access **voice portals** that package a variety of voice services and, in some cases, personalize them to your needs. The list goes on and on, with new ways of providing information and transactions and facilitating human-to-human communications appearing every day.

5. Counting systems from all the major vendors.

The companies deploying these systems are motivated by a number of factors:

- **Saving money:** Speech systems typically save companies significant amounts of money, usually paying for themselves within a few months. When companies replace touchtone services, abandonment rates typically go down substantially, and automation rates often rise dramatically. Decreased call durations have also been a factor, saving companies toll call fees.
- **Improving reach:** Companies want to be available to their customers everywhere (at home and when mobile) at all times (24×7×365). In some cases, a system is deployed to complement the self-service already provided over the Web. In this way, companies can reach customers who either don't have Web access or desire the same self-service access when they are away from their desk or in their car.
- **Extending a brand:** When you engage in spoken interaction, you get more than "just the facts." Speech communicates at many levels. As we listen to someone speak, we make judgments about numerous attributes: the speaker's emotional state, social class, trustworthiness, friendliness, and so on (Soukup 2000; Giles and Powesland 1975). If we design a speech application with these things in mind, we can connect with customers in new ways. The system becomes an extension of the company's brand and image. In effect, we can design the "ideal employee"—with the desired voice, the desired personality traits, the desired mood, and the desired way of handling customer needs and problems. We can present that image reliably, phone call after phone call.
- **Solving new problems:** Many kinds of problems can be solved, or services offered, by speech applications that were simply impossible in the past. For examples, see the sidebar.
- **Increasing customer satisfaction:** Numerous surveys and deployment studies have shown high user satisfaction with speech systems.

From the point of view of the end user, there are many appealing advantages of using speech systems compared with other access modes:

- **Intuitive and efficient:** Spoken language systems draw on the user's innate language skills. Many tasks can be made simpler and more efficient than with touchtones. For example, in a travel application a caller may say things such as, "I wanna leave on June fifth" rather than enter an awkward and unintuitive

New Ways to

Speech applic routing. Many one convenier ing set of iten available serv itself to an int not been pos earlier genera understandi words) have n then be autom recently deplo to say things. "Yes, I want t with my voice sages." (Thes

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New Ways to Solve Old Problems

Speech applications let organizations solve problems in new ways. One example is call routing. Many companies want to combine their various access phone numbers into one convenient point of entry to serve all the needs of their customers. But the resulting set of items from which a caller must choose (such as the names of the various available services) is often huge. Furthermore, the set of choices often does not lend itself to an intuitive menu hierarchy that callers can easily navigate. As a result, it has not been possible to create such systems with touchtone technology (or even with earlier generations of speech technology). Recent advances in **natural language understanding** (technology that figures out the intended meaning of a string of words) have made it possible to let callers state their needs in their own words and then be automatically forwarded to the appropriate service. For example, a system recently deployed by Sprint PCS, with 40 different "routes" or services, allows callers to say things such as, "I just had a call dropped, and I'd like to get a credit for it," "Yes, I want that store in Rockville, on Rockville Pike," and "I'm having a problem with my voice mail—it's locked up on my phone, and I can't get into it to get my messages." (These were transcribed from actual calls.)

Another new application of voice technology is the personal agent. Most of us are not rich enough to hire someone to sit beside us in our car, office, and home and accompany us as we walk down the street, all the while handling our phone calls, reading us our e-mail, managing our calendar, and carrying the entire world's white pages and yellow pages. A number of companies now offer automated **personal agents**, which use speech technology to provide such capabilities on the user's phone.

touchtone sequence (such as 0605) after hearing a long-winded instruction. Even simple things such as saying the name of your destination city, rather than spelling it on a touchtone keypad, bring significant convenience to end users.

- **Ubiquitous:** Telephones are ubiquitous. Many people carry cell phones. Spoken access makes systems available from anywhere, even when the user is far from the desktop.
- **Enjoyable:** A well-designed speech system can provide a user experience that is engaging and enjoyable, at the same time efficiently meeting the user's needs.
- **Hands-free, eyes-free:** Activities such as driving occupy the user's hands and eyes. Speech is an ideal solution for accessing services while engaged in such tasks. Furthermore, mobile devices generally have very poor user interfaces. Entering complex information is awkward with keypads, pointing devices, or handwriting recognition. Speech is the ideal solution.