RED HERRING THE BUSINESS OF TECHNOLOGY

The invisible secretary

SRI explores the idea of a thinking computer – for soldiers.
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SRI International is using a $22 million grant from the U.S. Department of Defense to develop new technology that could replace people with machines. In this case, the carbon-based forms in danger are secretaries.

Like any living, breathing American secretary, this digital creation has to understand English, answer the phone, schedule meetings, and reply to email. (No running out for Krispy Kremes just yet.) The assistant, much like a school child, is expected to learn over time and pass exams each year.

What has any of this got to do with the military? The Defense Advanced Research Projects Agency (DARPA) wants SRI to build a digital secretary so it can apply that knowledge to create applications suited for the battlefield. DARPA envisions soldiers who can simply ask their computers for information rather than spend time operating clunky keyboards and push-button screens.

The software secretary is an extension of an idea that has been floating around research institutions for some time under a variety of different guises. The late Michael Dertouzos, former director of Massachusetts Institute of Technology's (MIT) Laboratory for Computer Science, believed that computing should be human-centric. He was fond of saying that people were slaves to their computers – forced to spend their lives feeding them data (see Lab Rat, February 22, 2001). To steer away from that predicament, the lab wants to make computers "ubiquitous," wherein the machines are so simple they fade into the background of our lives. An early step is creating intelligent assistants and natural language processing applications.

Likewise, the Xerox Palo Alto Research Center (PARC) has been working on the concept of ubiquitous computing since the 1980s. Last year, IBM had a pervasive computing program code-named Planet Blue (see Lab Rat, October 19, 2000) that was designed to find new ways for today's emerging technologies. Other DARPA-funded research institutions are running similar programs: Carnegie Mellon University's (CMU) Project Aura, the University of Washington's Portolano project, and the University of California at Berkeley's Endeavor Expedition are each developing human-centric computing architectures.

"We are going to have to develop systems that understand spoken language because the basic form factors – the laptop, the phone, and the PDA – are not going to change," says Norman Winarsky, vice president of strategic development at SRI.

What is different this time, according to Adam Cheyer, chief architect of the CALO project, is the approach. SRI will pull together brains and experience from more than 22 research establishments including Yale University, MIT and companies such as Boeing. Together, they will develop a project called Cognitive Assistant that Learns (CALO), which is derived from the Latin calonis, meaning "soldier's assistant."

"It's the largest artificial intelligence project every funded by DARPA," says Mr. Cheyer. "We are going to bring together about 150 of the world's top artificial intelligence experts here to create a software system that will make fewer errors, be more flexible, and have the ability to learn," he says. "It's a really different way of working." SRI hopes to integrate a number of different AI programs including an email assistant, a scheduling assistant, a Web master assistant, and a space-planning assistant, into a sort of Microsoft Office-like suite of intelligent applications.

Specifically, the system will be made up of multiple artificial intelligence algorithms and systems covering such areas as reasoning and action, physical awareness, cyber awareness and multimodal dialogue or language. Agent-based software will come from CMU, while adaptive learning and natural language (understanding) algorithms are the responsibility of the SRI team.

Language is one of the toughest pieces of the puzzle. "One reason language is difficult is enormous the amount of common sense reasoning behind a sentence," says Mr. Cheyer, "as well as social cues such as intonation. There is simply too much information."

The new software systems will be developed and tested on a distributed network used by the 22 research establishments involved in the project. All participants will have the ability to access the software from a personal computer, PDA, or mobile phone.

Such software could, for example, examine an incoming telephone number and compare it to its user's contact management software. It then might decide to reroute a call from the boss or family member to a cellular phone. It might even interrupt a call in progress, say, if the boss is on another line.

A software-based scheduling assistant might trawl the Internet to find the cheapest flight, book it and automatically cancel any meetings that occur on site during a business trip. If the tasks it carries out meet with the user's approval, the software should evolve to carry out these tasks on its own.

It is a tall order, but DARPA hopes that research projects such as these will give rise to a next generation of military technology. And that usually leads to new consumer devices and products. Global positioning system (GPS) technology, the laser, and the Internet were all developed with agency funding. "Today's software is brittle and stupid," says Mr. Cheyer. "We want to change that." But if CALO fails its yearly test, DARPA will not allow it to move up to the next level. If only that were the case for all software.