

Computers converse in different languages

Japan, Germany and the United States simultaneously test a system Thursday that translates spoken words

By DAVID THURBER
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TOKYO — "Moshi-moshi," said a Japanese researcher, speaking into a microphone.

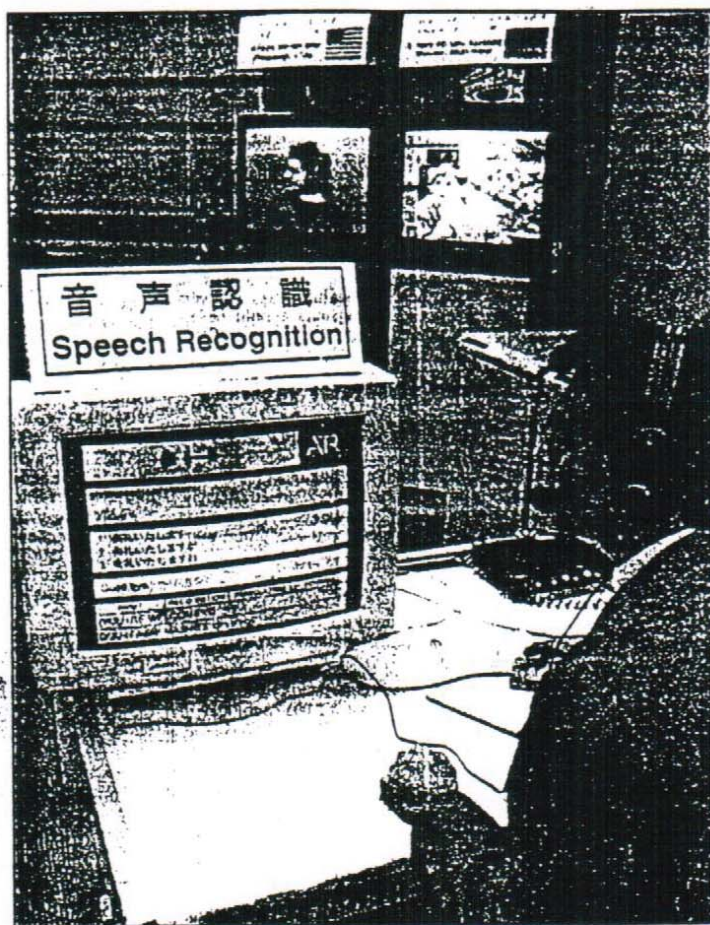
Eight seconds later, a computer in Pittsburgh gargled the translation: "Hello."

Thus did people and computers in Japan, Germany and the United States begin a transoceanic chat Thursday, the first international test of a system that transforms spoken words from one language into another without need of an interpreter.

The \$128 million computer has taken seven years to develop; it now understands about 1,500 words in Japanese, English and German, said researchers at Kyoto's Advanced Telecommunications Research Institute.

On Thursday, Japanese researchers conversed for about 15 minutes with colleagues at Carnegie Mellon University in Pittsburgh, then with electronics giant Siemens AG in Munich, Germany.

The sentences were first recognized and translated by a computer into written text, which was sent by modem over a telephone line. A voice synthesizer on the other end



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Please turn to **COMPUTER, Page B6** A technician conducts computerized telephone translation tests in Kyoto, Japan. Researchers linked Kyoto, Pittsburgh and Munich, Germany, using the translator.

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Computer: Translations remain limited

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then "spoke" the translated words.

"It was a success," said Shigeki Sagayama, head of speech-processing for Advanced Telecommunications. "It recognized and translated all of the conversation."

Researchers had agreed ahead of time to talk about an imaginary conference, and likely phrases had been pre-programmed into the computer, such as "This is the conference office. May I help you?" and "I'd like to apply to attend the conference."

For the foreseeable future, Sagayama said, automatic translation

systems will be limited to particular kinds of conversations since errors increase dramatically as topics and vocabulary grow.

"For a subject like this, we can translate about 90 percent of common expressions. That's quite a lot," he said.

"The system might be used by car rental agencies or hotels for reservations when multilingual staff isn't available and the range of conversation isn't too broad," he said.

The program allows some variation in phrasing, but it can't understand unusual forms of speech.

Each new user of the system must

first introduce his voice, a process that takes two or three minutes. Once the computer learns a vocal range, it can understand most words a given person says.

Current computer speech recognition devices are quite primitive, largely because of the difficulty of determining when words and sentences begin and end, and the inability to incorporate context, which is key to meaning.

Matsushita Electric Industrial is selling a speech-recognition device that allows audible programming of VCRs, and Toshiba Corp. has an experimental machine that can take simple orders at a fast-food restaurant.

A variety of computer programs are able to "read" text to blind people. For a computer, reading and talking are much easier than listening.

Sales of the new system are unlikely for another 10 years because of the high costs — the current system uses four powerful computers — and because of the challenge of understanding ungrammatical "natural" speech, Sagayama said.

His lab, established in 1986, is sponsored by the Japanese government and private telecommunications, broadcast and electronics companies