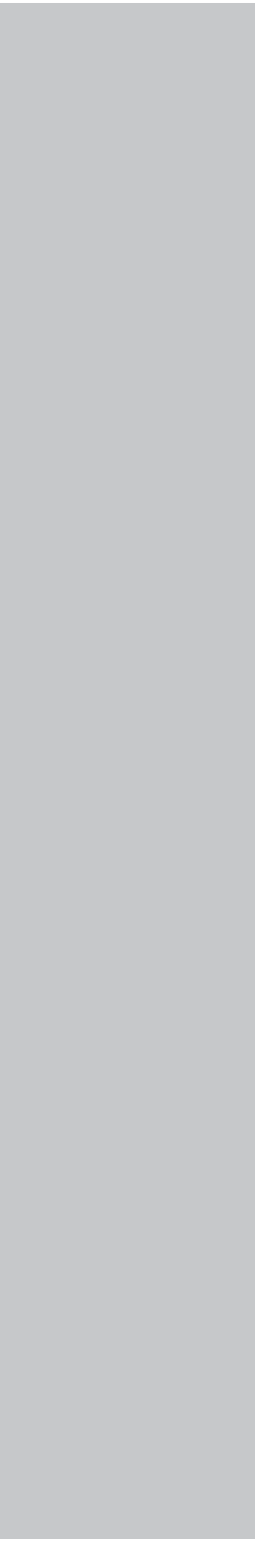


SPEECH RECOGNITION

A WORLD OF OPPORTUNITIES



PACER CENTER



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OPENING DOORS WITH SPEECH RECOGNITION

Speech recognition technology has revolutionized the way people with disabilities use computers. This technology is at the forefront of providing more opportunities for education, employment, and leisure.

Speech recognition technology helps people with disabilities interact with computers more easily. People with motor limitations, who cannot use a standard keyboard and mouse, can use their voices to navigate the computer and create documents. The technology is also useful to people with learning disabilities who experience difficulty with spelling and writing. Some individuals with speech impairments may use speech recognition as a therapeutic tool to improve vocal quality. People with overuse or repetitive stress injuries also benefit from using speech recognition to operate their computers hands free. Speech recognition technology has great potential to provide people with disabilities greater access to computers and a world of opportunities.

WHAT IS SPEECH RECOGNITION?

Speech recognition, also referred to as voice recognition, is software technology that lets the user control computer functions and dictate text by voice. For example, a person can move the mouse cursor with a voice command, such as “mouse up;” control application functions, such as opening up a file menu; or create documents, such as letters or reports.

Today's generation of speech recognition products are more affordable and user-friendly than ever before. These products require less initial training than their predecessors and typically offer much improved accuracy. For these reasons, more and more people with special needs are considering speech recognition as an alternate method for computer access.

HOW DOES SPEECH RECOGNITION WORK?

Speech recognition software is "speaker dependent," which means that it must be trained to recognize and understand the user's voice. The user trains the software by reading a selection of paragraphs to the computer. The computer analyzes the voice data from which it creates a unique voice file for that particular user.

Commercially available speech recognition software is designed using a *continuous speech* model to process voice data. Continuous speech means that the user speaks to the computer using sentences and phrases rather than speaking with a pause between each word. This allows the user to speak fluently without diminishing the program's accuracy.

IS SPEECH RECOGNITION RIGHT FOR YOU?

There are several factors to consider when deciding if speech recognition is appropriate technology for a child or adult with special needs. An initial assessment of the potential user's needs and goals, abilities, and motivation, as well as an evaluation of the environmental demands, will help determine whether voice recognition is a good fit.

"I can type a lot faster with my voice than I can type with my fingers. This means I can be more creative because I'm not thinking about the letters."

— an 11 year old girl with CP

Needs and Goals

It is important to establish the purpose of someone using voice recognition. Is the main goal to navigate computer hands-free or to dictate written work? If the user needs hands free control, than a more sophisticated voice recognition software program may be necessary. Learning to use a voice recognition system takes time and patience. Concrete goals and realistic expectations about voice recognition make a big difference in the success or failure of its use.

Abilities

Before deciding to use voice recognition technology, take a moment to examine the prospective user's skills and abilities and see if they match the speech recognition program's user requirements. For example, in order to complete the initial training, the user must be able to read a series of paragraphs out loud.

While the user does not need to be a "computer expert," he or she does need to have the computer skills required to operate the voice software, word processing program, and operating system software simultaneously. The user must also memorize a set of voice commands to control the computer hands-free.

Speech recognition is most successful when the user has consistent speech patterns and adequate breath support. People with speech impairments or limited breath support may use voice recognition, but they may need customized training and support. Another essential skill is ability to formulate and express ideas verbally. If a person has difficulty organizing and expressing thoughts with spoken language, speech recognition may not be the best choice.

"I'm excited about my son's potential using voice recognition. It will probably mean greater success in college and life because he can write so much faster."

— a parent of a 16 year old with ataxia

Motivation

Another important factor to consider is whether the prospective user has the motivation and patience to train a voice recognition system successfully. While voice recognition technology has improved greatly, the training process can be time-consuming and frustrating. Anyone who is seriously considering a voice recognition system should be aware of the effort and time commitment involved.

Environment

Consider the environment in which the individual will be using voice recognition system. For example, will the person be using it in a classroom or work environment? Background noise can affect some systems adversely. Also, dictating out loud can be disruptive to others. Finally, the confidentiality of dictation content should be considered.

SELECTING THE RIGHT SYSTEM

Most speech recognition systems require the following components to operate effectively: speech recognition software, a compatible computer and sound system, and a noise-canceling microphone. A portable dictation recorder that lets a user dictate away from the computer is optional.

Speech Recognition Software

In recent years, the price of speech recognition products has decreased significantly. There are many affordable products on the market today. However, the variety of product options may confuse consumers. Learning about differences in product features can help determine which

"I believe speech recognition technology can be harnessed to work for you, not against you, to enhance both productivity and comfort."

– journalist with a disability who utilizes voice recognition

voice product will best suit the user's needs. Oftentimes, the software manufacturer's Web site will provide in depth descriptions and product comparison charts that clarify the differences between products.

Computer System Requirements

Running voice recognition software places great demands on a computer system. In generally, a computer with a powerful processor, plenty of RAM (working memory), and ample hard drive space will be sufficient. The product manual or the software manufacturer's Web site will likely list the specific computer requirements.

Sound Card

The sound card is a critical part of a speech recognition system. Recognition problems may be the result of poor sound card performance or incompatibility between the soundcard and the voice recognition software. Most speech recognition programs contain a utility program that evaluates the quality of the soundcard. If the computer's soundcard is inadequate, the user will need to get a vendor-approved soundcard. Voice recognition software vendors usually provide an approved list of soundcard's in the product manual or on their Web site.

Laptop computer noise may interfere with quality sound processing. A USB microphone, which bypasses the internal soundcard, may resolve this problem.

Microphone

Most speech recognition software comes bundled with a noise canceling microphone. Proper and consistent positioning of the microphone is essential for good recognition. It is also helpful to

"Why should educators care about speech recognition? One reason is that it will eventually be so widespread as to be practically inescapable."

— Trends T.H.E. Journal

adjust the audio levels before each session to accommodate for day-to-day variations in environmental noise and variance in microphone positioning.

If the microphone that comes with the software does not meet the user's needs, there are a wide variety of speech recognition microphones available on the market. To learn more about microphones, visit some of the useful Web sites listed at the end of this pamphlet or contact the Pacer Simon Technology Center.

Portable Voice Recorders

Some speech recognition software programs have mobile dictation capabilities. This means that portable digital voice recorders can be used to dictate files when you are away from the computer. Later, the dictated voice files can be transferred to the speech software program on the computer for transcription into text format.

Only certain speech recognition products have this capability. Contact the software manufacturer's website to identify products that will work with portable voice recorders. Be aware that only vendor-certified voice recorders have been tested and proven to work with the voice software. Software vendors generally provide a list of certified portable voice recorders on their websites.

"Speech makes an ideal form of person-to-machine interaction—it can actually help people avoid injuries like repetitive strain."

— Mac World

MAKING SPEECH RECOGNITION WORK

Thorough training of the system is very important for success of voice recognition. Most speech recognition systems require the user to complete an initial training

session so that the software can learn the user's vocal style and speech patterns. However, additional training is usually necessary to raise recognition accuracy to a satisfactory level.

Some people with disabilities require customized training, set up, and technical support. There may be technical difficulties with the software or hardware. In the case of system failure, an alternative method should be readily available for use. Local voice recognition vendors may provide training and technical support packages for additional cost.

STEPS TO SUCCESS

1. Select a computer system, microphone, and sound card that meet the voice recognition software requirements.
2. Adjust the audio levels before each dictation session.
3. When dictating, speak clearly and precisely.
4. Use the correction procedures recommended to improve accuracy.

USEFUL WEB SITES

Computing Out Loud, a consumer-based Web site, features speech technology product comparison charts, useful tips for troubleshooting, a speech recognition users group, product reviews, and more. www.out-loud.com

The Literacy Center specializes in voice recognition resources for people with learning disabilities. The site offers tips and information on improving voice recognition outcomes for users with special learning needs. www.the-literacy-center.com

Voice Users Mailing List focuses on effective use of voice recognition software. www.voicerecognition.net

SPEECH RECOGNITION

Speech Recognition Products	Product Description	Operating System	Approx. Price Range	Web site
Dragon Naturally Speaking Voice Products	Voice dictation and navigation for Windows. Hands-free capabilities and application compatibility varies between products.	Windows	\$60-\$700	www.scansoft.com
IBM Via Voice for Windows Voice Products	Voice dictation and navigation for Windows. Hands-free capabilities and application compatibility varies between products.	Windows	\$30-\$200	www.scansoft.com
QPointer Mouse	Voice (hands-free) navigation of the computer that is application independent.	Windows	\$100-\$700	www.commodio.com
Math Pad by Voice & MathTalk	Math Pad by Voice-Basic addition, subtraction, multiplication, and division by voice. Must have Dragon Naturally Speaking speech engine to use this product. MathTalk - Voice any math from pre-algebra, algebra, trig, calculus, statistics, thru Ph.D. and graduate level. Must have Dragon Naturally Speaking speech engine to use this product.	Windows	\$225-\$900	www.metroplexvoice.com
iListen by MacSpeech	Voice dictation and navigation for Macintosh computers.	Macintosh	\$150	www.macspeech.com
IBM Via Voice for Macintosh	Dictation by voice, limited voice navigation capabilities.	Macintosh	\$125	www.scansoft.com

The Simon Technology Center, a PACER Center project, is dedicated to making the benefits of technology accessible to children and young adults with disabilities. Parents, professionals, and consumers serve as partners with the Center.

PACER Center is a statewide nonprofit organization that serves families of children and adults with disabilities. PACER (Parent Advocacy Coalition for Educational Rights) is a coalition of 20 disability organizations.

PACER is staffed primarily by parents of youth with disabilities, and by persons with disabilities. PACER Center carries out the philosophy of “parents helping parents” through workshops, individual assistance, and written information.



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