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Revolution in information storage

Electronic books contain thousands of pages on a single compact disc

By STAN FREEMAN

Start with the complete works of Shakespeare, then throw in a set of encyclopedias and the telephone directories for the 50 largest U.S. cities.

Add in the most recent hundred books written about the Civil War and the repair manuals for all American-made 1992 cars.

And then for good measure, toss in the contents of a few dozen cookbooks.

What you'd have is the library that one compact disc could comfortably store, a compact disc that can easily be read by a computer and therefore its user.

Electronic books will not replace the paper and print variety any time soon. (Who wants to carry a computer to the beach?) But they will eventually find their proper niche in the world, say information scientists.

"Up to now, we have heavily relied and concentrated on using one type of storage medium, which is paper. In only the last couple of years have other possibilities emerged," said Dr. Ching-chih Chen of the Simmons School of Library and Information Sciences in Boston.

"There's been a tremendous development in technology for us to deliver information. Not only are they available but in very affordable prices," she said.

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What will make this revolution in reading possible is CD-ROM (compact discs with read only memory). The same size CDs that play 72 minutes of music can also store 300,000 pages of printed text. And with a few adjustments, they can be read by a personal computer.

The possibility created by CD-ROM that has received the most attention is interactive multimedia — a blending of video, sound and print to provide information.

Users of such a system could call up written material about President John F. Kennedy, watch a documentary film about him and listen to his most famous speeches all on the same computer terminal.

However, there are limits to multimedia. Most historical information is in printed form and multimedia cannot turn print into film or sound.

The amount of printed material — books, magazines and newspapers — that has accumulated in the world's libraries for all these centuries is vast, to say the least.

And the work required to transfer much of it to CDs would be daunting if it were not for new scanning technologies that allow a computer to do the work itself, to read a text and store the contents. Not only that, computers can take printed material in a foreign language and translate it into English or any other language.

For students and researchers, it is a priceless technology. For instance, 20 years' worth of Time Magazine or several hundred history books could be stored on just one CD.

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With a book, an index must be searched for a certain subject. However, a computer could make that same search through 300,000 pages of text stored on a CD in an instant, looking for obscure bits of information or overlapping subjects.

"It allows you to jump around according to your curiosity and your need," rather than sequentially, said Chen.

"That is a totally new approach. You can speculate 'I wonder what China was like two years ago. I wonder what Egypt was like 2,000 years ago?' The information seeker is provided a way to find information that is not in sequence. You don't have to be thinking linearly," she said.

W. Richards Adrion, head of the computer sciences department at University of Massachusetts, said computers will allow people to reassemble huge amounts of text to fit their need, in a sense to make custom-made books or articles.

"For instance, if you are reading Shakespeare, you might be able to read a paragraph and then bring up all the criticism that has been written about it," he said.

"But one of the real problems we're having is we're creating technology that stores more and more information" without having adequate ways of searching through it to retrieve what the reader wants, he said.

"We need to get at it in a more meaningful way than a word search," said Adrion.

Most computers find information in a large block of text by searching for "key" words or phrases, such as "Lincoln" or "Civil War." But that technique has limits, said Bruce Croft, an information retrieval specialist at UMass.

"Let's say you are asking the question 'What are the causes of the recent increase in oil prices?' Just because a document contains the phrase 'oil prices' doesn't mean that it is relevant. If you just say 'oil prices,' you are going to get a whole slew of stuff that may or may not be useful to you," he said.

Researchers hope one day to be able to program a computer to analyze written text and to be able to answer specific questions such as "What were the causes for the Civil War?" or "What Civil War battles lasted more than two full days?" Croft said.

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What limits the market for electronic books at present is the limited number of titles that have been transferred to CD. But as has been the pattern with many new technologies, as the market grows, more CDs will become available and as more CDs become available, the market will grow.

Electronic books and the CDs for them are already appearing in stores. Encyclopedia Britannica can now be bought on CD as can the encyclopedias of other companies. Language dictionaries, airline and hotel guides, travel maps and even a medical advisor are available on CD.

Portable electronic books are also a reality. Sony is offering the Data Discman Electronic Book Player for $550. It looks like a palm-size foldup computer. It has a 3.5 inch liquid crystal screen and plays 3-inch CDs which can hold 100,000 pages of text.

For $39.95, Sony also sells accompanying CDs, including the Library of the Future, a CD which holds 150 classics such as the complete works of Shakespeare and all of the Sherlock Holmes mysteries.

"Paper books will continue to fulfill their role. They are not going to be disappearing," said Chen. "They are very simple to carry around. No one is going to carry a computer with them to read in bed, but they'll take a book."

"But what we need is to look intelligently at each type of media and make the best use of it," she said.

A new way to read

Electronic books will allow a reader to jump around according to their interest and curiosity. A computer will be able to scan hundreds of thousands of pages of books, newspapers or magazines stored on a CD looking for answers to specific questions.

Who was Captain Kidd?
William Kidd was a 17th century British sea captain who received a royal commission in 1695 to apprehend pirates who molested ships of the East India Company. But within two years he had turned to piracy himself and was eventually hanged for the offense in 1701.

When did piracy begin?
Piracy has occurred in all stages of history. In the ancient Mediterranean, the Phoenicians engaged in both commercial shipping and piracy as did the Greeks and Romans.

What years was Greece at its height?
Classical Greece, considered the mother of Western Civilization, began to emerge about 750 B.C. as a loose confederation of city-states devoted to maritime trade, art, literature, politics and philosophy. It began to decline about 400 B.C.

What year did the Olympic games start in Greece?
The Olympics were first held in 776 B.C. in Olympia, Greece, and were held thereafter at four-year intervals for more than 600 years until being discontinued when Greece fell under Roman rule. The first program involved only one event, a foot race the length of the stadium.

What was the average batting average for baseball players in the National League in 1913??
National League average batting average - 1913 - .262

What year did Jim Thorpe win Olympic medals?
Jim Thorpe, an American Indian of Sauk and Fox descent, won the decathlon and pentathlon at the Olympic Games in Stockholm in 1912. But he was stripped of the medals in 1913 when it was learned he had played semiprofessional baseball. He went on to play professional baseball, batting .252 in 289 career games in the National League from 1913 to 1919.

Union-News graphic by Mike Nasuti