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Navigating Digital Home Networks

By MICHEL MARRIOTT

WHILE the broad vision of a digital lifestyle is clear, the details of living it are still a bit blurry.

In the not-so-distant future, computers are not only supposed to churn bits and bytes for utility, productivity and fun. They are also to form the center of a digital home network, smartly knitting together television sets, video game consoles, home theater systems, portable music players, cameras nd camcorders, telephones and almost anything else that can bear a microchip and liquid crystal display screen.

To drive home the point last month at the Consumer Electronics Show in Las Vegas, Hewlett-Packard enlisted Carson Kressley, the fashion stylist from "Queer Eye for the Straight Guy," to give the oh-so-late-20th-century apartment of a Manhattan writer an updated look - and provide him with better access to his music, movies, snapshots and television programs.

The solution included eliminating physical media like CD's, cassette tapes, videotapes and DVD's. Everything, including the writer's photos and home video, was digitized and stored on a hard drive in the apartment and linked to flat-screen televisions, a home theater system, his PC and his color printer.

But what the makeover failed to make clear - as consumer electronics executives and technologists often fail to do in such demonstrations - is how people will be able to retrieve precisely what they want, when they want, from such deep digital wells.

It will require more than a fancy remote control.

"We're all seeing the reality of the problem," said Steven Drucker, the lead researcher for the Next Media Research Group at Microsoft Research in Redmond, Wash.

Consumers are discovering that all those gigabytes of digital pictures and home movies - whether they are stored in personal computers or burned onto CD's and DVD's - are enormously difficult to sort and search through. Digital-camera owners are realizing that technology has not rescued them from the shoebox overflowing with pictures, but simply replaced the shoebox with a virtual one that is similarly overflowing, or at least overwhelming.

Strains of what Dr. Drucker describes as "information overload" are also beginning to afflict consumers who are literally buying into the promise of, say, toting 10,000 of their favorite songs in a pocket-size audio player. Many audio player owners are at a loss to find and play 5 or 50 songs they want to hear without first tediously constructing time-consuming playlists.

Even searching by song title, musician name or musical genre, to name a few standard indexing methods, often becomes fairly useless when that search yields hundreds if not thousands of songs. Have the 19th-century metaphors of desktops, folders and files, some wonder, outlived their usefulness in managing emerging digital lifestyles?

"Folders and that whole thing breaks down," said Jim Gemmell, a researcher in Microsoft's Bay Area Research Center, who is studying what he calls "personal media management enhancement." Files and folders "don't scale up for large numbers," he said.

As part of a research project called MyLifeBits, Mr. Gemmell and his fellow researchers have been digitally storing practically every piece of information common to an American household - books, letters, memos, articles, photos, voice recordings, phone calls, radio broadcasts, television programs, films and music - and trying to develop software that can easily and quickly annotate, store and retrieve any item on command.

"We need software to become your personal assistant," Mr. Gemmell said. "You don't want to have to worry about it."

But consumers, for instance those drawn to digital cameras and camcorders, are learning that they have to tag and annotate photos and movies meticulously if they hope to find them easily.

"Taking snapshot after snapshot to get just that moment you want," Dr. Drucker said, costs far less when shooting to digital memory than to conventional film. "But the real costs come in going through all those pictures and finding the one you want. Summarizing and organizing become huge problems."

Dr. Drucker joked that digital camcorders should be called "write only" because many consumers may use them to shoot or, in digital parlance, "write" video but may never go through the trouble of editing and watching what they capture.

"We're all seeing the reality of the problem," he said.

Solutions may depend on the development of more powerful processors and more sophisticated software that uses a kind of artificial intelligence to tag, sort and retrieve media in more intuitive, helpful ways. Some predict that voice- and face-recognition breakthroughs will lead to systems that make media navigation as simple as saying, "I'd like to see all new pictures I've taken of the baby."

Some researchers suggest that digital cameras will one day include Global Positioning System technology so that a computer can sort photos and videos not only by time and date, but also by where they were taken.

"We're not quite there yet," said Jim Mohan, senior product manager for Adobe Photoshop Album 2.0, one of the most popular software programs for finding, fixing, sharing and preserving digital pictures. Besides providing an array of tools to reshape, repair and alter digital photos, Photoshop Album 2.0, released late last year, offers a number of methods for categorizing photos and videos.

One way, Mr. Mohan noted, is by sorting photos by the dates on which they were taken. By using a sliding timeline or calendar view, any set of digital photos and videos can be found by the day, week, month or year they were made if the camera was set to the right time and date.

"The main problem is, how do I get that photo when Aunt Millie comes over and wants to see that picture of Uncle Bob and Spike the dog in Hawaii?" Mr. Mohan said.

For years, Apple Computer, a pioneer in greatly simplifying the process of moving photos out of digital cameras and into computers for display with its iPhoto software, has wrestled with making the process simpler. Last month, Apple released iPhoto 4 with promises of managing photos more easily.

The advances include Smart Albums, which lets users create digital photo albums that automatically update themselves, adding photos that have specific dates, keywords or ratings - five stars for favorites, for instance, said Greg Scallon, Apple's iPhoto project manager.

Finer control can be achieved if pictures are given keyword tags that can be dragged and dropped into entire collections, like Spike the dog, Hawaii, Uncle Bob. Enter the keywords into a search and, in an instant, the picture or pictures are found without the bother of clicking through files and folders.

Further annotations can be added to photos, including audio clips, captions and text notes, making searches even faster and more intuitive.

Adobe Photoshop Album 2.0 also includes some pixel recognition that Mr. Mohan said helps the software determine whether pictures were taken indoors or outdoors. Adobe is working on other ways to help the software read information that is in the photo itself, he added.

While consumers have had to be more hands-on in using advanced technologies to identify and store digital photos and video, similar technologies have been quietly applied in digital audio for years.

One of the first breakthroughs came in 1995, with the advent of CDDB, or the Compact Disc Data Bank. CDDB, an online service, could identify a music CD placed in a PC and then download the disc and track name and artist into the computer. Whenever consumers copied songs from CD's - storing them on their computer hard drives as MP3 files, for instance - CDDB saved them from typing in all those song titles and related information, known as metadata.

Today, the company that devised that system, known as Gracenote, serves more than a million users a day in more than 130 countries with a database of more than 30 million songs, its executives say. It is the core music-recognition software for such online music services as iTunes and is licensed by practically every maker of portable audio players.

But as the digital music revolution unfolds, and high-capacity hard drives permit more music to be stored, said Gracenote's president and chief executive, Craig L. Palmer, the company must offer solutions to new challenges, like identifying tracks from CD's when the songs are played on next-generation car stereos or wireless hand-held devices.

One of the company's latest responses is audio waveform recognition, offered in the second generation of Gracenote MusicID. That technology basically examines a few seconds of the music's audio footprint, or waveform, to match it with an online database of 3.6 million song waveforms. Kathryn Shantz, Gracenote's marketing and public relations manager, said that about 25,000 waveforms were being added to the database each week.

Music ID is also being embedded in some car stereo systems and portable devices that can copy CD's, she said, enabling the systems to identify and sort songs by artist, title, genre and other information.

Gracenote and other audio recognition and sorting companies - like MoodLogic, which has recently been adapted to manage digital music on TiVo set-top boxes - are using the metadata to compose quick playlists of songs even without requiring users to listen to all of the songs first.

Gracenote Playlist 2.0, for example, requires users to select one or more songs or artists. The software can then automatically generate a "smart mix" playlist of songs based, for example, on points of commonality like artists, CD release dates and genres, which are divided into 22 major groupings and 250 microgenres. It is media management by association.

RealRhapsody, by RealNetworks, offers an online library of more than 480,000 songs along with Internet radio that users manage on their PC's, but takes advantage of content intelligence in the company's servers. For example, when a user listens to music by the group Outkast, the system offers links to music by Outkast

"contemporaries," "influences" and "related projects."

Taking a similar approach to greater lengths, Dr. Drucker of Microsoft drew approving gasps last month from an audience of more than 1,200 at the Consumer Electronics Show when he projected the interface of what he called media variation software. He demonstrated how such software could manage a vast collection of films with a touch of artificial intelligence.

When he selected "Blade Runner," the 1982 science-fiction classic directed by Ridley Scott and starring Harrison Ford, the software created wheels of related films, each represented by its DVD cover. One cluster consisted of films by Mr. Scott. Another included all films starring Mr. Ford.

Then he selected another film by Mr. Scott, "Gladiator," prompting different related clusters to emerge.

"It's based on that idea of six degrees of separation, sort of," Dr. Drucker said, adding: "You don't even have to work with just movies. You could be working with music, you could be working with books."

When that will happen, Dr. Drucker could not precisely say.

"Any single software solution is not going to be what it's all about," he said. "It's going to be this entire lifestyle."