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Recursive Reviews

Hypermedia, Interactive Multimedia, and Virtual Realities
by Martin Halbert

When I fly to a conference I always find the moment of takeoff exciting. After the tedium of airport lines and the slow process of boarding, the engines rev up and you are suddenly thrust back into your seat as the whole aircraft seems to strain trying to vault into the sky. Then, in another moment, the perspective dramatically changes as the ground is left below, the vast tangle of roads and locations becomes abruptly apparent, as if one were looking down at a map. You know in your bones then that you are going somewhere, not just wasting time in Kafkaesque delays. Today, technologies like hypermedia and interactive multimedia are like a plane ready to take off, gathering momentum for a jump that promises to take us to a new information environment. Reading about these new computer tools one feels that we are heading to an exciting, but unknown destination.

No one knows what the landscape of information technology in the 21st century will look like, but there are many sources that will sketch the most prominent features. This column will direct the reader to the best "guidebooks" to new interactive computer technologies like hypermedia and virtual reality simulations. In the spirit of Recursive Reviews, I won't try to limit the discussion artificially to "just" hypermedia, or "just" interactive multimedia. Instead, the aim will be to point out: (1) practical sources that orient the reader to the newest computer media technologies, and (2) new journals that discuss the possibilities of the media.

It may be objected that buzzwords like "hypermedia" and "interactive multimedia" are not much more than hype currently. The terms have been bandied about so much in the last few years that it would be easy to conclude that they are nothing but empty phrases that the industry has been using for impressive ad campaigns. I don't agree with this. I think these concepts represent a host of human-computer interaction ideas that the most innovative thinkers have been developing for years, and which are only now beginning to enter the mainstream. These concepts are being embodied in the best new computer applications, which will have dramatic impact on the work of all information professionals in the 1990's.

Now is the time to become familiar with the issues surrounding these technologies. But aside from the practical impacts on our jobs, following the development of new computer technologies is refreshing, and re-inspires us in our work. Innovations in computer media are exciting news for libraries, which have only dealt with one information medium for millennia.

As We May Think

There have been many seminal works that touched on the idea of automated handling of large bodies of different kinds of media. No discussion of the area would be complete without at least mentioning Vannevar Bush's article "As We May Think" (Atlantic Monthly, July 1945) which discussed a device called the MEMEX that could retrieve and manipulate large quantities of microfilm, audio recordings, and other media that would be of use to a researcher. Bush had all the right ideas (e.g., multimedia and automated links between pieces of information), but his article is outdated because of the obsolete technological framework that he uses to discuss his ideas.

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Computer Lib/Dream Machines

The first fully developed exposition of the idea of computer manipulated media was the seminal book that introduced the term "hypermedia," Computer Lib/Dream Machines by Theodore Nelson (first published privately in 1974, later reprinted with extensive updates in 1987 by Microsoft Press). If you read only one new book this year, read Computer Lib. It is the most insightful (and inciting!) book on computers that I know of.

Computer Lib was one of the most influential early works that promoted the idea of personal computers. It had several themes: (1) everybody should understand computers; (2) computer systems are difficult to use only because they are designed poorly; and (3) computers can be wonderfully empowering and enjoyable tools when designed well.

The book is written in an engagingly chatty tone (the book was consciously modeled after Stewart Brand's Whole Earth Catalog and resembles it in many ways), and is full of tongue-in-cheek pronouncements like "Computers are just as oppressive [in the 1980s] as before, but smaller and cheaper and more widespread. Now you can be oppressed by computers in your living room." Despite (or perhaps because of) all the humor in it, Computer Lib is an illuminating survey of the major issues of making computers usable. The flip side of the book (literally flip side, the book is printed back to back with its sister title), Dream Machines, canvases the most important ongoing developments in graphical computer systems. If you want an entertaining, opinionated, informative book on the fundamental issues of user interfaces,

read Nelson's book.

Hypertext Hands-On!

For a more sedate and neutral treatment of hypertext issues, turn to Ben Shneiderman. Shneiderman is currently the most prominent researcher in the field of human/computer interaction. His book Hypertext Hands-On! is an excellent introduction to the topic that lives up to its title by including a hypertext version of the text on floppy disks.

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The book and hypertext are written in a very clear and concise style. Hyperlinks in both the electronic and print versions are easy to follow and logically arranged (unlike many hypertexts I've run across which are tangled and confusing). The Hyperties software runs fine on any PC-compatible, but, if you have a Hercules monochrome monitor, it's difficult to spot most of the text embedded hyperlinks. Because of this drawback, I preferred using the print version of the work (sigh).

Shneiderman covers both theory and implementations of hypertext systems. In his chapter on "Systems" he gives neutral descriptions of all major hypermedia products that are currently on the market. Also included in the work are examples of possible hypertext applications and a review of major personalities in the history of hypertext. Hypertext Hands-On! could easily be used as a textbook introducing the subject of hypermedia, and it is worth reading by anyone interested in the field.

BYTE

For those interested in the nitty-gritty of current computer systems and what they can offer, there is no better source than the many trade journals and tabloids of the computer industry. I offer up BYTE as a good one stop source for following personal computer technologies. It is not particularly biased toward one brand of computer, and is a monthly, so you will not be deluged by the amount of reading entailed in following weekly tabloids.

The February 1990 issue had a particularly good in-depth section that analyzed what interactive multimedia means to different computer firms, what the pros and cons were of each company's system, and what new technical issues were raised by interactive media. My favorite article in the issue was "The Birth of the BLOB" by Tim Shetler, which discussed data storage implications of BLOBs (Binary Large Objects, the nodes of multimedia databases). If you want to know why DVI is important to IBM, or why the Agnus blitter makes the Amiga display so good, read this issue of BYTE, and future ones too.

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CD-ROM Professional

A magazine that falls somewhere between the trade magazine and the academic journal is CD-ROM Professional. Subtitled "The Magazine for CD-ROM Publishers and Users," it is aimed at information professionals like librarians who want practical advice articles. It has many product reviews, how-to columns, and technology feature articles in each issue. Oriented specifically to optical storage topics, it is one of the best sources to follow interactive multimedia products in, since most of these products come out on CD-ROMs currently.

The September 1990 issue is a good example of this journal. It had an interview with Sony's chief multimedia spokesman, Takashi Sugiyama, about where Sony is headed with the technology. The same issue had articles on problems encountered in CD-ROM technical support and how-to backup CD-ROM workstations.

ACM Journals

The Association for Computing Machinery generates a plethora of journals on all aspects of computer technology. Three ACM journals that are worth following regularly are the Communications of the ACM, Computer Graphics, and SIGIR Forum.

Communications of the ACM features a special issue on interactive technologies like multimedia and hypertext roughly once a year. The July 1989 issue was devoted to interactive technologies and had several good articles on digital video.

Computer Graphics (put out by ACM SIGGRAPH) is traditionally the place where the hottest, glitziest new research projects in computer graphics technology appear in living color. The March 1990 issue constituted the proceedings of the 1990 Symposium on Interactive 3D Graphics, and showed amazing new levels of sophistication. The issue is packed with project reports of the newest technological buzzword, "virtual realities." Also called microworlds, these are computer simulated environments. They may be close simulations of physical reality (useful for simulating physical systems), or they may be dazzlingly abstract environments like the higher-dimensional "hyperworlds" viewable with Columbia University's n-Vision system.

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The SIGIR Forum, a publication of ACM's SIG on Information Retrieval, is an excellent journal for the information scientist in all of us. The Fall 87/Winter 88 issue had an article by Robin Hanson called "Toward Hypertext Publishing: Issues and Choices in Database Design" that is the best piece on the theoretical and practical concepts of hypertext systems that I have seen yet. The best feature of Hanson's article is the

concise discussion of the various ways that one might run the fee structure on a commercial hypertext network.

There are many other ACM publications that could be mentioned, but these three are particularly valuable sources.

New interactive computer technologies are often dramatically different from the standard office software that we are accustomed to. I find it useful to follow journals that analyze the possible uses of new computer media. Two new journals, Hypermedia and Multimedia Review, feature scholarly discussions of next generation information technology.

Hypermedia

Hypermedia regularly reviews an eclectic variety of conferences and books related to hypermedia topics. Interestingly enough, its first issue had a review of William Gibson's seminal science fiction book Neuromancer in addition to more standard fare. In my opinion, this was entirely appropriate, considering the fact that many of Gibson's colorful SF concepts have been embraced wholeheartedly by software designers.

My favorite Hypermedia article appeared in the Volume 1, Number 3 issue. It was a piece entitled "A Similarity-Based Hypertext Browser for Reading the Unix Network News," by Michael H. Anderson, Jakob Nielsen, and Henrik Rasmussen. The article described a prototype user interface called HyperNews that organizes incoming network news postings with hyperlinks following discussion streams and an automatic similarity/relevance rating feature (somewhat like fuzzy logic information retrieval systems). Although the system described was a prototype created solely for concept study, the need for systems like this to follow the colossal amount of electronic mail and forum postings is obvious (I often wish I had a working system like the HyperNews prototype to handle all the PACS-L messages I get every day).

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Multimedia Review

Multimedia Review is a fascinating journal that pledges "to acquire the kind of articles that give inspiration for reflection --for metacognitive understanding." Don't let the fancy language scare you off, this is a great journal to promote deeper understanding of the possibilities of multimedia. The articles often have catchy titles (my favorite title in the Summer 1990 issue was "Elements of a Cyberspace Playhouse" by Randal Walser), and are written by industry and academic experts in the field of multimedia systems.

If the decade of the nineteen eighties was the era when the "personal computer" revolution came about, then the nineties may

be the decade of the "personal simulator" revolution, and Multimedia Review may be its harbinger. Articles like Scott S. Fisher's "Virtual Environments: Personal Simulations & Telepresence" (Summer 1990 issue also) discuss current state-of-the-art systems in the historical context of what the designers are aiming for in the long run. As fact follows fancy we may all one day find ourselves working in virtual workspaces like William Gibson imagined in fiction, and Autodesk corporation has now implemented in actuality.

Bringing It All Home

A final anecdote may bring multimedia closer to home for you, as it did for me. As I was preparing to leave work today (eager to get home and finally finish this overdue column!) I took a break to try out a new computer that had appeared in the evaluation center of our campus computing center.

It was a Silicon Graphics workstation, and as I logged on to the machine and explored some of its demo software packages I was staggered by the real-time animation capabilities of the machine. In twenty minutes, I had run through a fractal display system, an amazingly realistic flight simulator (it makes the latest version of Microsoft's Flight simulator look sick), a hilariously real looking interactive simulation of a Jello icosahedron bouncing around a room, a design tool for studying wave oscillation phenomena in surfaces, and a dazzling graphical visualization of a mechanical insect that obediently crawled after my cursor wherever I led it.

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The image animation windows in all these applications were razor sharp, the kind of crispness that one sees in computer generated movie sequences like The Last Starfighter and Tron. The insect automaton moved realistically and cast a shadow. The illusion of depth and reality was dramatic.

My point is that within this decade simulation technology like this will be on all our desktops! Interactive multimedia and hypermedia are technologies of the near future, and we librarians had better become accustomed to them and think about them before we are caught off guard. Besides, they are fun. I know I want another crack at that F-15 flight simulator. Perhaps next time I'll remember to bring up my landing gear so they don't get torn off at Mach 2.

Books Reviewed:

Nelson, Theodor H. Computer Lib/Dream Machines (Rev. Ed.).
Redmond, Washington: Microsoft Press, 1987.
(ISBN 0-914845-49-7)

Shneiderman, Ben, and Greg Kearsley. Hypertext Hands-On!: An Introduction to a New Way of Organizing and Accessing Information. New York: Addison-Wesley, 1989. (ISBN 0-201-15171-5)

Journals Reviewed:

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(ISSN 0360-5280)

CD-ROM Professional 3, No. 5 (September 1990).
(ISSN 1049-0833)

Communications of the ACM 32, No. 7 (July 1989).
(ISSN 0001-0782)

Computer Graphics 24, No. 2 (March 1990).
(ISSN 0097-8930)

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(ISSN 0163-5840)

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