CHAPTER 1

Introduction

Chapter 1 provides a framework for the rest of the text, including basic definitions, a history of multimedia, a discussion of why we should study multimedia.

> "Interactivity is not a technology, but a way of life, an orientation, and a mindset". Celia Pearce. *The Interactive Book*, Preface. 1997.

Definitions

The computer industry is rife with the abuse and over-use of special buzzwords, some of which are important to the study of multimedia. Some of the most common are discussed below.

Hypertext

A primarily text-based environment, generally with non-sequential navigation paths which may be represented as buttons or highlighted text.

`hy.per.text` *n (1986): a database format in which information related to that on a display can be accessed directly from the display* `[Merriam-Webster's Collegiate Dictionary]`

This can be compared to a traditional text narrative (such as a book) which has a distinct linear path for the narrative. With a hypertext product the user is presented with some form of interface allowing navigational choice. In many respects the user is a co-author, choosing the path down which they will go. This enables the reader to go on an information odyssey not possible with traditional linear texts. I also introduces some significant challenges to the design and implementation of effective hypertext systems.

The dictionary definition supplied in the margin above refers to the fact that alternate information paths in the text currently displayed on the screen are represented in the text itself. This may take the form of a button, a word or words that are differently coloured, highlighted, underlined, boxed or otherwise demarcated from the regular text stream. It is also interesting to note the use of the term

database in this definition. Many consider hypertext systems (including the World-WideWeb) to be special examples of database systems.

Ted Nelson is generally attributed with the first use of the term `hypertext` (1965) in his description of the Xanadu system. The term has since been used to describe systems with varying degrees of functionality. The most common of course is derived from the markup language used with the WorldWideWeb - HTML - **H**yper**T**ext **M**arkup **L**anguage.

Media

Individual self-contained units of information based on one of the fundamental communication models (e.g. text, images, audio, video, animation).

`media` *n, pl me.di.as often attrib [pl. of medium] (1923) 1: a medium of cultivation, conveyance, or expression; esp: medium* `[Merriam-Webster's Collegiate Dictionary]`

This narrow definition is related to the broader range of meanings `media` can have, some of which are indicated in the dictionary definition in the margin. The term as we use it here also has obvious roots in the elements of communication used in the various forms of mass media (e.g. newspapers, TV). In our case the media have been digitized to facilitate their use in a computer system.

While media are traditionally considered from the point of view of type (e.g. text, images, video) they may also be categorized according to their function or use (e.g. narrative, ad, chat). Under this latter classification some of the newer forms of online interaction may also be considered "media". If static text is one of the media types, why can;t dynamic interactive text also be another category? Viewing an online chat session as another media type in the arsenal available to the developer ensures that the full breadth of functionality will be considered.

Under this view media also become dynamic elements able to transition into one another. Thus, a chat session upon archiving becomes another textual media element in a hypertext document. A frame from a video becomes an image, and an audio track becomes an integral part of a video and a voice-over from a video becomes a text link for the hearing impaired.

When one considers *all* the media elements available, and the myriad interactions possible, rich hypermedia worlds become a reality.

Hypermedia

A hypertext system which makes use of 2 or more media elements together, and a variety of interactive tools to tie them together in a meaningful way.

The traditional definition of the term "hypertext" implies that it is a system for dealing with plain text. Since many of the current systems actually also inlcude the possibility of working with graphics and various other media, some people prefer using the term "hypermedia", to stress the multimedia aspects of their system. `[Jakob Nielsen, Multimedia and Hypertext: The Internet and Beyond. 1995.]`

The defining feature of hypermedia is the use of multiple media types. While text is often one of the media elements used, it need *not* be present for the creation of a hypermedia system. In addition to presenting a linear or non-linear hypertext narrative, a hypermedia product integrates the various media into the narrative. Hypermedia always refers to a computer system, and is not used to describe non-digital systems.

Based on this definition, and the one following, a hypermedia piece is essentially an interactive multimedia system.

Multimedia

A system which provides for the display of 1 or more of the media types, and may or may not make use of interactive techniques.

`multi-me-dia`, *a. [f. MULTI + MEDIA.] Designating or pertaining to a form of artistic, educational, or commercial communication in which more than one medium is used.* `[Oxford English Dictionary]`

The most important distinction between multimedia and hypermedia is the fact that multimedia systems may not make use of interactive techniques, while a hypermedia system always does. For example a multimedia kiosk may not allow interaction at all, but simply be a self-running ad or demo. It is basically a television commercial that has been developed for delivery in a digital environment. Aa hypermedia system may be seen as a system for browsing multimedia data sources.

Multimedia has also been used to describe non-digital systems which make use of a variety of media in addition to print. For example, it can be traced to the early 60's where it was used to refer to campaigns that made use of print and video in order to promote a concept or product. The term is still used in this respect today.

Many people would consider the terms hypermedia and multimedia to be synonymous, particularly since they are both largely limited to the digital realm these days, and completely non-interactive systems are rare. For that reason I use the term multimedia to refer to both concepts, as it is definitely the most commonly used of the two.

History of Multimedia

Multimedia technology and applications are not new babies on the block - they have been around for some time, both in theory and in practice. An excellent review of the history of hypertext is presented in Jakob Nielson's book[1] - the discussion presented below is a short summary drawn from that and other sources.

Bush and Memex

Vannevar Bush is credited with the first description[2] of what we would refer to today as a multimedia system - way back in 1945. Bush called his theoretical system (it was never built) the *Memex*, or *Memory Extender*. The Memex was essentially a desk with special equipment for storing (using enhanced micrographic techniques) inputting (using a photographic process) and retrieving (using special indexes of stored material) information that was purchased or personally produced.

The system as described sounds like a standard office desk with a recessed camera and microfilm reader, as well as an array of special knobs and levers for navigating the information. One does not have to stretch very far to imagine this system as a desk with a recessed computer system, attached to the web, and outfitted with the latest scanner, mouse and graphics tablet.

Bush's description included some examples of how the system would be used by a scientist, and the types of applications that would be produced (specialized encyclo-

1. Jakob Nielsen, *Multimedia and Hypertext*, 33-66.
2. Vannevar Bush, *As we may think*, Atlantic Monthly, August 1945. http://www.isg.sfu.ca/%7Educhier/misc/vbush/

pedias). Anyone who has used the Web for research purposes will immediately see some parallels, despite the fact that 50 years separates the two concepts.

Ted Nelson

Ted Nelson coined the use of the term hypertext in a series of works (some self-published) describing a system for storing and retrieving all material ever written (the *Xanadu* concept). The separate documents in this system would contain links between each other, and between individual words in these documents.

Image of Xanadu or Nelson

Some people feel that Nelson's vision of Xanadu encompassing all material ever written with all manner of relationships and links is infeasible - in fact Nelson has more detractors today than supporters. My feeling is that Xanadu is on its' way to reality with the ongoing developments of the Web and other Internet technologies. New protocols like XML and SMIL make the technical aspects of Xanadu more and more feasible, while the passage of time will make the inclusion of much of what has been written in such a system more and more a reality.

Early Hypertext Systems

The beginnings of development of actual hypertext systems took place in the early 60's, when computer systems themselves were still largely confined to educational institutions and companies with significant R&D.

One of the first hypertext systems was actually created to support development of an early "office productivity" suite. The *Augment* project was overseen by Douglas Engelbart (who has been credited with many significant developments for computers). Part of this system was *NLS*, which was designed to support the activities of the people working on Augment by providing a facility for the storage and recall of research notes, documents, etc.

NLS and other early systems, such as the *Hypertext Editing System* (1967) and *FRESS* (1968), were developed using mainframe systems, and were necessarily limited to text only. One of the earliest multimedia systems was the *Aspen movie map* (1978), developed at MIT. This dual-monitor system made use of videodiscs to store and retrieve large amounts of video and graphical information.

Other early systems were developed for the UNIX environment, and with few exceptions (*KMS*, *Hyperties* and *Notecards* - 1983-85) were research products that never made it to the commercial arena. The functionality of some of these early systems can be seen in enhancements to the basic functionality of the Web that we see occurring today. The difference with today's developments is that they are taking place under a (relatively) stable umbrella of standards and protocols.

Guide and HyperCard

Development systems for Macintosh and Intel computers began to appear in the mid-late 80's, and were responsible for the increasing interest in multimedia systems. *Guide* was one of the first (1986), and up until recently was still a very robust and full-features multimedia development system. The more recent versions took full advantage of the Windows and Macintosh GUI's, and continued to develop and refine basic functionality of the early mainframe and UNIX systems.

Hypercard Stack Image

Around the same time (1987) the first version of *HyperCard* was released for Macintosh computers. HyperCard was probably the first system to have strong support for graphical links and functionality, and quickly became the most popular system for implementing multimedia pieces. HyperCard was simple to use (it was designed for the Mac after all!) but also came with a reasonably sophisticated programming language (*HyperTalk*) that gave the developer a great deal of flexibility in customizing and extending the standard functions.

HyperCard is still in use today, and has spawned numerous siblings. *SuperCard* and *Hyperstudio* are probably the most famous examples, while *MetaCard* was an example of a system designed for use with UNIX and DOS, but NOT Macintosh.

There are numerous examples of multimedia development systems for PC platforms today, many of which are discussed in more detail in “Authoring” on page 65. The most common systems (*Director*, *Authorware*, *IconAuthor*, *ToolBook*) are all in a transitionary stage where they are adding better support for development of Web-based multimedia systems.

Pong, Mario and CD-ROM

The early seventies also saw the development of some of the technologies that were increasingly important in the development of multimedia systems. The first video game was *Pong* (1972) which ushered in the age of the video game, a development which contributed significantly to the graphical and interactive aspect of multimedia systems.

Interactive laserdiscs were first introduced in 1974, and one of the first significant products developed around this new technology was IBM’s *DiscoVision* system, which was a laserdisc kiosk system used by GM and Ford.

Image from Voyager’s Beethoven

In 1981 the Apple II+ introduced audio, and *Nintendo* came out a year later. In 1984 the first *virtual reality* system was developed by NASA and Radio Shack (ahh - the glory days). In 1985 the *High Sierra* format was developed, describing the format under which data was to be written to the newly developed CD-ROM discs. The first CD-ROM encyclopedia came out in the following year with the introduction of the 1st version of *Grolier*’s. The development of *ISO 9660* followed in 1987, laying the foundation for the next decade of successful CD-ROM development.

The 90’s were ushered in with the release of Voyager’s *Beethoven* - still one of the best examples of an educational multimedia title - and *Virtual Valerie*, one of the first in a long line of erotica and pornographic products for the relatively new medium of CD-ROM. In fact, in the early days of CD-ROM, pornographic movies and titles accounted for the bulk of CD-ROM titles produced in the new pressing plants.

MPEG and *QuickTime* were introduced in 1991, setting the stage for the integration of digital movies into multimedia products. Unfortunately it would be almost a decade before hardware would catch up, allowing reasonable quality videos to be played back on an average system. More and more CD-ROM titles were produced in the early 90’s (they could still be listed in specialized catalogues in 1995), until around 1994, when sales of CD-ROM drives and titles finally took off. CD-ROM production is so common these days that it is no longer possible to have exhaustive lists of new titles.

The introduction of *DVD* in 1996 (discussed in more detail in "Hardware" on page 11) promises to revitalize the CD-ROM industry, which some people feel has taken a hit from the success of the Web. Although it undoubtedly has, CD-ROM and DVD will remain important technologies for the delivery of high-quality multimedia material, something the Web can still not do for all people at a cheap rate.

The Web

The Web is without a doubt the most commonly used multimedia delivery environment today, although it's strengths and weaknesses parallel those of CD-ROM (see "Packaging and Distribution" on page 97). The Web got its' start[1] in 1992 when Tim Berners-Lee introduced the first web server and browser systems, developed for the NeXTStep operating system. This was quickly followed by the release of *Mosaic* in 1993, which became the first widely successful graphical web browser.

Tim Berners-Lee or Mosaic/NeXT Browser

After this initial research and development stage, the Web started to grow at an exponential rate as more and more people put information up on their new web servers. The result was what I like to refer to as the *Digital Dumpster* stage of the Web's evolution. Much of the information on the Web in first few years was very poor, either in content, design, or both. It was so easy to establish a presence on the Web and create a homepage, that a lot of people were doing it without consideration for why or how to do it well.

In the last few years Web protocols and development tools have matured, and the standards have evolved to a point where it is possible to easily create good looking content. As well, the Web has been around long enough that a lot of high-quality material has found its' way to a web server near you. The result is a stage in the development of the Web that I like to call the *Digital Library* stage.

Although the rapid change of technology may make it seem like a confusing and frustrating time to be working with multimedia, it is actually the most exciting. For the first time in the brief history of multimedia, the convergence of various technologies has brought the development and delivery of high-end multimedia titles to the mainstream. This is also the first time that we have a generation of users weaned on things digital, making the use of interactive multimedia a natural and productive experience.

Why Study Multimedia?

Multimedia is hardly a discipline unto itself - so why are we spending all this time on a Multimedia course?

Multimedia skills are increasingly in demand by all sectors, particularly business. A new university graduate who has a good grounding in multimedia/Web development tools and techniques will be a valuable asset to a company trying to establish a quality presence on the Web, develop multimedia training tools for their staff, or innovative products for their users. With the increasing sophistication of multimedia delivery

1. There are a number of Internet/Web histories on the Web, but the paper by Robert Cailliau is a good start. http://www.inria.fr/Actualites/Cailliau-fra.html

techniques, the ability to grasp all aspects of the multimedia development process is important.

Graph of multimedia/ designer salary scale

This course will present all aspects of the multimedia development process, from the inception and management, through to the development and distribution of a high quality product. The goal is to provide a general introduction to all aspects, and not provide a detailed treatise on any one aspect. Where available references to more detailed material are provided for further investigation.

My Philosophy

My basic philosophy for multimedia development can be summed up in 3 words:

Innovate or Intubate

For anyone who has ever watched ER, the message should be clear. Innovation, whether creative or technical is a necessary component of any successful multimedia project or organization. If you do not innovate you will stagnate and eventually someone will have to put one of those tubes down your throat (hence intubate) to revive you.

As a minimum, maintain and open mind to innovation around you, and be prepared to take a risk. That may be as simple as using non-company colours in your new website, or committing significant resources to development around a new and experimental set of protocols. Whatever the level of risk or innovation, it is important to be open to the possibility, and not automatically close the door. It is my belief that if you follow this simple premise, you will not only develop high quality multimedia products that work, but you will be proud of them as well.

Resources

There are a number of general multimedia texts and resources, the best of which are listed below.

- Haykin, Randy, ed. *Multimedia Demystified: A Guide to the World of Multimedia from Apple Computer Inc*. New York, NY: Random House. 1994.
- Lopuck, Lisa. *Designing Multimedia: A Visual Guide to Multimedia and Online Graphic Design*. Berkeley, CA: Peachpit Press. 1996.
- Maricopa Center for Learning and Instruction. *Multimedia Authoring Web*. http://www.mcli.dist.maricopa.edu/authoring/ [August 1998].
- *The Media History Project*. http://www.mediahistory.com/ [August 1998].
- Multimediator Partnership. *MultiMediator: Canada's Multimedia Guide*. http://www.multimediator.com/ [August 1998]
- Nielsen, Jakob. *Multimedia and Hypertext: The Internet and Beyond*. Cambridge, MA: Academic Press. 1995.
- Pinheiro, Edwin J. *Introduction to Multimedia: Featuring Windows Applications*. Belmon, CA: Integrated Media Group. 1996.

- Villamil-Cassanova, John and Louis Molina. *Multimedia: An Introduction.* Indianapolis, IN: Que Education and Training. 1997.