

COMP7903 MULTIMEDIA TECHNOLOGY - SUMMER SEMESTER, 2001/2002

Introduction and Overview - What is Multimedia

History

The term Multimedia was first coined in the late 1980's by senior members of the Apple Media Lab, a division of Apple Computer in Cupertino, California. For the first time it became possible to create computer based presentations which incorporated a variety of digital media and thus in turn spawned a plethora of authoring software which could be used to create the new medium. As the power and speed of personal computing developed, both the capabilities and expectations of multimedia technology increased in rapid succession. As we are little more than a decade into the multimedia revolution it would be a mistake to believe we are anywhere but at the very dawning of this exciting and unpredictable era. Accordingly any attempt to define or quantify the technology needed to facilitate multimedia production can only be, at best, a snapshot in time.

Definition

What is multimedia? The answer depends on who is doing the defining. And the definition is being redefined as the technology unfolds. For the purposes of this course, multimedia is defined as a collection of various media including video, audio, graphics, animation and text. Many would also define it as requiring a degree of interactivity however this places a restriction on the limits of definition that may well prove to too restrictive as the medium evolves. It may well include interactivity, but there is a growing body of opinion which believes the level of interactivity demanded of the new medium to be greatly overestimated. Interactivity therefore is definitely an option but it is not necessarily essential. Some define multimedia as being, by definition, computer based. This too would seem presumptuous since the entire industry is still in its infancy. Whilst most multimedia is currently accessed via personal computer this may change in the not too distant future. Many industry analysts predict a blurring of the boundaries between technologies and have adopted the buzz-word "*convergence*" to describe the apparent coming together of disparate technologies. On the other hand it could be argued that rather than a convergence of technologies we are witnessing a divergence of technological streams which has no parallel in modern history.

Television & Video

In the broader sense traditional television and video may be defined as multimedia. The trouble here is that it is becoming increasingly more difficult to define traditional television. Historically television was broadcast via analogue signals transmitted

from terrestrial based transmitters. Today we define this as "Terrestrial transmission" which would seem a somewhat confusing term given that it is broadcast via aerial electromagnetic radiation. Terrestrial transmissions includes satellites, conventional television cable or any medium described as "off-line". On-line transmission, on the other hand, infers the use of the Internet such as TV-over-IP (Television delivered via Internet Protocol). Additionally there is delivery of video via videotape and DVD which is making dramatic inroads into the use of video cassettes as a distribution medium.

Television and video is also undergoing a transition from analogue to digital and at the upper edge of the spectrum the term digital also implies hi-definition (HDTV). Add to this the break-up of international standards for digital television into even more divergent systems than existed prior to the move to digital, as well as the introduction of HD-TV over IP, and streaming video over wireless technology (WAP), the future is even less clear for all but the informed few.

The most common usage of video in multimedia at present is in the area of streaming media over the internet as well as short video clips played from downloads or CD-ROMs. Due to bandwidth and storage limitations these tend to be highly compressed, small format and sometimes slower frame rates than conventional video.

Internet

Arguably the most significant technological milestone of the twentieth century has been the meteoric rise of the Internet. It is still difficult to comprehend the rapid acceleration of adoption of the World Wide Web (WWW) during the last decade of the century. It is even more difficult to imagine where this technology is heading in the coming decade let alone further into the future. What is certain is that it will have profound impact on virtually every aspect of human endeavour and that multimedia technology will play an ever-increasing role as the phenomenon expands.

Interactive Media

The most common example of interactive media is the Internet. This was not the case ten years ago. Then, interactive media was computer based applications or interactive CD-ROMs. These still play an important role in multimedia technology but have to a degree taken a back seat in view of the explosive expansion of the WWW. The sheer logistics of marketing and distributing interactive media via disc makes the use of Internet based interactive media the logical choice for more and more content providers. Computer games, on the other hand, are still largely distributed on interactive CD or DVD compatible media. They now make up the largest and most profitable segment of the entire entertainment industry surpassing motion picture box office takings by a wide margin.

Audio

Although usually relegated as the poor relative to video, audio is a dynamic and essential component of any multimedia production. The digital audio era began with

the introduction of the CD (Compact Disc) in the late 1980's. It has now replaced most other media for the legitimate distribution of music. With the ability to store approximately 640 - 700Mb of digital code on a single inexpensive and virtually indestructible disc, the medium formed a natural synergy with personal computers. CD's greatest strengths, of course are their high fidelity and the fact that as a true digital medium, there is absolutely no quality loss between generational copies. CD-ROMs, Audio Cards and MIDI interfaces also play an integral role in contemporary multimedia production and the rapid rise in popularity of MP3 compatible hardware and software is nothing short of a revolutionary.

Graphics

Graphics is the visual landscape of multimedia. It plays an important part in most multimedia productions and is arguably its most powerful tool. It gives the other elements context and ambience and provides the necessary linking between disparate visual and audio elements. In essence there are two types of graphics used in multimedia:

Pixel based graphics

An image such as a photograph or diagram which is defined as a "bit mapped" image. Rows upon rows of rectangular dots (pixels) which comprise the image as a whole much like a photograph in a newspaper is made up of rows of dots known as a screen.

Vector based graphics

An alternative to pixel based images is one where the graphical elements are comprised of lines and fills which are defined by coordinates generated by the authoring software. Adobe Illustrator was an early exponent of vector based graphics and EPS (Encapsulated PostScript) remains an industry standard vector graphic format. Flash animation is another example of vector graphics albeit one synonymous with web based animation.

Animation

There are in effect three types of animations used in multimedia productions.

Pixel based animations

Essentially a series of pixel based images played in a continuous sequence to achieve an illusion of movement. This is usually in the form of a compressed or non-compressed motion image file such as an MPEG file, Quicktime.mov file or an .AVI or similar type file.

Vector based animations

Flash animations are an industry standard vector graphics animation format. Rather than relying on pixels the transition between individual images are achieved by manipulation of the defining geometry of the vector images.

Hybrid animation

This can be best described as animation based on the movement of both pixel and/or vector based elements, images or movies by the authoring software. An example of this might be the ability to animate pixel images and vector based text against a graphic background in an interactive media presentation.

Text

The obvious example is HTML (Hypertext Markup Language) which has spawned the development of the WWW as the pre-eminent multimedia source. The use of Postscript and TrueType fonts for both desktop publishing and multimedia authoring is another major milestone in computing. The development of the PDF (Portable Document Format) format by Adobe Corporation has revolutionised information distribution. Although we have not yet seen any signs of the long promised "paperless office" the widespread adoption of the PDF system is a new horizon for the use of the printed word and plays an integral role in multimedia communication.

Telephony

Although not widely regarded as multimedia technology until very recently the area of digital mobile telephone networks is opening up some surprising areas of possible overlap. 3G (third generation mobile telephone technology) utilises WAP (Wireless Application Protocols) to provide digital broadband communication. Although it has many critics and the recent downturn in technology stocks has seen a massive rethink about the fledgling technologies potential, it raises the possibility of a whole generation of new communication devices and approaches to the way people communicate.

David Gilbert
December 2002