

Multimedia Technology (IT-204-F)

Section A Introduction to multimedia

Lecture 1

Basics of Multimedia

Basics of Multimedia Technology

Multimedia: The term multimedia comes from the Latin words “multus” which means “numerous” and “Media” means “middle” or centre. In other words we can say that multimedia means “Multiple Intermediaries” or “Multiple Means”.

The multiple means by which one can perceive information are:

1. Text (e.g. books, letters, newspapers)
2. Images and graphics(e.g. photographs, charts, maps, logos, sketches)
3. Sound (e.g. radio, gramophone records and audio cassettes)
4. Video & animation (e.g. TV, video cassettes and motion pictures)

What is Multimedia?

- “Multimedia” has no strict definition.
- Multimedia is any combination of text, graphic, sound, animation and video that is delivered by computer.
- When you allow the user to control what and when these elements are delivered, it is interactive multimedia.
 - Text
 - Audio and speech
 - Images
 - Graphics
 - Video



Multimedia Definitions

- **Multimedia:**

1. It is any combination of text, art, sound, animation, and video delivered to you by computer or other electronically or digitally manipulated means.

Although the definition is simple but the main motive behind the topic is to make each multimedia element stand up and work.

Other Definitions:

2. Multimedia is commonly defined as the combination of text, graphics, audio, video and animation on a computer.
3. Multimedia is a method of designing and interacting computer technologies on a single platform that enables the end-user to input, create, manipulate and output text, graphics, audio and video using a single user interface.

Multimedia : Uses & Applications

- Multimedia applications are primarily existing applications that can be made less expensive or more effective through the use of multimedia technology.
- **Uses of Multimedia:**
 1. Business
 2. Education
 3. Home
 4. Public Place.
 1. **Multimedia in Business:** Business is logical mainstream market for multimedia. This includes marketing, advertising, product demos and various other methods like presentation, network communication etc.
e.g.
 1. advertising
 2. Presentations
 3. Multimedia Advertising.

Applications Contd.:

2. **Multimedia in Education:** This is perhaps the most needy field of multimedia. One of the major challenge of today's scenario is to meet the needs of variety of students. Multimedia will provoke radical changes in the teaching process during the coming decades.

3. **Multimedia at Home:** The area of multimedia lies from gardening to cooking to home design, remodeling and repair. Most multimedia projects are reaching home via TV sets.
Today home consumers of multimedia own either a computer with an attached CD-ROM or DVD drive or a set top player that is connected with a TV. Another example is X-Box or Sony Play station.

4. **Multimedia in Public Places:** In Hotels, Railway stations, shopping malls, museums, multimedia can be made available in the form of kiosks to provide information and help, or it can be connected with wireless devices such as a cell phones or PDA(Personal digital assistant).

Applications Contd.:

- **Some more applications are:**
 1. Video on Demand or Movies on demand, is a service that provides movies on an individual basis to TV sets in people's home. The movies are stored in a central server and transmitted through a communication network. A set-top box(STB) connected to a communication network converts the digital information and make it displayed on TV sets.
 2. Home Shopping & Information System: Many kind of goods & services can be sold online either through TVs or through internet. The service will help the user to navigate through the available material to plan vacations, purchase goods or say apply for new DL or Passport.
 3. Networked Games: can be played with the help of a set-top box or through internet.
 4. Digital Libraries.
 5. Telemedicine.

Applications Contd:Multimedia In Telemedicine:

- A multimedia telemedicine system using Transfer Control Protocol and Internet Protocol (TCP/IP) over the Internet is developed. Doctor with patient and doctor can communicate each other using this system. Real-time data, including audio, video and instant message, and non-real-time data, including vital sign signals, radiological images with DICOM 3.0, file, bio-signal, bio-data and so on, can be exchanged on the system. This system's architecture is client/server mode.
- All data are encoded/compressed before transferring through Internet/Intranet. The real-time audio is encoded and decoded by MPEG (Moving Picture Experts Group) audio layer 3 algorithm and real-time video is encoded and decoded by MPEG-4. The software implementation of needed functionality without any externally attached hardware CODEC (Coder/Decoder) units enables the compact design with low cost. The real-time video has 25 frames per second at Local Area Network and more than 20 frames per second at ADSL(Asymmetric digital subscriber line).

Multimedia: Present Scenario

- **Multimedia in present Scenario:** The multiple modalities of text, audio, images, drawing, animation and video in multimedia are put to use in ways as diverse as:
 1. Video Teleconferencing
 2. Distributed lectures for Higher Education.
 3. Telemedicine.
 4. Cooperative work environment that allows business people to edit a shared document or schoolchildren to share a single game, that pass control back and forth.
 5. Making multimedia components editable-allowing the user side to decide what components, video, graphics are required or can be deleted-thus making components Distributed.
 6. Using voice recognition to build an interactive environment.

Multimedia Research

- **Multimedia Research topics and Projects:** Multimedia consists of a wide variety of topics, such as:
 1. **Multimedia Processing & Coding:** This includes multimedia control analysis, content based multimedia retrieval, multimedia security, audio/image/video processing, compression etc.
 2. **Multimedia System Support & Networking:** This includes protocols, internet, operating systems, client and servers, quality of service(QoS).
 3. **Multimedia tools, end systems, and Applications:** These includes hypermedia systems, user interfaces, authoring systems, multimedia education etc.

Multimedia Software Tools

- **Multimedia S/W tools:** These are divided into following main categories:
 1. Music sequencing and Notations. Cakewalk, Cubase, Macromedia, Soundedit
 2. Digital Audio: Cool Edit, Sound Forge, Pro Tools
 3. Graphics and Image Editing: Adobe Illustrator, Adobe Photoshop, Macromedia Fireworks.
 4. Video Editing: Adobe Premiere, Adobe After Effects, Final Cut Pro.
 5. Animation
 - Multimedia APIs
 1. Java 3D
 2. Direct X
 3. Open GL
 - Rendering Tools
 1. 3D Studio Max
 2. Softimage XSI
 3. Maya
 6. Multimedia Authoring: Macromedia Flash , Macromedia Director, quest

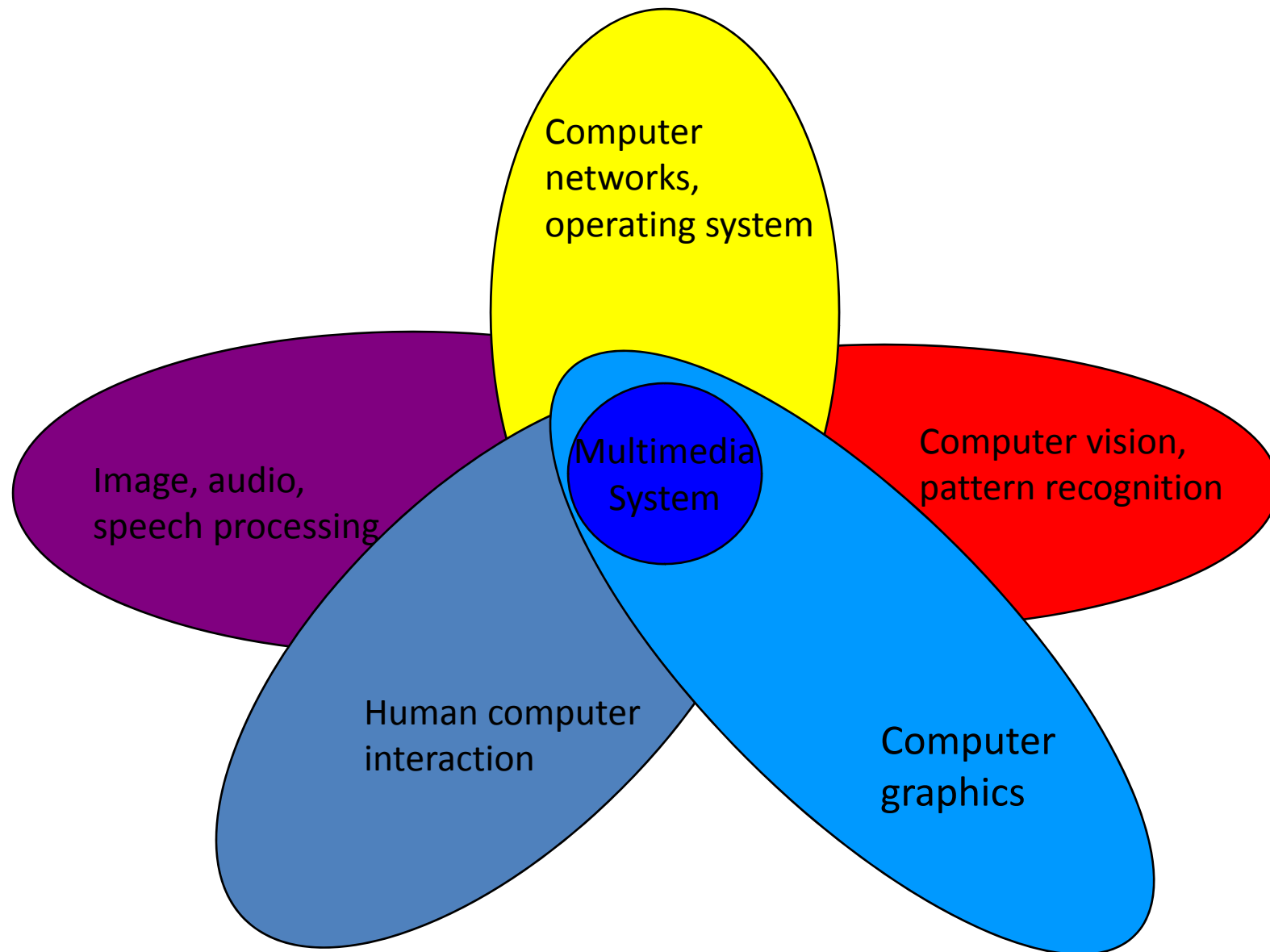
Multimedia System

- Multimedia involves more than simple addition of new data types.
- It integrates a wide range of symbol modes simultaneously into a coherent framework.
- The framework is usually denoted as a multimedia system.

Elements of Multimedia System

- **Elements of Multimedia Systems:** A Multimedia system combines elements that are familiar from the world of films, video, broadcast, television, music and Telecommunications as well as computing.
- **Some of the basic components are:**
 1. A processor, a PC or a workstation that has been enhanced to handle audio and video.
 2. A variety of methods by which the user can interact with the system, such as keyboard, mouse, joystick or touch screen.
 3. A screen that can display high quality still images and moving videos as well as computer-generated text, graphics and animation.
 4. Speakers to allow speech and music to be output.
 5. A Microphone.
 6. A way to play back pre-recorded source material, usually from some form of optical disks, such as CD, DVD.

Multimedia System is Multidisciplinary



Challenges in Designing Multimedia System

- Developing a successful multimedia system is non-trivial.
 - Continuous media types such as video need a lot of space to store and very high bandwidth to transmit.
 - They also have tight timing constraints.
 - Automatically analyzing, indexing and organizing information in audio, image and video is much harder than from text.
 - Multimedia involves many different research areas and needs more complex and more efficient algorithms and hardware platforms.

Examples of Multimedia System

Real Estate

The screenshot displays a real estate application interface with a blue background. It features three main sections:

- House Flip Book:** A grid of four house listings, each with a color image, a price, and a brief description. The listings are for houses in Cambridge, with prices ranging from \$890,000 to \$1,050,000. Navigation buttons (Next, Previous, First, Last, Load...) and a Close button are visible at the top.
- Video Conference:** A window showing a man with glasses and a beard speaking into a microphone. It includes a GTE logo at the top and a Quit button.
- Mortgage Calculator:** A window titled "Mortgage Calculator" with the note "(values are only approximations)". It contains a table with columns A and B, showing calculations for a home mortgage.

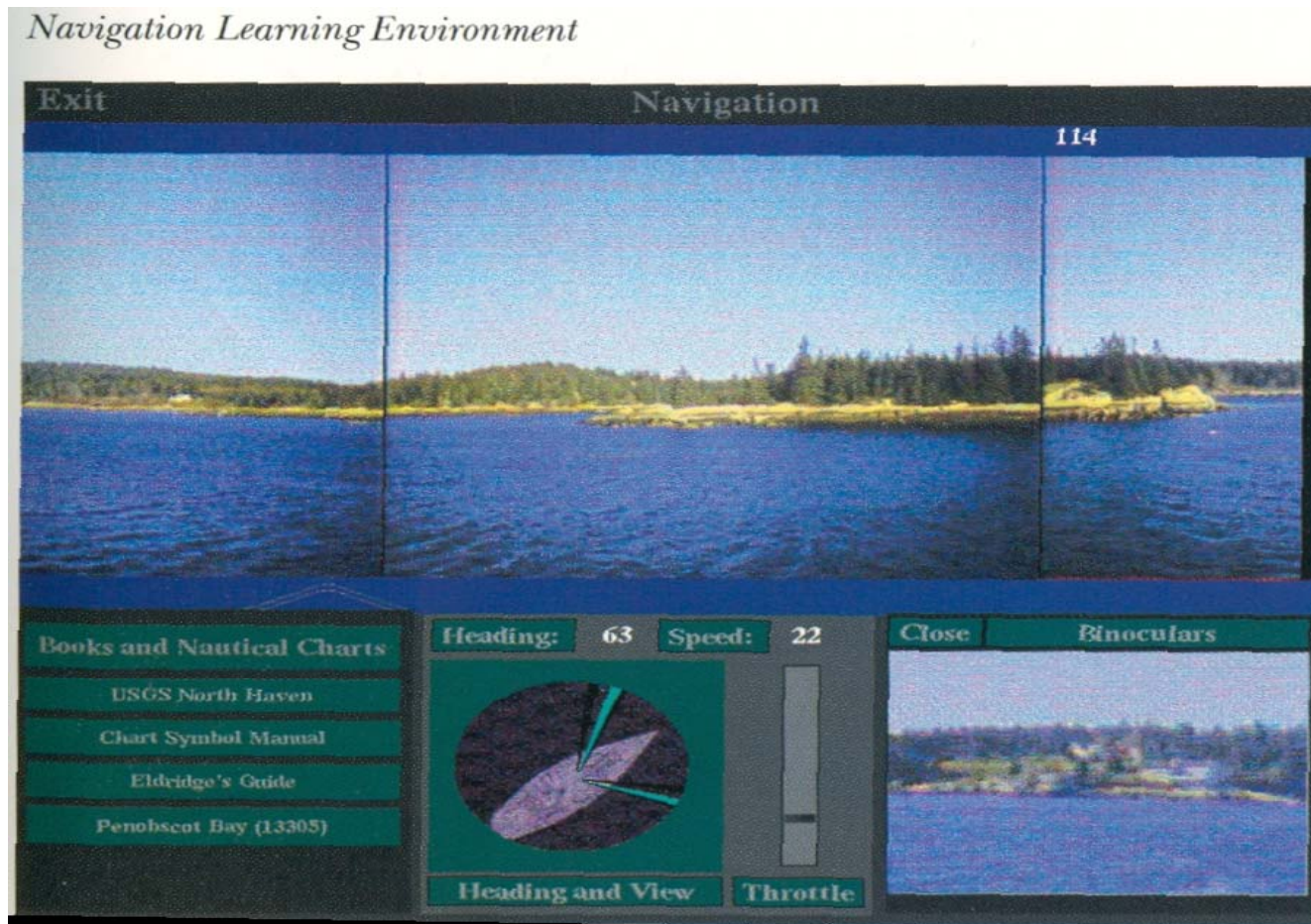
	A	B
0	Home Mortgage Calculations	
1		
2		
3	House Price	120000.00
4	Down Payment	20000.00
5	Interest Rate	10.00
6	Years of loan	30.00
7		
8	Monthly Payments	877.57
9	Total Payments	335925.77
10	Total Interest	215925.77

This prototype real estate application was developed with the AthenaMuse software at GTE Laboratories. House descriptions and color images are retrieved from a multimedia database and placed in a customized listing booklet. The client and Realtor can discuss candidate homes and financing options via desktop videoconferencing and a shared document facility.

Interface:
Russell Sasnett, at
GTE Laboratories.

Real Estate in MIT's Project Athena

Multimedia System Examples Contd.-I



The *Navigation Learning Environment* is a complex simulation designed to teach the basics of coastal navigation with “surrogate travel” techniques. The software can render a view in any direction from the pilot’s perspective, using a database of 360-degree panoramas. Maps and charts help to set a course, while a throttle control determines the rate at which the boat’s position is updated. Interface and content: Matthew Hodges.

Navigation Learning Environment in MIT’s Project Athena