Multimedia Technologies

(IN 1610)

Introduction to Multimedia

Course Outline

Credits: 2.5

Outline Syllabus:

- Introduction to Multimedia components
- Using text in Multimedia
- Digital images
- Digital Audio Basics
- Audio video production basics
- Principles of animation

Ref Book: Multimedia Making It Work – Tay Vaughan

Table of Content

What is multimedia?

- The word multimedia is composed of two parts: the prefix **multi** and **media**.
- Multi = Plural, more than 1, many
- Media = Medium of communication

What is multimedia?

Multimedia is a combination of content forms:

Text

Audio

Still Images

Animation

Video

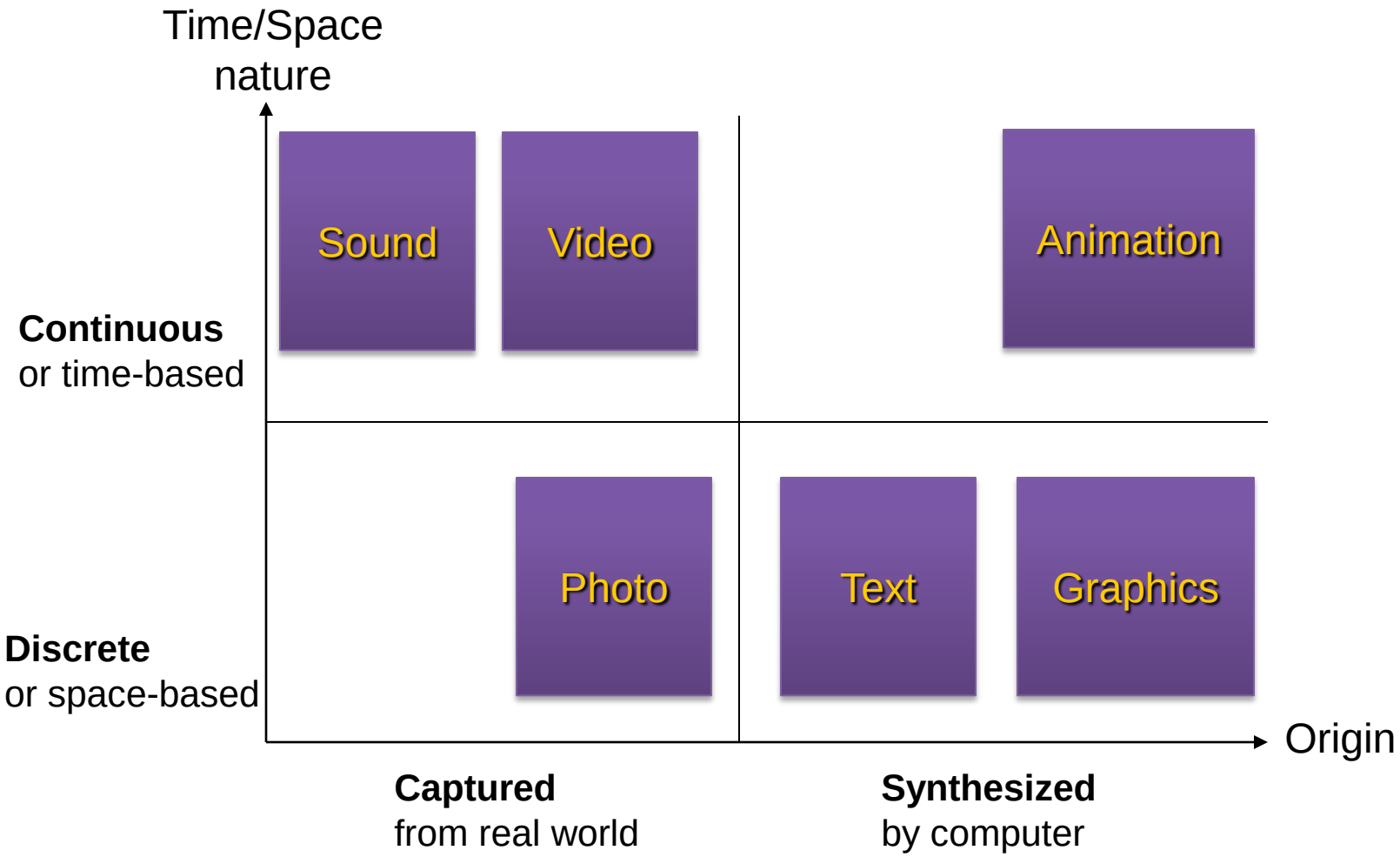
Interactivity

What is multimedia?

Definition:

Multimedia is the ***presentation of a computer application incorporating media elements such as text, graphics, animations, audio, and video.***

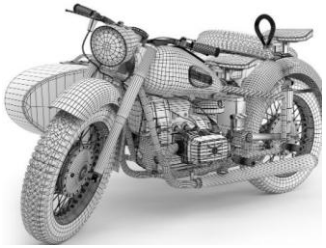
Classification of media types

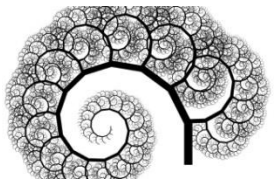


Captured Versus Synthesized Media

- ***Captured media*** refers to information types captured from the real world (e.g. Still pictures, moving pictures, and sound).

- ***Synthesized media*** refers to information types synthesized by the computers (e.g. Text, graphics and computer animation).





Discrete Versus Continuous Media

- ***Discrete media***
  - refers to media involving space dimension only (e.g. Still images, text and graphics).
  - Discrete media is also referred to
    - static media
    - non-time-based media
    - non-temporal media
    - space-based media.

- ***Continuous*** (time based)
  - Media refers to time-based media (e.g. Sound, moving images, and animation).
  - Continuous media is also referred to
    - dynamic media
    - time-based media
    - temporal media.

Multi-sensory system

- According to *Dr. Albert Mehrabian*, a specialist in interpersonal communication at the University of California, says:

People recall 20% of what they see
40% of what they see & hear
70% of what they see, hear & do

- Multimedia allows for seeing, hearing and doing (multi-sensory system)

Characteristics of Digital Multimedia System

1. **They must be computer-controlled.**
   User is able to view, hear, and see using a Multimedia PC System.

2. **They are integrated.**
   At least one discrete and one continuous media combined for information presentation and sharing.

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3. **The information they handle must be represented digitally.**
   Consists of various form of media i.e. text, graphics, audio, video, and animations; created, stored, processed, and transmitted DIGITALLY.

4. **The interface to the final user may permit interactivity.**
   User is able to navigate, interact, create, and communicate.

Benefits of using multimedia in software

- **Ease of use**
  - User friendly, increase user's effectiveness
- **Intuitive Interface**
  - Allows user to determine functions of an application by their own intuition
- **Immersive Experience**
  - Software application takes over the entire computer screen, allows user to focus on application

Benefits of using multimedia in software

- **Self-paced interaction & better retention**

  - allows information processing at one's own pace

- **Better understanding**

  - simultaneous presentation of different media provides richer & broader range of information.

- **Cost effectiveness**

  - less training, less technical support

Problems with Multimedia

- **Investment costs**
  - multimedia involves high volume of content
  - expensive copyright and royalty
- **Technical barriers (accessibility issues)**
  - upgrade IT & PC infrastructure
- **Sociopsychological barriers**
  - *Generation gap*
  - *Learning rates*
  - *Learning in group/individual*
  - *Importance of teacher*
- **Legal problems**
  - Copyright

Where to use multimedia ?

- Business
- Government
- Education
- Broadcasting & Entertainment
- Research & Development
- Health

Business

Interactive Multimedia Merchandising

- Online-shopping Kiosks
- Virtual shopping / home shopping

Desktop Videoconferencing

- Due to the high cost of transportation and the large amount of employee time spent traveling to meetings, videoconferencing is on the rise.

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Multimedia Travel Systems

- These systems enable the travel agents to show their customers about where they will travel, what will be their accommodation like, and what they will be able to do at their destinations.

Real Estate

- Multimedia systems enable buyers to visit hundreds of properties virtually, view on screen photos of homes, inspect floor plans, see street maps, and study neighborhood demographics.

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Corporate Training

- Many corporations have used multimedia to reduce training cost and improve employee productivity.

Advertising and Electronics Brochures

- The electronic brochure is an advertising and marketing tool that usually consists of single diskette or CD-ROM sent to targeted audiences. Corporations are also beginning to offer shareholders annual reports on CD-ROM.

Government

Public Service Kiosks

- Multimedia kiosks convey public service information such as jobs and employment opportunities.
- City-info kiosks offer to citizens and travelers the ability to find information on addresses, points of interest, shops, restaurants, public transportation, hours of opening, guided tours, city transport info.

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Politics

- Multimedia in general and internet in particular are playing a big role in politics and virtual campaigning where every political candidate contesting in an election has a web site.

Consumer Information

- Multimedia based CD-ROMs are available which contains government information on a wide variety of topics: government forms, list of government offices in each state, tax preparation etc.

Education

Computer Aided Learning

- To assist student through simulation for better understanding such as volcano eruption, corrosion, language pronunciation, etc.

Virtual Campus

- Learning takes place in a virtual classroom using video conferencing and online lecture so that students all around the world can attend.

Broadcasting and Entertainment

Electronic catalogue

- Product features and descriptions are advertised through web, CD and mobile devices.

Interactive Movie

- Viewers can decide the direction of the plot of the movie and camera angle.
- http://www.survivetheoutbreak.com/

On-demand News or movies

- News, movies and TV series can be watched on demand through web and mobile devices.

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3D or animated movies

- Movies created through advance 3D technology and animation techniques.

Video Games

- Advances in the field of multimedia have led to more attractive video and computer games being available now in the consumer market.

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Virtual Reality

- Virtual Reality refers to the use of a computer to immerse the user into a simulated experience that it seems real. Virtual reality systems often use special hardware to enhance the experience, including visual displays.

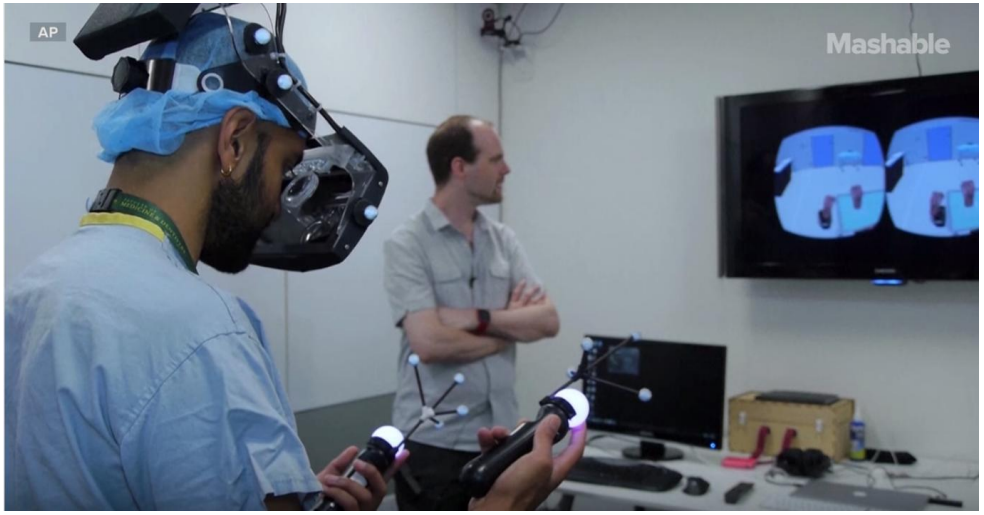
Cyber Sports

- Cyber Sports is the use of virtual reality to provide computer users with a realistic sports experience. Two new interactive virtual reality devices let you “Swing” and “Hit” balls at your PC.

Medicine

Virtual Surgery

- Virtual surgery authoring system has been created for producing surgical training simulation.
- Surgeons can use 3-D images created from magnetic resonance imaging (MRI) scans of the human body to practice complicated procedures such as brain tumor removal and reconstructive surgery.



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Video Conferencing and Image Retrieval

- The use of imaging techniques
  - X-Rays
  - CT, MRI etc
- The collection, maintenance, processing and distribution of the records
  - significantly improved by using computer based storage and multimedia networking
- Records are integrated with the on-line patient information
  - Easily shared by both local and remote physicians,
  - benefits like reduced cost and improved care.

Multimedia Products

- **Briefing**

  eg: *corporate presentation, sales presentation and educational lectures.*

- **Reference**

  eg: *encyclopedias, dictionaries*

- **Database**

  eg: library system, phone directory

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- **Education and Training**

  eg: - *Instructor support products – Resource materials for instructors*

  - Standalone or self-paced products – Learning materials for students to study at their own pace

- **Kiosk**

  eg: *bank machines, mall information centers.*

- **Entertainment and Games**

  eg: *computer games and movies.*

Evaluating Multimedia Products

- Evaluation can be done from two perspectives:

User's Perspective

- **Subject and Content**
- **Platform**
- **Usability**
- **Cost**

Developer's Perspective

- **Content**
- **Performance**
- **Delivery**
- **Interface**

User’s perspective

Subject/content

- Area of interest
- Entertainment value – multimedia games and sports-related products
- Education, training or learning objectives – how-to and subject-related products
- Need for information – encyclopedia or similar reference products

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Platform (hardware and software)

- Focus on what type of equipment the user has and if it is compatible with a specific product.
- Criteria for evaluation:
  - Hardware platforms
  - Computer processor speed and data bus requirements
  - Memory sizing

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Usability

- Usability means that the user can apply, learn, use the program efficiently.
- The key criteria here are:
  - **Learning/training time:** how long does it take to learn how to use the product,
  - **Error rate**: how often mistakes made by the users and how severe is the mistake?,
  - **Task Time**: how long does it take to accomplish a task,
  - **Retention**: how difficult is for the user to operate and how attractive is the product to use.

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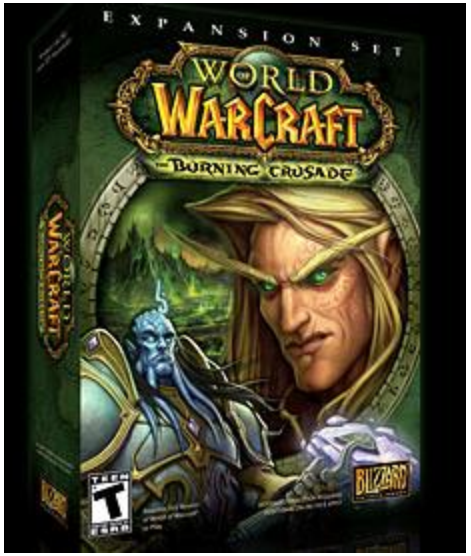
Cost

- The cost can be the first or the last factor considered by many people. Generally, users are willing to spend depending on how much is gained.



Developer’s perspective

- Developer must evaluate and aim to improve their product better than the last.

- From the developer’s perspective, evaluation will cover:

  - Content
  - Performance
  - Delivery
  - Interface

Developer's perspective

Content

- Product domain or subject matter- is the material useful for the end user?
- Message – How does the product communicate the information? Will the users understand it?
- Comparison to comparable products

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Performance

- Developer must consider that general users have equipment that has much less capabilities,
  - products should always be tested on a range of platforms before they are released.
- Graphic, audio and video presentation should be use wisely not to slow down the application for slower machine.

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Delivery

- Delivery means how fast user is able to use the product depending on the speed of the installation procedure, the configuration and documentation.
- The instructions should be straightforward, easy to configure and documentation are thorough and adequate.

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Interface

- Ease-of-use for novice users
- Depth for experienced or expert users
- Navigation features all work and are all useful and user-friendly

Enabling Technologies

- The main reason for increasing popularity of multimedia lies in dramatic concurrent advances in some enabling technologies
  - Higher processing power
  - More memory capacity
  - Bigger storage capacity
  - Better compression technology
  - Carrier and transmission technology
  - Input and output device technology
  - Protocol technology
  - Database technology
  - Software technology