

Unit - II

Components of Multimedia

* Text

- Text provide content, explanation and details to support other media elements.
- Text is used in menus, buttons and hyperlink.
- Text identifies image, video and audio.
- Heading, Titles and Subtitles.

* Basic Sound Concepts

- Audio format
files type like MP3, WAV determines sound quality and compatibility.
- Sample Rate
Measure audio quality with higher rates.
- Bitrate
Determine audio file size and quality.
- Volume and Gain
Control the loudness of audio.
- frequency → Measure sound waves.

* MIDI

- Musical Instrument Digital Interface
- MIDI is a protocol used in multimedia to communicate musical information between devices.

→ MIDI benefits in multimedia

- Small file size
MIDI file are compact, making them ideal for web and mobile application.
- flexibility
MIDI can be edited and rearranged easily.

- Low CPU usage

MIDI playback require minimal processing power.

→ Common MIDI application in Multimedia

- Music composition and production
- Video game sound track
- Interactive installation
- Virtual reality experience.

* Speech

Speech in multimedia refers to the use of spoken language in various forms, including :-

- Voiceovers - Narration or commentary
- Dialogue - Conversation b/w characters in animation.
- Audiobooks - Spoken version of books, article or documents.
- Podcast - Audio programs discussing various topics.

* Basic Concept of Images.

- Pixel - The smallest unit of digital image, represented by combination of red, green and blue (RGB) values.
- Resolution - The number of pixels per inch (PPI) or pixel per centimeter (PPC) measuring image detail.
- File Format - Common format like JPEG, PNG, GIF with unique compression and quality.
- Color Depth - The number of bits used to represent pixel colors, ranging from 8-bit to 32-bit.
- Image Ratio - Measured in inches, cm with aspect ratio like 4:3, 16:9 etc.
- Image editing - Cropping, resizing, rotating, adjusting brightness etc.

* Graphic format

Graphic formats are used to store and display visual content.

- Compression - Balance file size and image quality.
- Color depth - Determine the numbers of colors supported.
- Animation - Support motion graphics.
- Scalability - Enables resizing without losing quality.

→ Common graphic format in multimedia

- JPEG
- PNG
- GIF
- SVG
- TIFF

* Overview of Image Processing

Image processing in multimedia refers to the technique and algorithm used to enhance, transform and manipulate digital images.

→ Image Processing Operation

- Image enhancement
Improving image quality and color balance.
- Image transformation
Rotating, cropping and flipping images.
- Image filtering
Applying effects like blur, sharpen etc.
- Image Compression
Reducing image file size while maintaining quality.

→ Tools And Software

- Adobe Photoshop
- GIMP - free and open source
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* Basic Concept of Video and Animation

→ Video

- Resolution - Number of pixel in frames
- frame Rate - No. of frames displayed per second (fps)
- format - MP4, AVI
- Streaming - Real time video transmission over networks

→ Animation

- frame - by - frame Animation
- Key frame animation
- Tweening
- 3D Modeling
- Rendering

→ Common Video and Animation techniques

- Cutting
- Transition
- Compositing
- Motion capture
- Visual effects

→ Tools and Software

- Adobe Premiere Pro
- Adobe Animate
- Blender - free and open source 3D creation.

* Conventional System

Conventional system in multimedia refer to traditional method of creating, storing and distributing multimedia content.

Ex:-

- Linear Video editing
- Analog Audio Recording
- Film Based Animation
- Print Media
- Broadcasting

* Transmission

Transmission in multimedia refers to the process of sending and receiving multimedia content over various communication channel.

- Media type - Transmission of different media type such as text, images, audio, video etc.
- Network - Transmission over various network, including internet, intranet, LAN, WAN etc.
- Protocol - Use of protocol like TCP/IP, HTTP, FTP.
- Error Correction - Detecting and correcting error that occurs during transmission.
- Security - Ensuring secure transmission.

* Enhanced System

Enhanced system in multimedia refers to advance technologies and techniques that improve the creation, processing, transmission, and presentation of multimedia content.

- AI - Applying AI for content analysis, personalization.
- Machine Learning
- Cloud Computing - Storing and processing multimedia content.
- IOT - Integrating multimedia with IOT devices.
- 5G Networks - High speed network.

* HDMI

High-Definition Multimedia Interface

HDMI is a digital video interface standard for transmitting high-definition video and audio signal between devices.

→ Features

- High definition video - Support video upto 4K.
- Multi-Channel audio - carries up to 8 channel of audio.
- Single-cable convenience - combine video, audio and control signal in one cable.

→ Devices :-

- TVs
- Projectors
- Gaming consoles
- Computers
- Mobile devices

→ Benefits :-

- High-quality video and audio
- Wide device compatibility
- Convenient single-cable connection.

* Computer Based Animation

Computer Based Animation in multimedia refer to use of computer software and hardware to create animated images, videos and interactive content.

→ Types :-

- 2D Animation
- 3D Animation
- Motion graphics

→ Techniques :-

- Keyframe Animation - Define animation movement.
- Tweening - Generating intermediate frames.
- Physics - based - Real-world physics to create animation.

→ Software

- Adobe Animate
- Blender

→ Application

- Film and Television
- Video games
- Advertising and marketing
- Education and training

* Authoring tools

Authoring tools in multimedia are software application used to create, edit and publish multimedia content.

Ex:-

- Adobe Director
- Adobe Authorware
- Macromedia Flash
- Lectora Inspire

* Categories of Authority tools

→ Linear Authoring tools

focuses on creating linear content, such as video, audio etc.

→ Game Development

Specialized for creating games, including 2D and 3D games and virtual reality.

→ E-learning tools

Designed for creating educational content such as online courses, tutorials etc.

→ Web Development tools

focus on creating web-based content, including web page, animation and web application.

→ Animation and Graphics tools

focus on creating animation, graphics and visual effects.