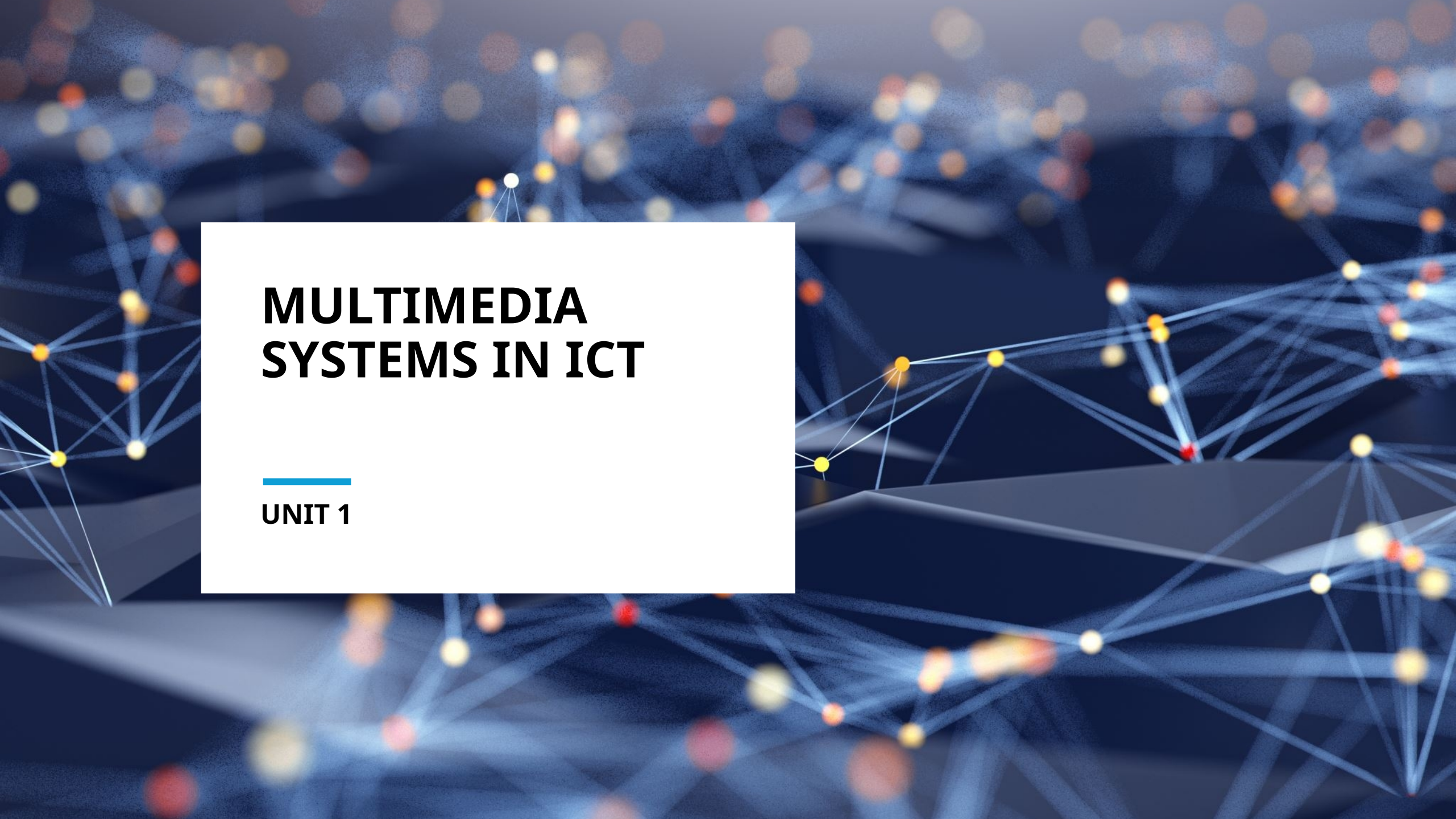


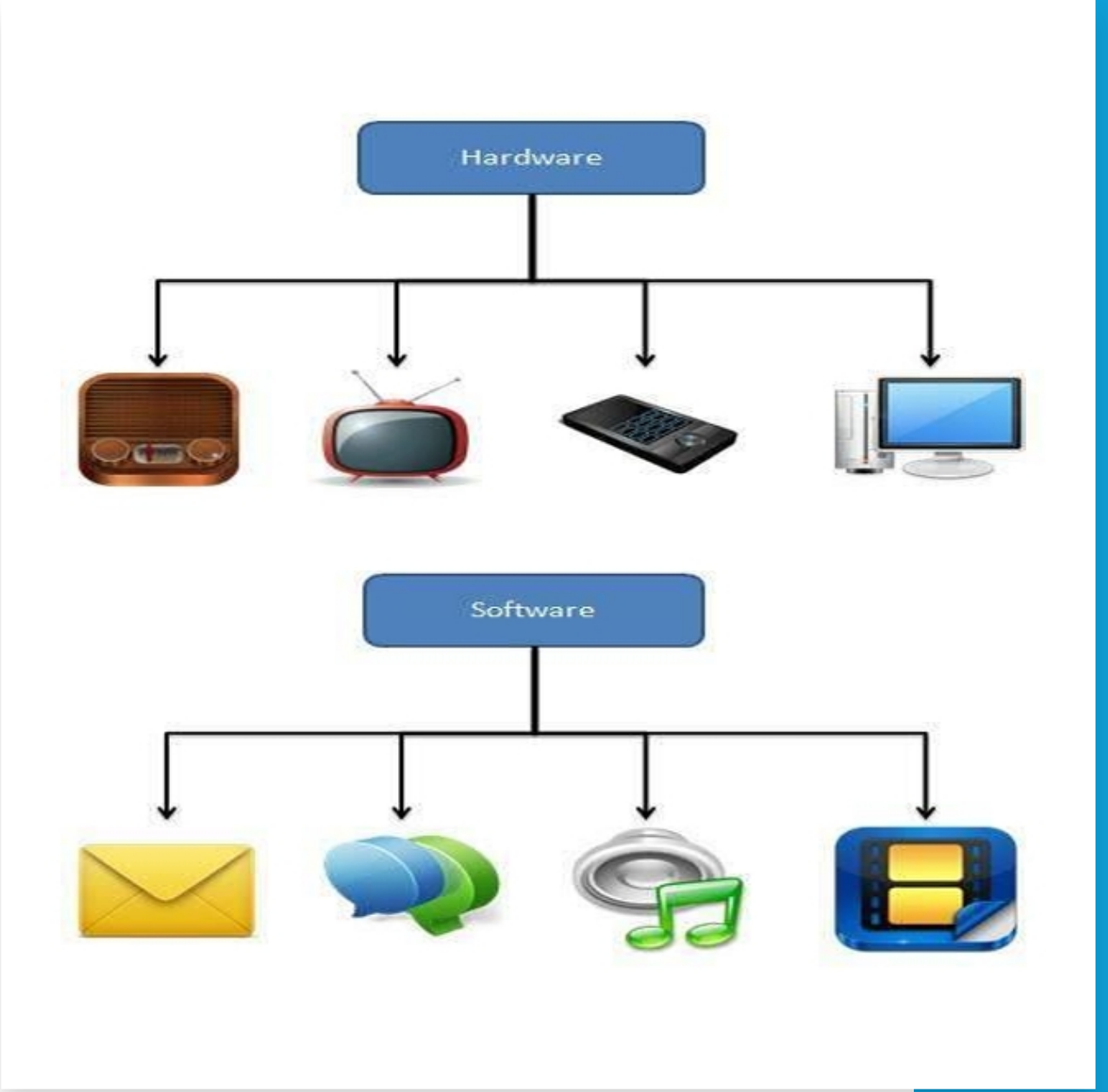
MULTIMEDIA SYSTEMS IN ICT

UNIT 1

Definition of Multimedia

- Multimedia is a representation of information in an attractive and interactive manner with the use of a combination of text, audio, video, graphics and animation.
- For examples: E-Mail, Yahoo Messenger, Video Conferencing, and Multimedia Message Service (MMS).
- Multimedia as name suggests is the combination of *Multi* and *Media* that is many types of media (hardware/software) used for communication of information.

Definition of Multimedia



Multimedia System

- A Multimedia System is a system capable of processing multimedia data and applications.
- A Multimedia System is characterized by the processing, storage, generation, manipulation and rendition of Multimedia information.
- It includes input devices (cameras, microphones), processing tools (editors, encoders), storage (HDD, SSD, cloud), networks (for distribution), and output devices (monitors, speakers, VR headsets).

Characteristics of a Multimedia System



Multimedia systems must be computer controlled.



Multimedia systems are integrated.



The information they handle must be represented digitally.



The interface to the final presentation of media is usually interactive.

Hypermedia

- Hypermedia is a type of multimedia that adds **interactivity** and **non-linear** navigation to various media forms, including text, graphics, audio, and video, through hyperlinks. In other words, it is a framework within which hyperlinking can occur.
- Hyperlinks are icons, texts or images that help users navigate to a new document, section or website.
- Hypermedia is a system or collection of graphics, data, files and texts connected across multiple digital media by hyperlinks.

Advantages of Hypermedia

Interactivity: Hypermedia enables more interactivity to take place since the user has an option to pick their path through the information being passed.

User Control: It makes the user have an upper hand in determining what information to pull out and how to pull out the information.

Disadvantages of Hypermedia

Complexity: In particular, designing hypermedia systems is a challenging process and the proper organization of processes is needed to provide users with comfortable interfaces.

Overwhelm: One of the disadvantages associated with the use of hypermedia is that it is non-linear and may at times, confuse the users through providing too many options or by disorienting them.

Non- multimedia

Non-Multimedia means any form of content or system that uses only one type of media (single mode of communication) rather than combining multiple media like text, images, audio, video, and interactivity.

Examples of Non-Multimedia Content



A printed textbook → only text (sometimes with static images).



A radio broadcast → only audio.



A vinyl record / cassette tape → audio only.



A handwritten letter → only text.

Non-Multimedia System

- A non-multimedia system is one that processes or delivers only one type of media. They lack integration of different formats and usually operate in a linear and non-interactive manner.

Examples of Non-Multimedia Systems:

- Typewriter → produces only text.
- Overhead projector with transparencies → only static images/text.
- Traditional telephone → only audio communication.

Differences between Multimedia and Non-Multimedia Systems

Characteristic	Multimedia System	Non-Multimedia System
Media Types	Uses multiple media (text, audio, video, images, animation).	Uses only one media type (mainly text or static images).
Data Type	Handles both discrete & continuous data (e.g., video/audio with timing).	Handles only discrete, time-independent data (text, images).
Interactivity	Interactive; users can control navigation.	Non-interactive; fixed, linear flow.
Complexity	More complex due to media integration and synchronization.	Simple; processes a single media format.
Processing & Storage	Needs high processing power and large storage.	Requires minimal processing and storage.
Hardware & Software	Requires specialized hardware/software (GPU, sound card, editors).	Uses basic hardware and simple applications.
User Experience	Rich, dynamic, engaging, multi-sensory.	Basic, passive experience.
Examples	VR, video games, streaming sites, interactive websites.	Word processors, simple databases, printed text.

Difference between Hypermedia and Multimedia

Comparison	Multimedia	Hypermedia
Basic	It represents the various forms of representing the information.	It is an extension of hypertext and not considered as text-based.
Types available	Both linear and non-linear available.	Only non-linear available.
Relation	It combines with hypertext to form a hypermedia.	It combines both hypertext as well as multimedia to represent information.
Based on	It basically works on interaction and interactivity.	It is used for inter-connectivity among elements and also for the cross referencing.
Requirements of hardware	It requires its own delivery system called as multimedia delivery system.	It provides the clickable links to increase capability.
Information present	It is the combination of the media and content which stores the information in some form across the devices.	It is more contrasting in nature and used in non-linear data representation.

Genesis of Multimedia

The history of multimedia dates back to the early 1960s when researchers began experimenting with combining various forms of media, such as images, text, and sound, into a single presentation. Over the decades, advances in technology have led to the development of multimedia software and hardware, making it easier for people to create and consume multimedia content. Today, multimedia is an integral part of our daily lives, from streaming videos and music to interactive games and virtual reality experiences. As technology continues to evolve, the possibilities for multimedia are endless.

Genesis of Multimedia

1960s

- Early experiments combining text, images, and sound.
- Researchers began exploring interactive media displays.
- Marked the start of multi-media integration in computing.

Early Development of Multimedia (1970s–1980s)

- **1970s**
  • First multimedia computers developed.
  • Systems could display images and text on screen.
  • Example milestone: *Pong* (1972), early graphical game.

- **1980s**
  • CD-ROMs introduced → allowed storing large multimedia files.
  • Digital audio gained popularity.
  • Multimedia became more accessible on personal computers.

Growth of Multimedia (1990s–2000s)

- **1990s – Rise of the Internet**
  - WWW introduced to the public.
  - Multimedia websites (text + images + audio + video) appeared.
  - Streaming technology enabled watching online videos.

- **2000s – Social Media & Mobile Devices**
  - Platforms like Facebook & YouTube revolutionized sharing multimedia.
  - Smartphones/tablets enabled multimedia access on-the-go.

Modern Multimedia (Present Era)

- **Present – VR & AI**
  • Virtual Reality offers immersive multimedia experiences.
  • Artificial Intelligence enhances multimedia creation (editing, personalization).
  • Expanding use in gaming, education, and entertainment.

Elements of Multimedia

The core elements of multimedia are text, graphics, audio, video, and animation. These components can be categorized as either static (unchanging) or dynamic (moving or time-based).

- **Text –** Basic element used in every multimedia application.
- **Graphics –** Bitmap & vector images enhance visual appeal.
- **Audio –** Speech, music, effects; stored digitally.
- **Video –** Moving visuals with sound; highest storage demand.
- **Animation –** Creates movement with sequenced images.

Types of Multimedia

1. **Linear Multimedia**

   Linear multimedia is a type of multimedia where the flow of content is pre-determined by the creator, and the user has no control over the sequence of presentation.

Examples:

- A cinema movie (plays from start to end).
- A TV program (user only watches).
- Advertisements in a theater or on TV.

Characteristics of Linear Multimedia



Predefined order of presentation (start → middle → end).



Users cannot skip, pause, or choose the content path.



Non-interactive in nature.



Suitable for storytelling, entertainment, and broadcasting.

Types of Multimedia

2. Non-Linear Multimedia

Non-linear multimedia allows the **user to control** the flow of content. Users can interact with the system, select paths, and decide what to view or listen to.

Examples:

Websites, e-learning, video games.

Characteristics of Non-Linear Multimedia

- Interactive → user decides the sequence.
- Non-linear navigation (click, search, choose, or skip).
- Flexible, engaging, and highly customizable.
- Involves hyperlinks, menus, and interactive elements.

Advantages of Multimedia

- Improves learning & retention.
- Engages multiple senses.
- Encourages interaction.
- Simplifies complex concepts.
- Useful in education, business, entertainment, healthcare.
- Cost-effective in digital form.

Multimedia Tools

- Multimedia tools are software applications used for creating, editing, and managing multimedia content such as audio, video, images, animations, and interactive media.
- These tools enable users to combine various media types to produce engaging and dynamic content, which is utilized in areas such as education, marketing, entertainment, and professional communication.

Classification of Multimedia Tools

1. Authoring Tools

They enable the creation of complete multimedia applications. It combines text, graphics, audio, and video into interactive presentations.

- **Examples of Authoring tools:**
- Adobe Flash (historically used for interactive websites, games).
- Articulate Storyline (e-learning course creation).
- Adobe Director (used for CD-ROM-based multimedia in the 90s).

Classification of Multimedia Tools

2. Editing Tools

They are used to create or modify specific media components.

Types & Examples:

- **Image Editing**: Adobe Photoshop, GIMP → Retouching photos, designing graphics.
- **Audio Editing**: Audacity (free), Adobe Audition → Noise removal, voice recording, music mixing.
- **Video Editing**: Adobe Premiere Pro, Final Cut Pro, DaVinci Resolve → Cutting, adding effects, transitions, subtitles.

Classification of Multimedia Tools

3. Presentation Tools

They are used to deliver information in an engaging slideshow or presentation format.

Examples:

- Microsoft PowerPoint → widely used in teaching and business.
- Google Slides → cloud-based collaboration.
- Prezi → non-linear, zoom-based presentations.

Classification of Multimedia Tools

4. Animation Tools

They are used to create moving graphics, cartoons, and 3D models.

Examples:

- Blender (free, open-source, powerful 3D modeling & animation).
- Autodesk Maya (industry-standard for movies and gaming).
- Adobe Animate (for 2D animations, web animations).

Classification of Multimedia Tools

5. Web Development Tools *(bonus category)*

They are used to build interactive multimedia websites and applications.

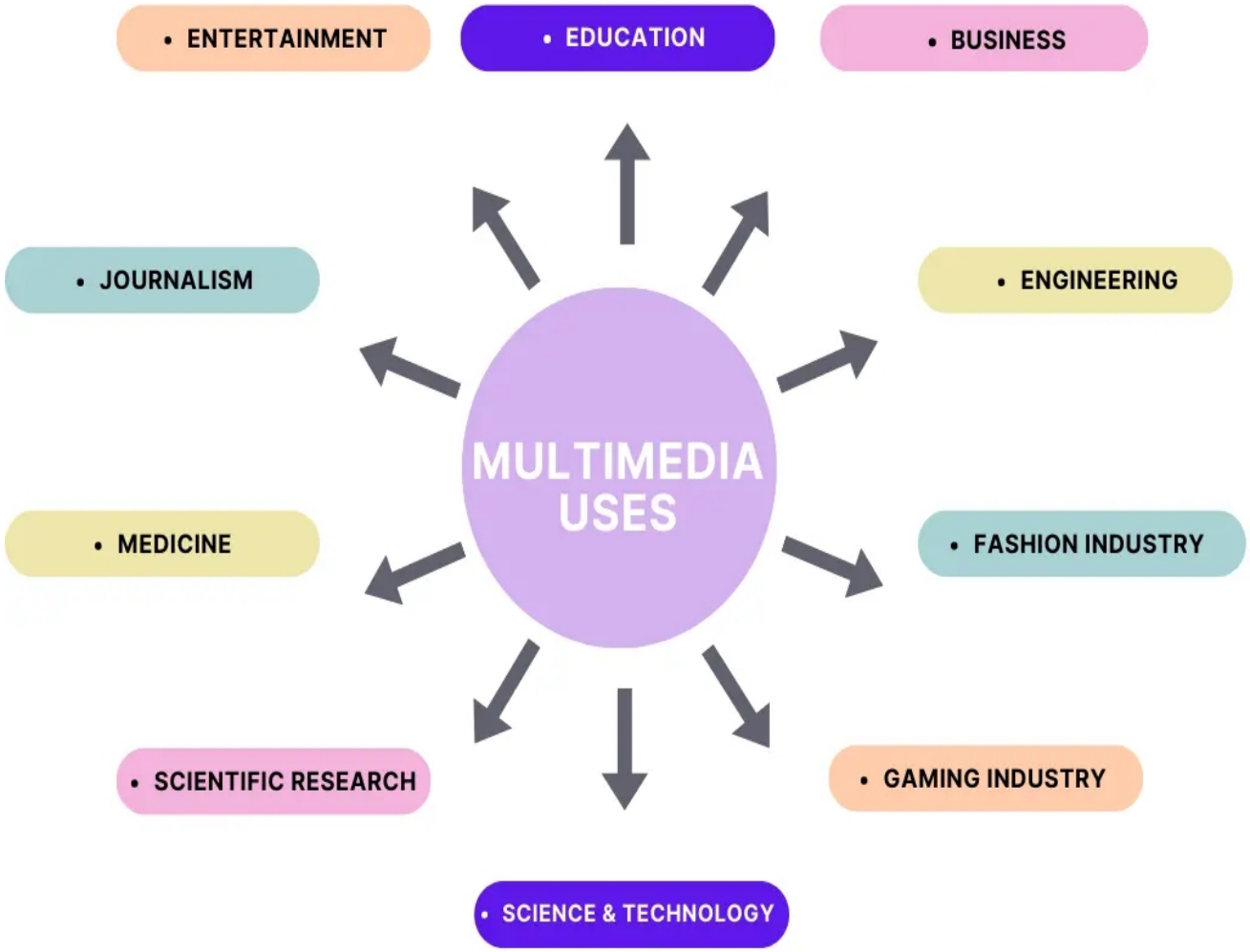
Examples:

- HTML5, Dreamweaver, WordPress, JavaScript frameworks.

Uses of Multimedia Tools

Tool Type	Uses
Authoring Tools	Build e-learning modules, tutorials, games, kiosks.
Image Editing	Design graphics, enhance photos, create UI.
Audio Editing	Record/mix audio, add sound effects, podcasts.
Video Editing	Create films, ads, tutorials, online content.
Presentation Tools	Deliver lectures, pitches, storytelling.
Animation Tools	Produce cartoons, simulations, 3D/2D animations.
Web Dev Tools	Design websites, apps, and interactive platforms.
Input Hardware	Capture audio, video, and drawings.
Output Hardware	Display visuals, play sound, provide immersive VR/AR.
Storage Devices	Store and distribute multimedia files.
Processing Devices	Handle heavy rendering, video editing, simulations.

Application of Multimedia Tools



Applications of Multimedia Tools



Education – Interactive learning, accessible content



Entertainment – Gaming, film editing, visual effects



Business & Marketing – Presentations, digital marketing, product demos



Communication – Video conferencing, information sharing