Multimedia Chap-1 - Its a question wise note for chapter 1

Multimedia System (Pokhara University)

What is Multimedia? Explain multimedia system with examples.

Multimedia is a combination of text, graphic, sound, animation and video that is delivered interactively to the user by electronic or digitally manipulated means.

The elements of multimedia are: Texts, graphics, video, audio, animation. Multimedia presentation is basically a digitally show. Because multimedia is field concerned with the computer control integration of graphics, text, drawing, still and moving images(video), animation, audio and any media where any type of animation can be represented, stored, transmitted and processed digitally.

Multimedia systems are systems that can store, retrieve, and process various types of media, such as text, graphics, image, full-motion video, audio, and animation. Multimedia system is a system that involves generation, representation, storage, transmission, search and retrieval, delivery of multimedia information.

Multimedia system allow users to create, process, share, and display information in a broad variety of formats. Example: - A manager or student can use a multimedia system to make an impressive business statement.

Multimedia systems involve some basic enabling techniques:

- Multimedia data representation and compression.
- Multimedia data processing and analysis.
- Transmitting multimedia data through communication networks.
- Multimedia database, indexing and retrieval.

Some characteristics:

- Multimedia systems must be controlled by a computer – storing, transmitting and presenting the information to the end users
- Multimedia systems are linked to one another, i.e., integrated: The system's multimedia components such as video, music, text, and graphics must all be integrated in some way.
- The data they work with must be represented digitally: The process of converting an analog signal to a digital signal.
- Usually, the interface to the final media presentation is interactive.
- Multimedia systems are integrated.
- The information they handle must be represented digitally.
- The interface to the final presentation of media is usually interactive.

Some examples include computer games, computer-assisted design, home improvement software that allows users to design and display a proposed project in 3-D, flight simulators, and simulation of a crash for accident investigation.

Explain data stream characteristics for continuous media.

The data stream characteristics in transmission are associated with any audio and video data transfer. Data Stream is any sequence of individual packets transmitted in a time-dependent fashion. Packets can carry information of continuous media. The data stream will be used as a synonym data flow.

Data stream characteristics in media transmission are connected with audio and video data transfer. Generally, those data stream characteristics are for continuous media can be classified on the basis of three given factors:-

1. According to time intervals between consecutive packets:

   a) Strongly periodic data stream
   If time intervals are of the identical length between two consecutive packets that's a continuing, then the stream is named strongly periodic and within the ideal case the jitter has the worth zero. For eg: PCM coded speech in traditional telephone switching.

   b) Weakly periodic data stream

   If time intervals between two consecutive packets is not constant but are of periodic nature with finite period then the data stream is called weakly periodic.

   c) A-periodic data stream:

   If the sequence of time intervals is neither strongly nor weakly periodic, instead the time period or time gap various between packets to packets during transmission then such data stream is called A-periodic data stream.

2. According to variation of consecutive packet amounts

   a) Strongly regular data stream:

   If the number of information stays constant during the life time of a knowledge stream, this feature is specially found in uncompressed digital data transmission, as an example audio stream of CD, video stream of camera in uncompressed form.

   b) Weakley regular data stream:

   If the amount of data stream varies periodically with time and not shows the behaviors of strongly regular data stream then it is called Weakley regular data stream, For example compressed video stream.

c) Irregular data stream:

If the number of information is neither constant nor changes in keeping with a periodic function, then the information streams are called irregular data stream. Transmission and processing of this category data stream is complicated. Since data stream includes a variable (bit) rate after applying compression methods.

3. According to continuity or connection between consecutive packets.

a) Continuous data stream:
If consecutive packets are directly transmitted one after another without any time gap then such data streams are called continuous data stream, For example audio data use for B channel of ISDN with transmission rate for 64 kbps.

b) Unconnected data stream

A data stream with gaps between information units is named and unconnected data stream. The transmission of a connected data stream through a channel with the next capacity treads gaps between individual packets, as an example the information stream coded with JPEG method with 1.2 Mbps on a FDDI network.\

What are required characteristics of multimedia system?

The characteristic of multimedia system is as follow: -

In general, multimedia is defined as an electronically delivered combination of media including video, still images, audio, and text in such a way that can be accessed interactively. Multimedia supports computer information to be represented through audio, video, animation I addition with traditional media (i.e., text, graphics, images, drawings). Multimedia application refers to the use of collection of different multimedia sources.

The characteristics that are requires for the good multimedia systema are described as follows: -

1. **File System**
File system must be efficient to meet the requirements of continuous media. These media files require very high-disk bandwidth rates. Disks usually have low transfer rates and high latency rates. To satisfy the requirements for multimedia data, disk schedulers must reduce the latency time to ensure high bandwidth.

2. **File formats that support multimedia**
Multimedia data consists of a variety of media formats or file representation including, JPEG, MPEG, AVI, MID, WAV, DOC, GIF, PNG, etc. AVI files can contain both

audio and video data in a file container that allows synchronous audio-with-video playback. Like the DVD video format, AVI files support multiple streaming audio and video. Because of restrictions on the conversion from one format to the other, the use of the data in a specific format has been limited as well.

3. **Input/Output**
   In multimedia applications, the input and output should be continuous and fast. Real-time recording as well as playback of data are common in most of the multimedia applications which need efficient I/O.

4. **Operating System**
   The operating system must provide a fast response time for interactive applications. High throughput for batch applications, and real-time scheduling,

5. **Storage and Memory**
   Multimedia systems require storage for large capacity objects such as video, audio, animation and images. Depending on the compression scheme and reliability video and audio require large amount of memory.

6. **Network Support**
   It includes internet, intranet, LAN, WAN, ATM, Mobile telephony and others. In recent years, there has been a tremendous growth of multimedia applications on the internet like streaming video, IP telephony, interactive games, teleconferencing, virtual world, distance learning and so on. These multimedia networking applications are referred as continuous-media applications and require high communication latency. Communication Latency is the time it takes for a data packet to be received by the remote computer.

7. **Software Tools**
   For the development of multimedia applications, the various software tools like programming languages, graphics software's, multimedia editing software's scripting languages: authoring tools, design software's etc are required. In addition to these the device drivers are required for interfacing the multimedia peripherals.

Explain Global Structure of Multimedia.

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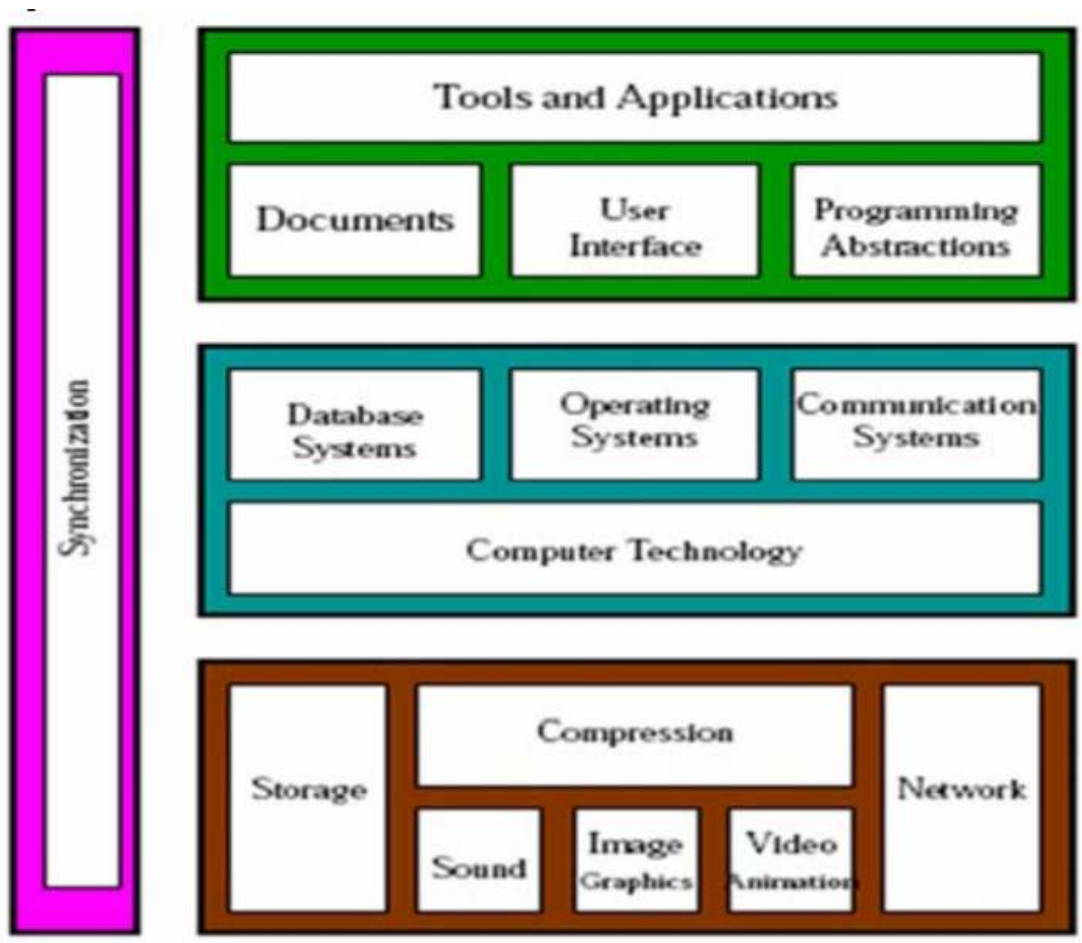

Figure: Global Structure of Multimedia

It deals with interaction between multimedia application and multimedia devices such as AGP

Card, Sound Card etc. Basic concepts for the processing of digital audio and video data are based
on digital signal processing. Different methods for the processing of image, graphics and
animation are described. The audio techniques section includes music (MIDI) and speech
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Device Domain

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System Domain

The system domain includes all supports for using the functions of the device domain, e.g., operating systems, communication systems (networking) and database systems. It provides the user with a programming and computational environment, which should be easy to operates.

Application Domain

It provides functions to the user to develop and present multimedia projects. This includes Software tools, and multimedia projects development methodology.

Cross Domain

It turns out that, some aspects such as synchronization aspects, are difficult to locate in one or two components or domain. The reason is that synchronization, being the temporal relationship among various media, relates to many components across all domain.

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System Domain:
The interface between the device domain and the system domain is specified by the computer technology. To utilize the device domain, several system services are needed. Basically, three

services exits. These services are mostly implemented in software. The operating system, serves as an interface between computer hardware/system and all other software components. It provides the user with a programming and computational environment, which should be easy to operate. The database system allows a structured access to data and a management of large

databases. The communication system is responsible for data transmission according to the
timing and reliability requirements of the networked multimedia.

Application domain: Provides functions to the user to develop and present multimedia projects. This includes software
tools, and multimedia projects development methodology. The services of the system domain are

offered to the application domain through proper programming abstractions. Another topic embedded in the application domain is document handling.

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