COM 419E: MULTIMEDIA TECHNOLOGIES

GROUP ASSIGNMENT

GROUP MEMBERS

1.FAITH WATIRI COM/011/19

2. DAN OMWA COM/049/19

3.IAN KOSKEI COM/029/19

4.ANTOINETTE AKINYI COM/018/19

5.AMOS MOGAKA COM/025/19

6.ELIZABETH ODHIAMBO COM/057/19

a) Define the following terms as used in Multimedia Systems:

MIDI- is a communication standard developed for electronic musical instruments and computers.

Encoding-Is the process of putting a sequence of characters that is letters, punctuation, and certain symbols into a specialized format for efficient transmission or storage.

Aspect ratio- is an attribute that describes the relationship between the width and height of an image.

b) List three applications of multimedia

Education

Multimedia assist learners to get on well with mental representations with the use of different media elements, which support information processing.

Engineering

Software engineers often use multimedia in computer simulations for anything such as military or industrial training. Multimedia can also be used as an open development framework for manufacturing applications by providing users with tools to re-engineer and integrate product and process information.

Creative industries

Creative industry use multimedia for a variety of purposes ranging from fine arts, to commercial arts, to journalism and software services.

c) Differentiate between Raster Graphics and Vector Graphics. Give two file formats for each. Raster graphics are digital images represented by a matrix of pixels called a bitmap while vector graphics are computer graphics in which visual images are created directly from geometric shapes defined on a cartesian plane. Raster graphics file formats • .JPEG. • .PNG. Vector file formats • SVG (Scalable Vector Graphics) • PDF (Portable Document Format)

d) A bitmap image has 157\*131 resolution pixels. Each pixel is 16-bit depth. Calculate the size of the bitmap image in kilobytes. File size= (resolution\*bit depth) = (157\*131 \* 16) =329072 bits \*0.000125 = 41.134 kilobytes

e) Discuss three challenges present in analog media that would call for digitalization of audio signals to solve

Analog signals are prone to generation loss

This is the loss of quality between subsequent copies or transcodes of data. In analog signals, generation loss is mostly due to noise and bandwidth issues in cables, amplifiers, mixers etc. One way of minimizing the number of generations needed was to use an audio mixing or video editing suite capable of mixing a large number of channels at once.

Analog signals are subject to noise and distortion, as opposed to digital signals which have much immunity

Both digital and analog systems are subject to noise and distortion. The difference is that you don’t listen to or view a digital signal. You have to convert it to analog. A digital signal only has to accurately convey tow levels. As long as the distortion and noise do not prevent reading these two levels, it can have converted to analog without any errors. With no errors, it is possible to recover the original analog signal without added noise or distortion.

In analog system, any added noise becomes part of the signal. Any distortion becomes part of the signal. There really is no way to separate them.

Analog signals are generally lower quality signals that digital signals

Digital recordings can be played and copied endlessly without ever losing their original quality. Over time, vinyl records and tapes can lose their audible value when being played or copied.

An analog audio bandwidth is considered unlimited. Therefore, it can move to a higher and higher resolution therefore losing its quality.

f) Discuss the distinction between lossy and lossless compression. Give appropriate techniques applied in each.

  Lossy Compression and Lossless Compression are the categories of data compression methods. The main difference between the two compression techniques is that, the lossy compression technique does not restore the data in its original form, after decompression on the other hand lossless compression restores and rebuilt the data in its original form, after decompression.

Differences:

|  |  |
| --- | --- |
| **Lossy Compression** | **Lossless Compression** |
| Algorithms used in **Lossy** compression are:  Transform coding,  Discrete cosine form,  Discrete Wavelet Transform,  fractal compression etc. | Algorithms used in **Lossless** compression are:  Run length encoding,  [Lempel-Zech-](https://www.geeksforgeeks.org/lzw-lempel-ziv-welch-compression-technique/)Welch,  Huffman Coding, Arithmetic encoding etc. |
| Lossy compression is the method which eliminate the data which is not noticeable. | While Lossless Compression does not eliminate the data which is not noticeable. |
| In Lossy compression, A file is not restored or rebuilt in its original form. | While in Lossless Compression, A file can be restored in its original form. |
| Lossy compression has more data-holding capacity. | Lossless Compression has less data-holding capacity than Lossy compression technique. |
| Lossy compression is used in Images, audio, video. | Lossless Compression is used in Text, images, sound. |

g) A frame size of a full coloured video is 800 by 600. It is recorded with a 2-channel quality audio at a frequency of 44.1Hz. Calculate the size of the uncompressed video file recorded for 3 minutes. (6mks)

***Solution***

* Bitrates (Mbps) / bits \* duration(s)

Bit rates = frequency \* bit depth \* channel

(44.1 \* 16 \* 2)

= 1, 411.2 kbps

Uncompressed video = 1411.2 / 8 \* 3(60)

= 31, 752 Mb

= 31, 752 / 1024

= 31.01 Gb