INTRODUCTION TO MULTIMEDIA:- COMPRESSION

TuK

Bachelor Information Technology/Communications and
Computing Networks Year 4 Semester 1

MULTIMEDIA APPLICATIONS / SYSTEMS AND APPLICATIONS

SUBJECT CODE: ECCI/ECII 4102

OVERVIEW

1. Lecture Introduction & Attendance Registration

2. Lecture Aims & Objectives

3. Lecture 1 Outline

4. Recommended Chapter from Recommended Reading List

5. Lecture 1 Topic

7. Q&A

LECTURE AIMS & OBJECTIVES

1)   **To introduce students to Multimedia text, graphic, sound, video & animation theories.**

2)   **To equip students with the knowledge to develop and use multimedia text, graphics, sound, video, animation skills**

3)   **To develop students' expertise in the use of Multimedia text, graphics, sound, video & animation tools and techniques**

4)   **To design multimedia text, graphics, sound, video &animation applications**

5)   **To implement the design, and maintain the implemented multimedia text, graphics, sound, video & animation systems while also supporting users**

6)   **To enable graduates to find a wide variety of career opportunities in information technology related areas in both private and public sectors**

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BASIC MULTIMEDIA CONCEPTS

INTRODUCTION TO MULTIMEDIA

DATA COMPRESSION

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RECOMMENDED CHAPTER FROM RECOMMENDED READING LIST

1. "Multimedia Foundations: Core Concepts for Digital Design" Focal Press, 2016

INTRODUCTION MULTIMEDIA: BASIC MULTIMEDIA CONCEPTS, TEXT, GRAPHICS, SOUND, VIDEO & ANIMATION IN A SINGLE APPLICATION

INTRODUCTION TO MULTIMEDIA-COMPRESSION

How To Compress Data (speech, video, images, graphics, audio)

- Exploit **inherent redundancy and irrelevancy** through **transforming** a data file into a **smaller file** from which **the original image file** can later be **reconstructed exactly or approximately**

- Data compression algorithms **are either Lossy or Lossless**

- **Lossy** (throw away non-essential- perceptually less relevant parts of the data stream

- **Lossless** (ideal e.g. zip)- not good enough for MM data but filter the data somehow

- Video and sound images are normally compressed with a lossless compression

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSLESS COMPRESSION

- **Techniques guaranteed to generate an exact duplicate of the input data stream after a compress/expand cycle**

- Example:- the transfer of a text file over a network

- No part of the source information should be lost during either compression or decompression

- Popular lossless coding techniques:- **Entropy, Huffman Coding** and **Arithmetic Methods**

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSLESS COMPRESSION ENTROPY ENCODING

- Independent of the type of information being compressed.

- Concerned solely with how the information is represented

- First convert it into run-length encoding (make the source information comprise of long substrings of the same character or binary digit)

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSLESS COMPRESSION (ENTROPY ENCODING)

- EXAMPLE: If an application requires the transmission of long strings of binary bits that comprise a limited number of substrings then each substring can be assigned a separate code-word

- Used instead of transmitting source string in the form of independent code-words or bits

- Transmission then takes place in the form of a different set of code-words but also an indication of the number of characters/bits in the substring

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSLESS COMPRESSION (ENTROPY ENCODING)

- EXAMPLE: the data to be transmitted is :**000000011111111110000011...**

- Could be represented as: **{0,7} {1,10} {0,5} {1,2} . . . .**

- To send this the individual decimal digits would be sent in binary form

- Assuming a fixed number of bits per code-word, the number of bits per code-word would be determined by the largest possible substring.

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSY COMPRESSION

- Information once **uncompressed** cannot be **fully recovered.**

- Involves **analyzing data** and determining **which part of it has little effect** on the **resulting compressed data.**

- Example#1:- compression of an image to reduce the resolution of the image

- Allows much lower data rates and file sizes than lossless compression,

- Lossy codecs commonly used for final production of Internet video

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INTRODUCTION TO MULTIMEDIA-COMPRESSION

LOSSY COMPRESSION

- Aim is not to reproduce an exact copy of the source information after decompression but instead a version of it perceived by the recipient as a true copy

- With such algorithms **the higher the level of compression** being applied to the source information **the more approximate the received version** becomes

- Example#2: transfer of digitized images and audio and video streams.

- Sensitivity of the human eye or ear is such that any fine details missing from the original source signal after decompression are not detectable.
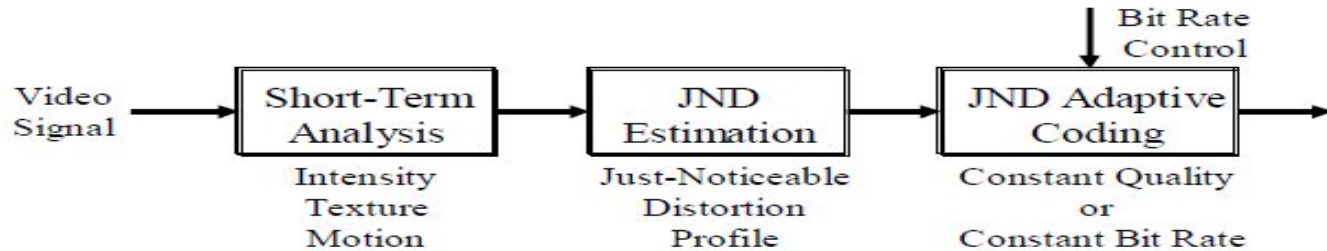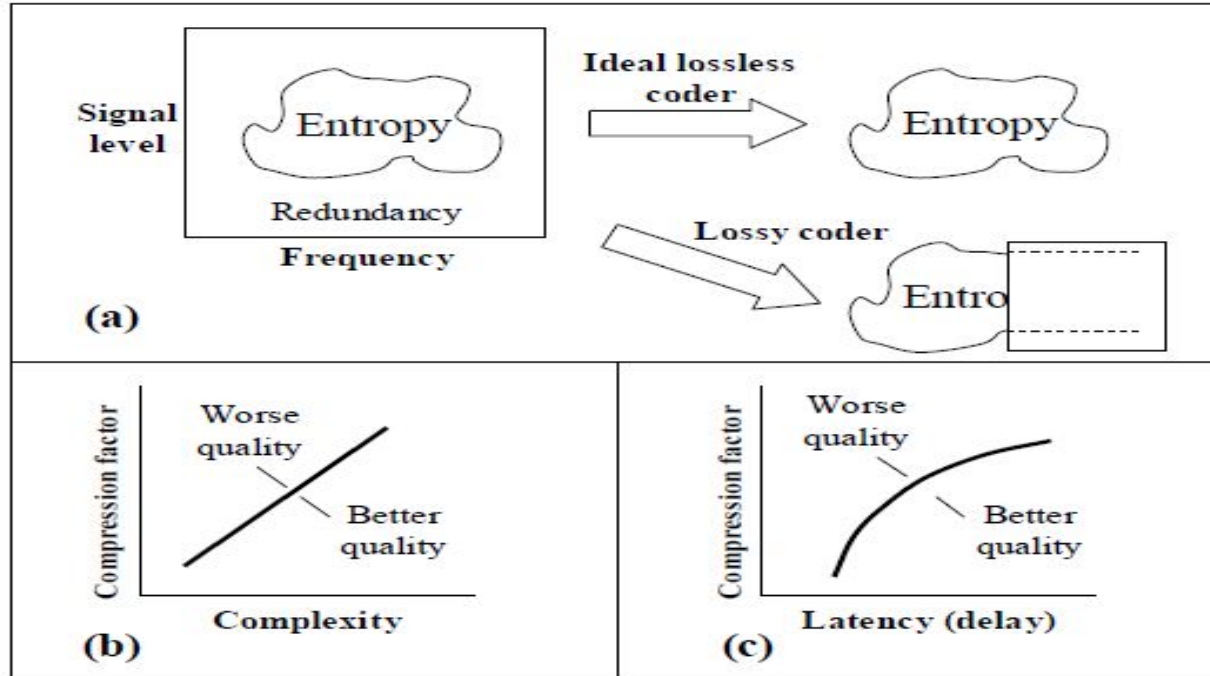
Perceptual Coding

Figure: Block diagram of generic image-coding algorithm

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Compression Methods Used by Various Image File Formats

	BMP	GIF	PNG	JPEG
RLE	X			X
LZ		X	X	
Huffman			X	X
DCT				X

QUESTION AND ANSWER SESSION

ANY

QUESTIONS

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