**UNIT III**

**Unit-IV**

1. **What is image compression?**

Image compression refers to the process of redundancy amount of data required to represent the given quantity of information for digital image. The basis of reduction process is removal of redundant data.

1. **What is Data Compression?**

Data compression requires the identification and extraction of source redundancy. In other words, data compression seeks to reduce the number of bits used to store or transmit information.

1. **What are two main types of Data compression?**

**Lossless compression** can recover the exact original data after compression. It is used mainly for compressing database records, spreadsheets or word processing files, where exact replication of the original is essential.

**Lossy compression** will result in a certain loss of accuracy in exchange for a substantial increase in compression. Lossy compression is more effective when used to compress graphic images and digitized voice where losses outside visual or aural perception can be tolerated.

1. **What is the need for Compression?**

In terms of storage, the capacity of a storage device can be effectively increased with methods that compress a body of data on its way to a storage device and decompress it when it is retrieved.

In terms of communications, the bandwidth of a digital communication link can be effectively increased by compressing data at the sending end and decompressing data at the receiving end.

At any given time, the ability of the Internet to transfer data is fixed. Thus, if data can effectively be compressed wherever possible, significant improvements of data throughput can be achieved. Many files can be combined into one compressed document making sending easier.

1. **What are different Compression Methods?**

* Run Length Encoding (RLE)
* Arithmetic coding
* Huffman coding and
* Transform coding

1. **Define is coding redundancy?**

If the gray level of an image is coded in a way that uses more code words than necessary to represent each gray level, then the resulting image is said to contain coding redundancy.

1. **Define inter pixel redundancy?**

The value of any given pixel can be predicted from the values of its neighbors. The information carried by is small. Therefore the visual contribution of a single pixel to an image is redundant. Otherwise called as spatial redundant geometric redundant or inter pixel redundant. Eg: Run length coding

1. **Define compression ratio.**

Compression is normally measured with the compression ratio:

**Compression Ratio** = original size / compressed size: 1

1. **Define source encoder**

Source encoder performs three operations

1) Mapper -this transforms the input data into non-visual format. It reduces the interpixel redundancy.

2) Quantizer - It reduces the psycho visual redundancy of the input images .This step is omitted if the system is error free.

3) Symbol encoder- This reduces the coding redundancy .This is the final stage of encoding process.

1. **Define channel encoder**

The channel encoder reduces reduces the impact of the channel noise by inserting redundant bits into the source encoded data. Eg: Hamming code

1. **What are the types of decoder?**

Source decoder- has two components

a) Symbol decoder- This performs inverse operation of symbol encoder.

b) Inverse mapping- This performs inverse operation of mapper.

Channel decoder-this is omitted if the system is error free.

1. **Define arithmetic coding**

In arithmetic coding one to one corresponds between source symbols and code word doesn’t exist where as the single arithmetic code word assigned for a sequence of source symbols. A code word defines an interval of number between 0 and 1.

1. **What is JPEG?**

The acronym is expanded as "Joint Photographic Expert Group". It is an international standard in 1992. It perfectly Works with color and grayscale images, Many applications e.g. satellite, medical.

1. **What are the basic steps in JPEG?**

The Major Steps in JPEG Coding involve:

DCT (Discrete Cosine Transformation)

Quantization

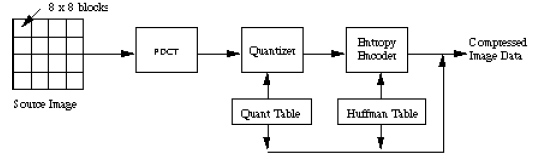
Zigzag Scan

DPCM on DC component

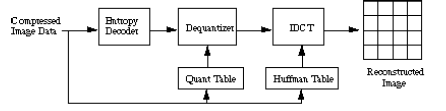
RLE on AC Components

Entropy Coding

1. **Draw the JPEG Encoder.**

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1. **Draw the JPEG Decoder.**

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