Test 1

1. Discussion the significance of sampling & quantization process in the importance in understanding the image processing.
2. Discuss the importance in understanding the image processing (application of DIP)
3) Image analysis and understanding society building
4) Importance of Biometrics considering the current application
5) Image representation.

1. Sampling Process & Quantization Process

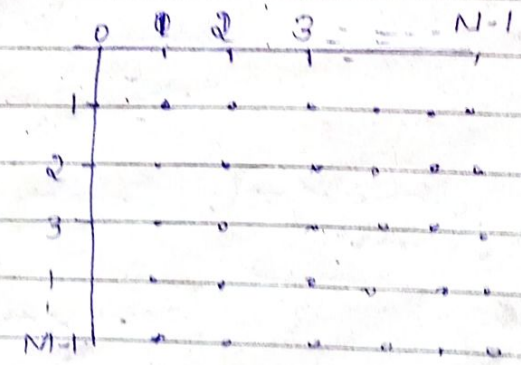
The sampling rate governs the spatial resolution of the digitized image, while the quantization level fixes the number of grey levels in the digitized image.

A magnitude of the sampled image is expressed as a digital value in image processing.

The changeover between continuous values of the image function & its digital equivalent is called quantization.

The number of quantization levels should be high enough for human perception of fine shading details in the image.

The representation of digital images using array data structure.



To perform sampling & quantization process on a analog image to a digital image. To perform operations on analog signal with a digital computer, we have to store that analog signal in the computer & more memory is required to store it. That is problem, so convert that

analog signal into digital format then store in computer & perform operations.

2) Image processing.

→ Digital Image processing involves image understanding, Image Analysis & computer vision which aims to imitate the proces of human vision electronically.

→ Image is better than any other information or words.

→ Human vision can easily understand the image

→ Interpretation of dynamic scenes such as moving objects.

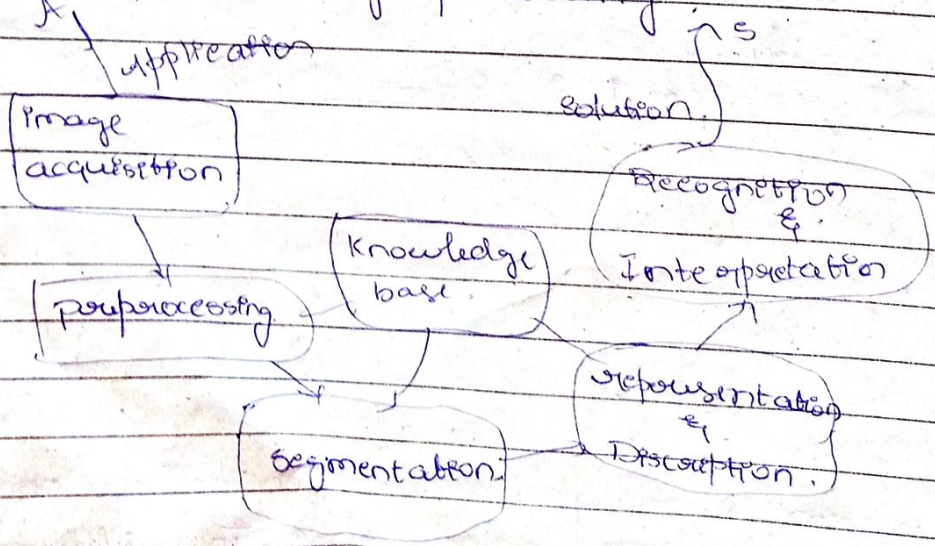
→ To improve the vision quality of the the image for human interpretation

→ To analyse the contents of image

→ Image enhancement - which improve of image.

→ This process helps in designing an accurate digital image processing & made autonomous machine perception most robust & reliable.

Basic steps in image processing



a) Image acquisition: firstly we have to acquire the image for processing. some preprocessing operation can happen in this step like correction etc.

3) preprocessing:
Process the image in the digital form.
image enhancement which means enhance the image quality, brightness etc.

c) Segmentation:
The process of subdivide of object of the image
The Thresholding helps to the segmentation & it divide the objects & the background of the image & also separate the different regions.

d) representation & Description: Selecting a good representation is only part of the solution for transforming image data into a form suitable for success processing.
Description means feature extraction.
feature extraction techniques are used to extract features of an image.

e) Recognition: It's the process that assigns a label to an object based on its features.

f) knowledge base: knowledge about a problem domain is coded into an image processing system in the form of knowledge database & it also controls interaction between the modules & guide the operation of each process

4) Biometric.
Biometrics are physical or behavior of human characteristics to that can be used to digitally identify a person to grant access to systems, data.
Application:
Today we can see almost biometric in so many places like.
→ Banking.
→ Airport.
→ secured transactions.
→ electronic voting.
Bio It is used to Authentication of a person.

For example -

Electronic voting system which seeks to make use of the uniqueness of the human finger print of the voters. The voters fingerprints captured & stored on the database.

5) Image Representation:

Selecting a good representation is only part of the solution for transforming image data into a form suitable for success processing.

It has many forms & it refers to the way that the conveyed information such as color, is coded digitally & how image is stored & how the structure of an image file.

→ color by numbers.

→ activity descriptions

→ differently, the visual content of the image can also take part in its representation.

→ It has provided new approaches of representation & new standards, gathered together into the discipline named content-based image indexing.

3) Image analysis is the extraction of meaningful information from images; mainly from digital Image analysis tasks can be as simple as reading bar coded tags or as sophisticated as identifying a person from their face

Application

→ Agriculture
→ Autonomous vehicles
→ process control
→ Face recognition
→ character recognition
→ Biometrics

→ Agriculture:
→ For harvesting
→ cleaning
→ for quality inspection
→ for disease identification

Banking: Document verification, person authentication, cheque analysis

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III 3rd Sem MSc(CS)

Image Processing