

STUDENT'S NAME <u>Vijetha B.V</u>		TOTAL MARKS OBTAINED
CLASS	SUBJECT <u>IP</u>	
ROLL NO. <u>193393746</u> DATE		

1. Discuss the significance of sampling & quantization in processing of digital images (4)
2. Discuss the importance of image pre-processing in understanding the digital image data (4)
3. justify 'Image analysis & understanding is an useful task for better society building' (4)
4. Discuss the importance of biometric Considering the Current applications (4)
5. Explain image representation (4)

1. 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.

2d representation of image

Origin  $0 \ 1 \ 2 \ \dots \ n-1$

$1 \ \dots \dots \dots \rightarrow 1 \text{ pixel}$

$m-1$   $f(x, y)$



The representation of digital image using array is shown here. We can notice here the reason to perform sampling & quantization process on a given analog image to digital image.

2. Image pre processing involves operations on image at the lowest level of abstraction where both the I/p & o/p image are intensity images. The aim of pre processing is an improvement of the image data that eliminates distortions or enhance some image features suitable for further processing. Image process enhancement is the most appealing pre processing technique. Basically, the idea behind enhancement technique is to bring out detail that is obscured. It simply to highlight certain features of interest in an image such as changing brightness & contrast etc."

Image processing is the use of a digital computer to process digital images through an algorithm. It is a field of digital signal processing. Digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the I/p data & can avoid problems noise & distortion during processing.

3. Image analysis & understanding is an useful task for better society building. We can justify this because lot of application is there that "helpful for society. The field of digital IP has seen continuous & significant expansion in recent years. The usefulness of the technology is seeming



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in many different fields connecting medicine through remote sensing. The advances with availability of IP has now further enhanced the usefulness of IP. Some of the major fields in which digital image processing is widely used are mentioned below.

- \* Agriculture
- \* Augmented reality
- \* Autonomous vehicles
- \* Biometrics
- \* Character recognition
- \* Forensics
- \* Image restoration
- \* Pollution monitoring
- \* Remote sensing
- \* Industrial quality inspection
- \* Face recognition
- \* Gesture Analysis
- \* Geo Science
- \* Medical image analysis
- \* Process Control

4. The important application of image processing is Biometrics. Biometrics are used in various fields. They are

- Banking
- Airport
- Electronic Voting
- Defense sector
- Secured transaction.

Using suitable pre-processing techniques, image is used to extract the hidden info in an obliterated image. It is possible to extract the hidden info in an image which is commonly used in forensic application.

Banking:

Typical tasks include: Document verification; person authentication; Bankers Cheque analysis.



cheque validation: The cheque is subjected to segmentation, subsequently subjected to automated cheque analysis for its understanding & hence validating the cheque.

5. Selecting a good representation is only part of the solution for transforming image data into a form suitable for succeeding processing. The representation of an image can take many forms. Most of the time, it refers to the way that the conveyed info, such as color, is coded digitally & how image is stored, i.e. structure of image. They describe the format of image files, the algorithm of image encoding such as compression as well as the format of the additional info often called metadata.

Representation & description almost always follow the o/p of segmentation stage, which is usually in raw pixel data. Constituting either the boundary of a region or all the points in the region itself.