

1. Discuss the significance of sampling & quantization in processing of digital images.
2. Discuss the importance of image & pre-processing in understanding the digital image data.
3. Justify image analysis & understanding is an useful task for better society building.
4. Discuss the importance of biometric techniques considering the current applications.
5. Explain image representation.

### Answers:

1. In order to create digital images we need to convert analog signal into digital signal. This involves sampling & quantization process. Sampling rate governs the spatial resolution of digital image. Quantization fixes the no. of gray pixel in the digital image. Magnitude of sampling image is expressed as digital value.



in image processing. ~~Diff~~ Difference between continuous signal & ~~an~~ digital signal is ~~digitalization~~.  
quantization.

2). The main goal of pre processing is improvement of image by eliminating distortion. Pre processing increasing brightness contrast changing etc. Histogram is used to enhance the brightness. By this we can see able to see the clear picture. pre-processing improves the quality of the image which will be in more understandable form. In the field of banking, forensic pre-processing takes very important part in by improving the quality of the document. We can check the signatures or thumb print using pre-processing. It gives clear image of it.



3. 90% of data is in terms of image. Image produces more information than textual data. Images are more understandable than text. 3 dimensional images ~~are~~ can be converted into 2 dimension but there will be some loss of information. In the field of crime, we can analyse the image & understand it. It will help in investigation. Image analysis involves extracting information from the image. It ~~is~~ is used in many application. In the time of floods, recognising the different types of seeds are the application. In bank, validation of cheques can be recognised by extracting the information of a images.



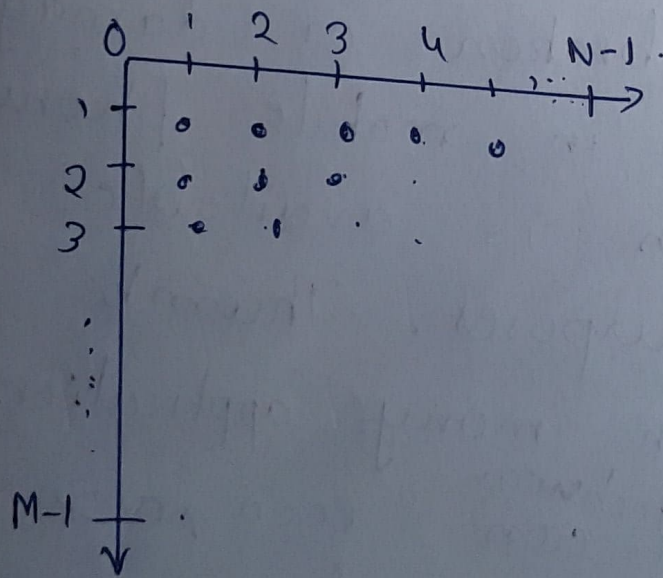
4. Biometric <sup>technique</sup> is used in banking, Airport, police station etc. Here it will extract the hidden information. Pre-processing is used to extract the hidden features. For example face recognition in airport, banking. Fingerprint recognition in crime branch.

This will be the investigation. In industrial areas, it will detect the broken or damaged files. Even in mobile phones face recognition is available for security purposes. Thumb fingerprint are used in many application.

Biometric <sup>technique</sup> can recognize the forgery of signature. ~~It is~~ Using biometric technique we can able to differentiate between original data & fake data.



5. Image is a non textual information which can be displayed on the screen & printed on paper. Image is defined in 2 dimensional format. i.e  $f(x, y)$  where  $x$  &  $y$  are horizontal & vertical coordinates. It is represented as rows & columns.  $f(x, y)$  gives the pixel value at that point. 2D representation of an image is shown below.



For digital image we need to convert analog images into digital. It is represented as array.