Q1

an image function(x,y) must be digitized both spatially and in amplitude.

Typically, a frame grabber or digitizer is used to sample and quantize the analogue video signal.

Hence, in order to create an image which is digital, we need to convert continous data into digital form. There are tow steps in which it is done:-

sampling
Quantization

the sampling rate determines the spacial resolution of the digitized image, while Quantization level determines 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 transition between continous values of the image function and 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 occurance of false contours is the main problem in image which has been quantized with insufficient brightness levels.

Q2

Pre-processing involves operations on images at the lowest level of abstraction where both input/output images are intensity images.

The aim of pre-processing is an improvement of the image data that eliminates distortions or enhances some image features suitable for further processing.

Image enhancement is the most appealing pre-processing technique,

The idea behined enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interest in an image such as, changing brightness and contrast of an image.

The aim of pre-processing is an improvment of the image data that suppresses unwilling distortions or enhances some image feature important for further Processing, although geometrics transformations of images (like rotation, scaling, translation) are classified among pre-processing methods here since similar techniques are used.

03

nowedays we are using surviellince systems to monitor socity building to analysis the behavior and activities and securing our children, and ~~over~~ our properties.

In society building it is important to use Image analysis and.

analysing and understanding images of society building is important to improve the Quality of the life for peoples and secure theme from security threats and Risk factors that can affect them.

Q4

Biometrics is used widly in many fields like:
- Authentication of persons
- Banking
- Airports
- Electronic voting
- defence sectors
- secured transactions.

it is comon to have physical and behavioral characteristic to authenticate aperson.

we have seen several sectors which adopt biometrics based person authenticaton for secure transictions, airport entry.

in airport we can detect aperson by eye-~~fing~~print

The kind of biometrics varies from face, signiture, palm-print, ear to speech and many more.

Biometric authintication and it's uses in modern day tech and digital image processing has anumber of advantages:
1- high security and assurance
2- user experience- convenient and fast
3- Non-transferrable- Every one has

# Q4 Continous

access to a unique set of biometrics.

4- Spoof-proof: Biometrics are hard to fake or steal

Q5

A digital image can be represented of a two-dimensional image as a finit set of digital values, called picture elements or pixels.

the smallest addressable image element is called pixel (Picture element). The array is called bit map.

Images can be from real world or virtual. Image can also be described as patial array of values.

Image is represented as an array, or a matrix of square pixels, arranged in rows and colmuns,

Image Processing is a procedure of converting an image to digital form and carry out some operations on it, in order to get an improvement image and take out several helpful information from it

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

[matrix represintation]

Q5/ Continue:

The representation of DI using array data structure, we can have the reason to perform sampling and quantization process on a given analoge image computer.

In order to store an analog signal, infinte memory is required to store it, we convert that signal format and then store it in computer and then perform operations on it