Image Processing

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1) List any five applications of image Processing

Applications of image Processing?

i) Image sharpening and restoring:

→ The Process in which we can alter the look and feel of a image. It fundamentally manipulates the images and helps to achieve the desired output.

→ It includes conversation, sharpening, detecting edges, vertical and recognition of images.

ii) Medical field:- → There are several applications in the medical field which depend on the functioning of digital image Processing.

→ Many Method are used such as segmentation & texture analysis which are further used for cancer and other disorder identification

iii) Remote sensing:

→ with the Progress in technology, the use of remote sensing has become increasingly common & impact demand with the domain of natural hazards.

→ The increase of geospational technology & the advantage Provide accent and accurate of technology and the internet.

iv) Transmission and encoding:- Today with the advanced technology, we can receive video feed, or live CCTV footage. From any part of the world with in a matter of sec.

→ This means that not only transmission

but also encoding of images have improved by multiple folds.

→ A variety of formats have been developed for high or bandwiths to encode images & then stream them over the internet.

v) Robot vision:- It entails using a combination of camera hardware and computer algorithms that allow robots to process visual data from the world.

→ Several robotic machines work on digital image processing.

2) what are different types of image sensors?

A. CMO & CCD are the two most important and common technologies for the image sensor market.

charged-coupled device (CCDs):

→ The CCDs are sensors based on an array of passive photodiodes which integrates charge during the exposure time of the camera.

→ The charge is then transferred to common electronics which reads the accumulated charges of the different pixels and translate them in voltages.

→ Since the CCD is a passive-pixel device the quantum efficiency is very high.

→ This is an advantage in applications where the high is quite poor.

→ For the Mode, since the electronics is same for all the pixels a high pixel uniformity can be achieved.

complementary Mental-oxide semiconductor

→ the CMOS are sensors based on an array of active pixels. the pixel-level electronics translates the charge accumulated in the photo diode in a well-defined voltage in this way the O/P of each pixel needs only to be acquired and sampled.

Global and rolling shutter

→ with global and rolling shutter the literature refers to the way an image is captured and read out.

→ with the rolling shutter read out scheme, the exposure time is the same for all the pixel of the sensors

3) what is adjacency?

A. → Two pixels are connected if they are neighbors and their gray levels satisfy some specified criterion of similarity.

→ for eg, in a binary image two pixels are connected if they are 4-neighbours and have same value (0/1)

→ let V be set of gray levels values used to define adjacency.

1 0 1

0 1 1

0 1 0

4-Adjacency :- Two pixels p & q with values from V are V-adjacent if a is in the set N4(P)

8-Adjacency: Two pixels p & q with values from V are 8-adjacent if a is in the set of N8(P).

M-Adjacency:- Two pixels p & q with values from V & M adjacent if

- q is in N4(P)
- q is in N8(P) &

The set is empty.

4) write any few mathematical operations on an image?

A. Arithematic operations like addition, subtraction and bitwise operations can be applied to the i/p images.

Mathematical operations:-

-> These operations can be helpful inenhancing the properties of the input images properties. The image arthmatics

-> These operations can be helpful inenhancing the properties of the input images properties

-> The image arthimatics are important for analyzing the i/p manage can be the applied for classifying thereosholding etc on an image.

Addition of image:-

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Addition of image: we can add two images by using function cv2.add() this directly adds up image pixels in the two images

syntax:- cv2.add(img1, img2)

-> But adding the pixels is not an ideal soln so we use cv2.addweighted()

Subtraction of images:

Just like addition, we can subtract the pixel values in two images and merge them with help of cv2.

Syntax: cv2.subtract(src1, src2)

-> Image arithemtic applies one of the standard Arithemtic operations (logical operator) to two/more images.

-> The images must be of the same size

-> Although image arithmatic is the most simple form of image processing there is a wide range of applications.

->logical operators are often used to combine two images.