

Date: P= 1

Name Mehboob Shabbir  
ID 13916  
Subject Digital Image Processing.

Ques 1:-

(a) what is Grey level Slicing? Explain in your own words with suitable example?

it increase the brightness of a pixel

in a grey scale you can take one pixel of one value between 0 to 255

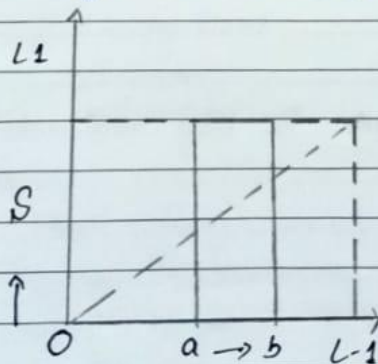
Grey level Transformation:

Grey level function can be written as

$$S = T(C_i)$$

Example:

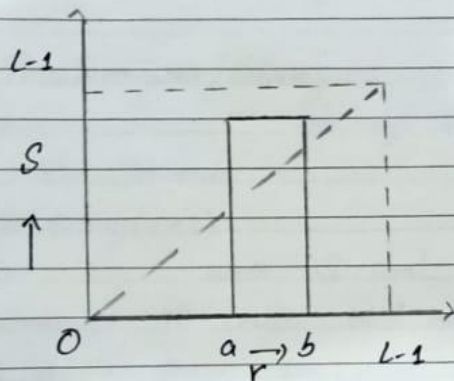
Grey level Slicing (Point Processing)



Slicing w/o background

Date: P = 2

Name Mehboob Shabbir  
ID 13916  
Subject DIP.



Slicing with back ground  
array level slicing is very applicable in  
different departments such as  
X-ray flaws  
CT-scan

There are three types of array level slicing  
Linear:-

Linear slicing include simple identity  
and negative transformation. identity transformation  
has been discussed in our tutorial of  
image transformation

Negative Slicing:-

It is inverse of identity  
transformation. in negative slicing each value  
of the input image is subtract from the  
L-1 and mapped onto the output image.

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Name Mehboob Shabbir  
ID 13916  
Subject DIP

log arithmetic Transformation/Slicing

they have further two types

log Transformation/Slicing

The log Slicing can be defined

by this formula

$$S = C \log(r+1)$$

where S and r are the pixel value of the output and input image and C is a constant the value one is added to each of the following pixel intensity of '0' in the image the log 0 is equal to infinity so '1' is added to make the minimum value at least 1.

Power-law

it is denoted by  $S = Cr^\gamma$  this formula the symbol  $\gamma$  is gamma variation in the value of  $\gamma$  varies the enhancement of the image. Different display devices/monitor have their own gamma correction that's why they display their image at different intensity.

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Name Mehboob Shabbir  
ID 13916  
Subject DIP

Qno 1 (b)

It is possible to get details in the negative of a picture? Justify your answer with suitable example.  
negative of an image is a total inverse in which light area appears dark. A negative colour image as additionally colour reversed. negative image has basically details in it but they are reversed in the film they are opened in the Photography Page  
negative film usually have less contrast. but a wider dynamic range. the final printed image the contrast typically increase when they are printed on a photographic page. when negative films are brought into digital they contrast can be adjust at the time of scanning and by other processor.

Qno 2

(ANS)

The right side image is enhanced by applying different enhancement techniques first we will discuss about contrast

stretching

Contrast Stretching.

This techniques is also called ~~normalization~~ it attempt to improve the contrast

Date: P=5

Name	Mehboob Shabbir
ID	13916
Subject	DIP

In an image by stretching the range of intensity value it contain to span a desire range of values.

How it's work:-

Before the stretching can be performed it is necessary to specify the upper & lower pixel value limits over the image should be normalized

Brightness enhancement:-

Brightness enhancement is shifting of intensity value to a higher value. The darker and the lighter pixel both get their value shifted by some constant value.

Example

In x-ray image brightness can be enhanced to find the dark spot. This two enhancement tools should be used gain a corresponding result.

Date: Feb

Name Mehboob Shabbir  
ID 13916  
Subject DIP

Ques:-

Find the following for the points 'P' & 'Q' given on grid

Data

for P

$$(x, y) = (6, 1)$$

for Q

$$(x', y') = (3, 7)$$

Solution

$$P(x, y) = (6, 1)$$

$$Q(x', y') = (3, 7)$$

$$\begin{aligned} \text{City block distance, } D_4 &= |x - x'| + |y - y'| \\ &= |6 - 3| + |1 - 7| \\ &= 3 + 6 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{Chess board, } D_8 &= \max(|x - x'|, |y - y'|) \\ &= \max(|6 - 3|, |1 - 7|) \\ &= \max(3, 6) \\ &= \max(6) \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{Euclidean Distance, } D_e &= \sqrt{(x - x')^2 + (y - y')^2} \\ &= \sqrt{(6 - 3)^2 + (1 - 7)^2} \\ &= \sqrt{3^2 + 6^2} \\ &= \sqrt{9 + 36} \\ &= \sqrt{45} \end{aligned}$$

Date: P = ?

Name Mehboob Shabbir  
ID 18916  
Subject DID.

Qno 4 Part (a)

What does Histogram of an image show.

Histogram of an image like other histogram also shows frequency. But an image of histogram shows frequency of Pixels intensity values.

In an image histogram the x-axis shows the gray level intensity histogram has many uses in image processing the first is the analysis of the image we can predict about an image by just looking at its histogram the second purpose use it for brightness purpose.

Qno 4 Part (b)

Match each picture with its possible histogram

Pic a : high histogram 2

Pic b : histogram 4

Pic c : histogram 3

Pic d : histogram 1