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Unit 1

Color Image Representation –

Color fundamentals – when color is available, it gives much more information about an image than intensity alone.

→ The actual color perceived by human of an object depends on both the color of illumination and the reflectivity

→ objects appear to be different colors because they absorb and reflect different colors of light.

→ Color is sensed by three colors (Red, Green & Blue) – Primary colors.

Unit 1

Color Image Representation

* Color is necessary for two reasons. The first reason is to identify the object. Identification is often improved by colour information.

* Full or true colour processing - This subject deals with the acquision, disklay and printing of full-colour images. The colour range of full or true colour images are dependat on the hardware of the systems used.

* Pseudocolour processing - The purpose of pseudo colour procesing is to assign artificial colours to a monochrome image. For example, colours can lee added to gray image based on the intesity values to facilitate image analysis.

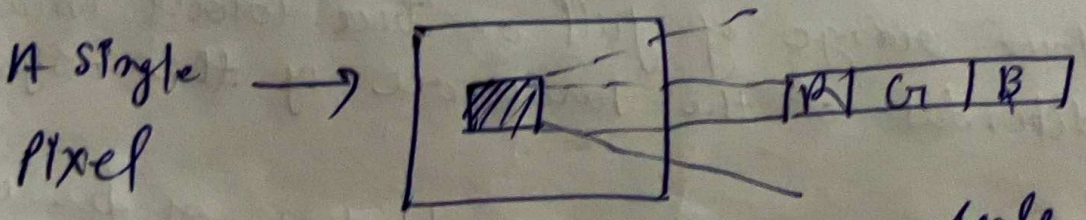
* Colour Image Storage & Processing - In colour image, the pixel colours are obtained by mixing the primary colours - Red, Green & Blue.

There are two ways of storing colour images — (2)

→ For component ordering - Colour image is stored as three three identical arrays, F_R, F_G, F_B. The value of the pixels of image are obtained by accessing all the three identical intensity images together. Mostly, true colours images are 24 bits to represent all the colours. Hence, colour images can be considered as three-band images.

→ Packed ordering - Packed ordering is another method, where every pixel contains all the three colour components packed together. It can be mathematically represented as -

$$f(x,y) = (R(x,y), G(x,y), B(x,y))$$



Convertion of colour image to grey scale image

⇒ A colour image can be converted to grey scale image by replacing the RGB values by the luminate value of each pixel. The luminate value can be obtained by

$$Y = \frac{R+G+B}{3}$$

The concept of noise in a colour image is same as that of noise in grey scale image same noise in gray scale image. The processing of to remove noise is also similar

→ Characteristics generally used to distinguish one color from another are brightness, hue and saturation.

Brightness - embodies the achromatic notion of intensity.

Hue - Hue is an attribute associated with dominant wavelength in a mixture of light waves. Hue represents dominant color as perceived by an observer. Thus, we call an object red, green or yellow, we are referring to its hue.

Color Transformation -

As with the gray level transformation, we model color transformations using the expression

$$g(x,y) = T[f(x,y)]$$

Where $f(x,y)$ - color input
$g(x,y)$ - transformed color output image
T - Color Transform.

For example - we wish to modify the Intensity Image then

$$g(x,y) = 0.7 f(x,y)$$