POORNIMA
COLLEGE OF ENGINEERING
DETAILED LECTURE NOTES

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Unit - 2

Basic Intensity Transformation Function ①

* Basic intensity transformation are essential tool in image processing that enable the adjustment of pixel intensity values in images.

① Linear Intensity transformation - includes negative and identity transformation.

Negative Transformation

The negative transformation is achieved by taking the complement of the original pixel intensity.

$$S = L - 1 - r$$

r = original intensity
L = maximum intensity level
S = negative intensity

Identity Transformation

It doesn't change the pixel intensity of an image

$$S = r$$

r = represents the original pixel intensity
S = transformed intensity

$$S = r$$

② Logarithmic transformation - Group of nonlinear intensity adjustment aimed to enhanced the visibility of detailed image.

Log Transformation

The log transformation involves applying the logarithmic function to each pixel value an image.

$$S = C \cdot \log(1+R)$$

S = transformed pixel value
R = original pixel value
C = constant that adjust the degree of enhancement

Inverse Log Transformation

Inverse log transformation is reverse operation, aimed to expanding the range of brighter image.

$$S = e^{R/C} - 1$$

③ Power-Law transformation - Gamma Correction due to adjust tonal and brightness characteristics of Image. The basic idea of power-law transformation is raise to pixel values of an image to certain power in order to adjust image's overall brightness and contrast

$$O = k \cdot I^{\gamma}$$

O → O/P Pixel value
I → I/P pixel value
γ → exponent, which controls the degree

k = constant