**Course: Advanced Bioinformatics**

**Module title: Enhancement- Point Processing**

**Module no. : 20**

Image Enhancement is the approach for enhancing the quality of the image. Enhanced image is further processed to attain useful information which can be further used for important tasks. The major three objectives of image enhancement are:

Highlighting interesting detail in images

Removing noise from images

Making images more visually appealing

Most common and easy way to enhance the image is to change the values of the individual pixels itself, change the grayscale values of the pixels. It will apply to all the image pixels and values of all the pixels will be update.

In Spatio-temporal Domain an image can be presented by the following equation

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

Where g(x,y) is the processed image, T is the transformation and f(x,y) is the original image.

First point processing filter can be negative Image where all the pixel values are reversed.

S=1-r

Second point processing filter can be threshold Image where all the pixel values greater than some threshold value are maintained other are removed.

S = 1.0 r>threshold

0.0 r<=threshold

Third we have intensity transformations, which are further dived into three categories.

Linear

- Negative/Identity

Logarithmic

- Log/Inverse log

s = c \* log(1 + r ) maps a narrow range of low input grey level values into a wider range of output values

Power Law

s = c \* r

Map a narrow range of dark input values into a wider range of output values or vice versa

Image Histograms: The histogram of an image shows us the distribution of grey levels in the image. High contrast image has the most evenly spaced

Histogram.