**Course: Advanced Bioinformatics**

**Module title: Restoration and Segmentation**

**Module no. : 22**

Image Restoration deals with identification of the degradation process and attempt to reverse it.

In a sense, it is similar to image enhancement, but more objective

G(x,y)= f(x,y) + (x, y)

Where (x,y) shows the additive noise in the original image.

Noise Models

* Gaussian
* Most common model
* Rayleigh
* Erlang
* Exponential
* Uniform
* Impulse
* Salt and pepper noise

**Restoration by spatial filtering:** similar to spatial filtering for image enhancement.

The arithmetic mean: average filter in spatial image enhancement.

Geometric Mean: lose less image detail.

Harmonic Mean: good for Gaussian & Salt noise but bad for pepper noise

**Contraharmonic Mean:** based on harmonic mean but user has control over the parameters.

Image Segmentation deals with partitioning of an image into meaningful regions with respect to a particular application. It is based on measurements taken from the image and might be grey level, color, texture, depth or motion

Image Segmentation is basically detection of discontinuities which can be of the following three types.

Points

Lines

Edges

**Edge Detection:** An edge is a set of connected pixels that lie on the boundary between two regions. 1st derivative tells us where an

edge is while 2nd derivative can be used to show edge direction. They are very sensitive to noise.