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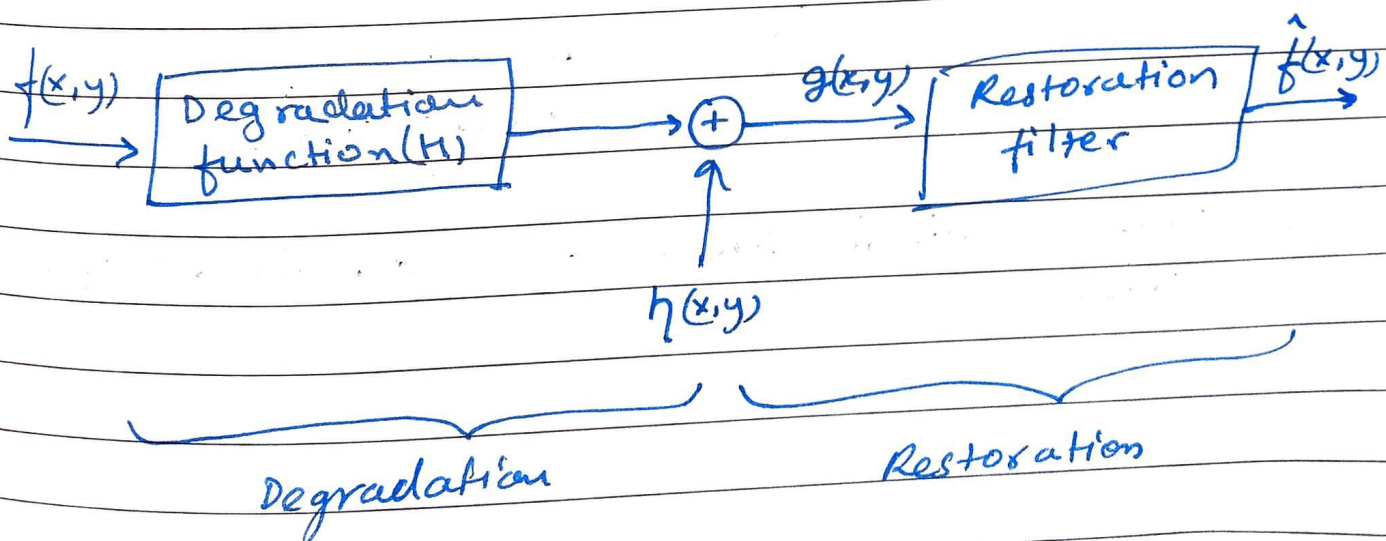
2. ~~Types of Noise Models:-~~

① Image Restoration and Image Degradation Model

→ Image Restoration is the process of recovering an image that has been degraded by some knowledge of degradation function H and the the additive noise team $\eta(x,y)$. Thus in restoration degradation is modelled and its inverse process is applied to recover the original image

$f(x,y)$ → [Degradation function(H)] → (+) $g(x,y)$ → [Restoration filter] → $\hat{f}(x,y)$

$\eta(x,y)$

Degradation   Restoration

② Noice Model :—

   i) Gaussian Model Noice

$$P(z) = \frac{1}{\sqrt{2}\,\pi\,\sigma}\; e^{-(z-\mu)^2/2\sigma^2}$$

(ii) Reighleigh Noise

$$P(z) = \left\{ (2/b)\,(z-a)\,e^{-(z-a)^2/b} \right.$$

(iii) Impulse Noise

$$P(z) \left\{ \begin{array}{ll} P_a & \text{if } z=a \\ P_b & \text{if } z=b \\ 0 & \text{otherwise} \end{array} \right\}$$

③. Order Statistic filters are non linear special filters

Types of filters:

i) **Median filtering :–** Replace the value of a pixel by the median of the pixel value in the neighbourhood of the pixel.

ii) **Min Max filtering :–** following equ

$$F(x,y) = max \ g(s;t) \qquad max \ filtering$$

$$F(x,y) = min \ g(s,t) \qquad min \ filtering$$

iii) **Midpoint filtering :–** Replaces the values of a pixel by the mid pt. b/w the max and min pixel in the neighbourhood

④ Homomorphism filtering is a generalised technique for signal and image processing. Involves a non linear mapping to different domain in which filter techniques are applied following by mapping back to the original domain.

It is used for image enhancement

It is used for Improve the appearance of greyscale image by simultaneously intensity range compression.

$$m(x,y) = i(x,y) \cdot r(x,y)$$

where

m = image.

i = ilumination;

r = reflectance.