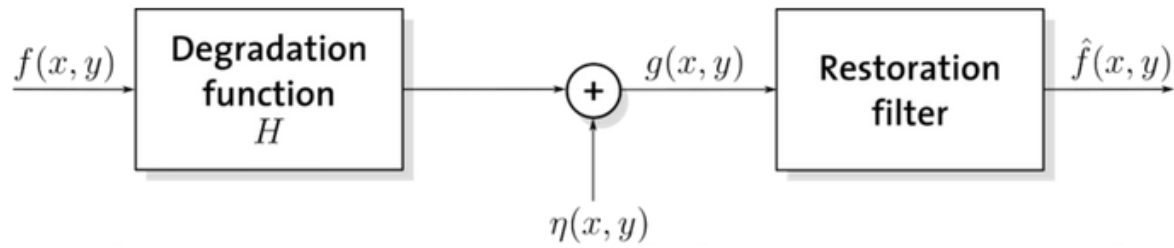


19CSE367 Digital Image Processing

SARATH TV

Last lecture

- Image Denoising using GMF
- Order statistic filters

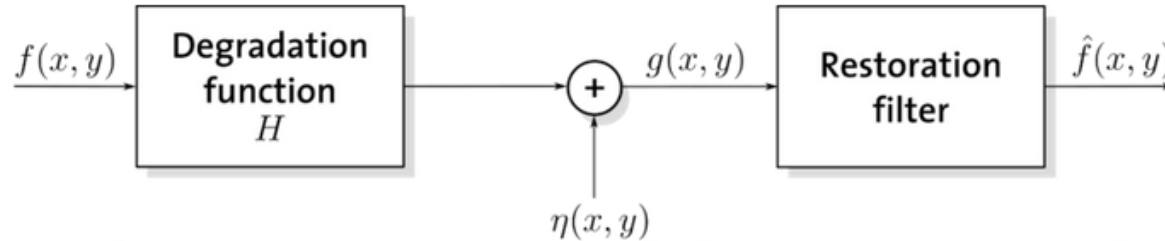


Degradation function estimation

- Image restoration process
- Image restoration considering only noise.
- Degradation function.
- Three ways to estimate the degradation function
 - Observation
 - Experimentation
 - Mathematical modeling
- Blind deconvolution - True degradation function is rarely known completely.

Estimation by Image Observation

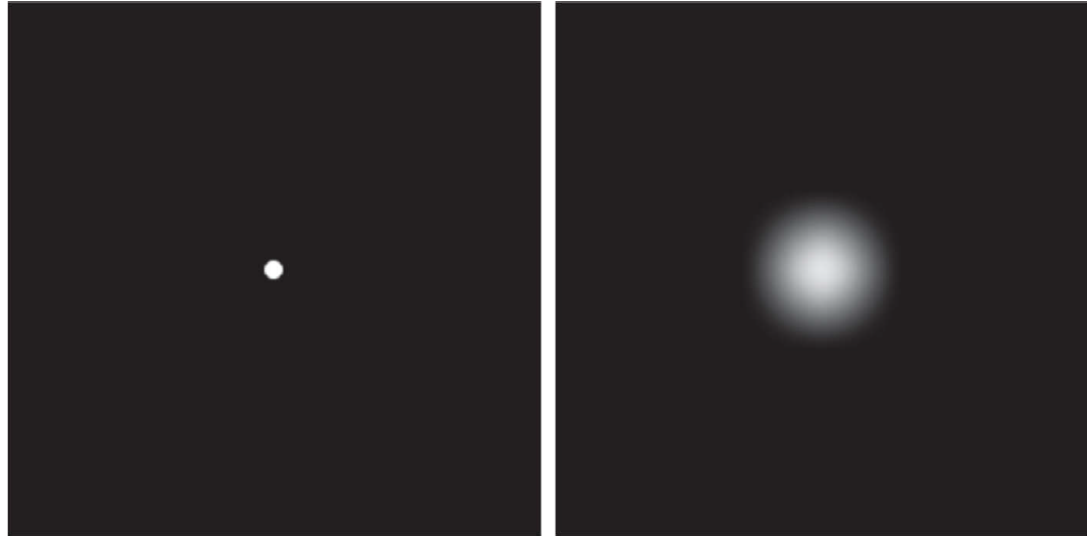
- Gather information from the image itself.
- Look for area in the signal content is strong- Reducing the effect of noise.



$$G(u, v) = H(u, v)F(u, v) + N(u, v)$$

Estimation by Experimentation

- Equipment similar to the one used for acquiring the degraded image
- Changing system setting – acquiring images – as close as to the image we want to restore.
- Underlying idea- obtain the impulse response of degradation
- Small dot of light as bright as possible.



Estimation by modeling

- Model can consider the environmental conditions also.



Inverse filtering

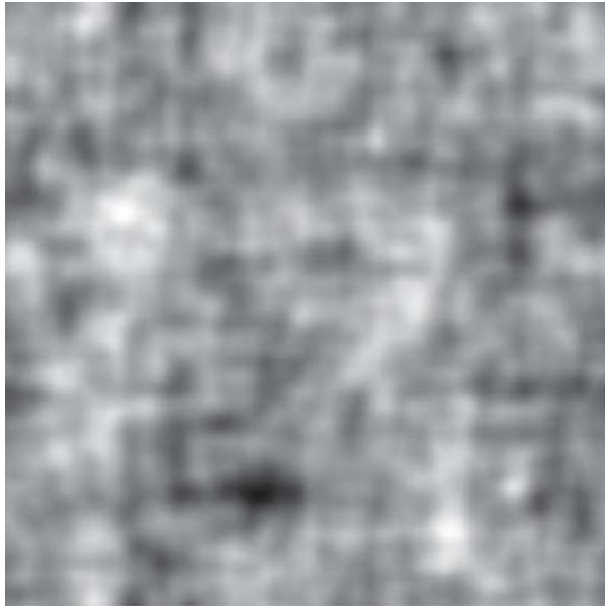
- The simplest approach to restoration is direct inverse filtering,
- where we compute an estimate of the transform of the original image by dividing the transform of the degraded image

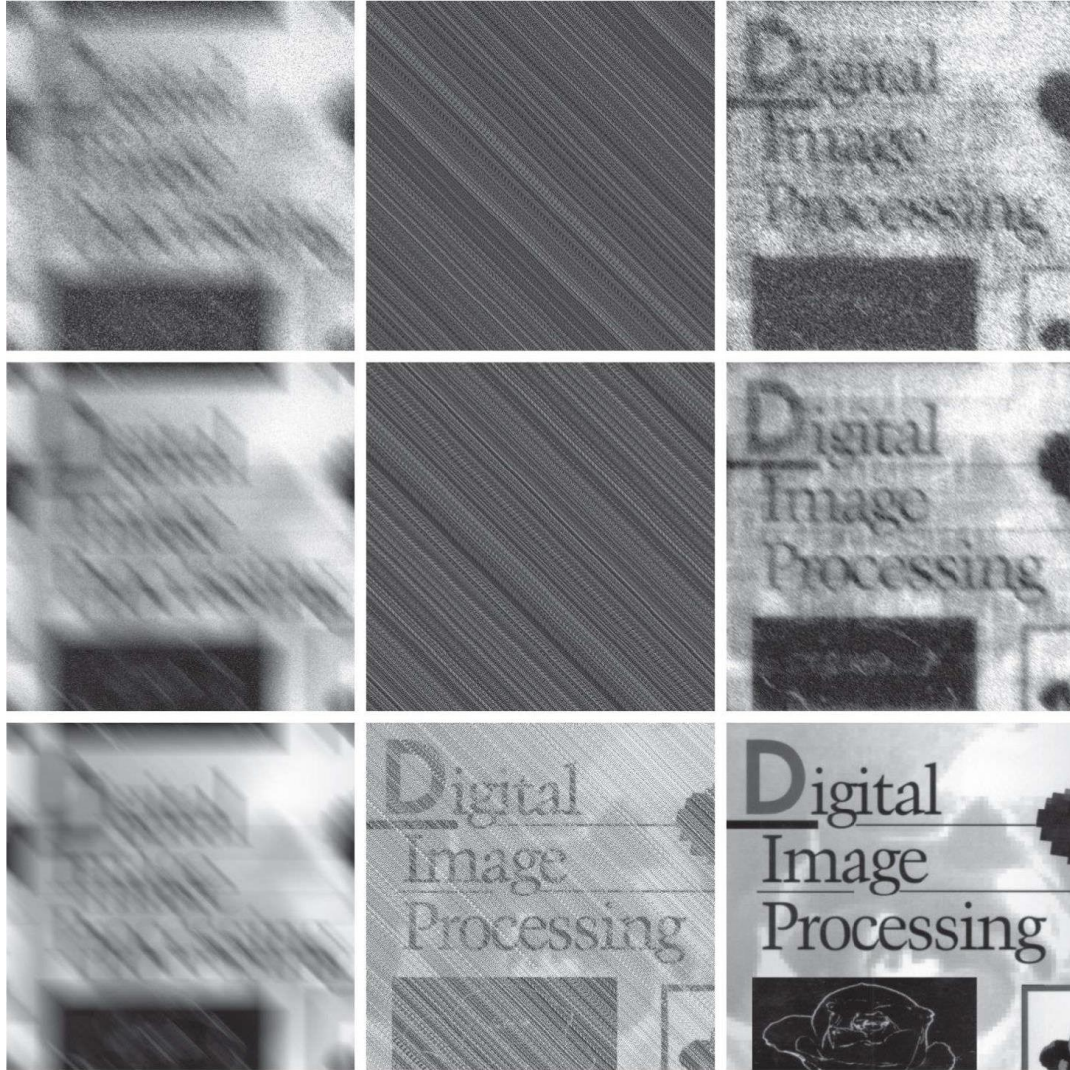
$$\hat{F}(u, v) = \frac{G(u, v)}{H(u, v)}$$

Min Mean Square Error Filtering

- Image and noise – Random variable
- Error – keep it minimal.

$$e^2 = E\left\{(f - \hat{f})^2\right\}$$





THANK YOU!