Name:

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L16-4154

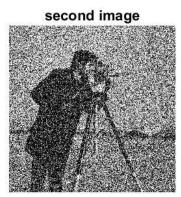
Project1 Phase3

P3.1(a):

Two noisy images are generated using the following formula with variance .2 and mean 0.

Noisylmage=OriginalImage + sqrt(Variance)*randn(256,256) + Mean





P3.1(b):

The noise can be reduced if we take average of above images. The derivation is as follows

Let we produce two noisy images
$$N_1(k,y)$$
, $N_2(k,y)$ adding noise to the image.

Im $g_1(k,y) = f(k,y) + N_1(k,y)$

Im $g_2(k,y) = f(k,y) + N_2(k,y)$

As the images are not related so their covariance covar = $E((Img_1-Img_1)(Img_2-Img_2)) = 0$ —(A)

The avg of two images is given by Im g_2 avg $(k,y) = \frac{1}{2}(Img_1 wg(k,y) + Img_2 wg(k,y))$

The avg variance is given by

$$E(Img_1-Img_2) - (Img_1+Img_2)$$

$$= E(Img_1-Img_1) + (Img_2-Img_2)$$

$$= E(Img_1-Img_1) + (Img_2-Img_2)$$

$$= \frac{1}{4}(Img_1-Img_1) + (Img_2-Img_2)$$

$$= \frac{1}{4}(E(Img_1-Img_1)(Img_2-Img_2)$$

$$= \frac{1}{4}(E(Img_1-Img_1)(Img_2-Img_2)$$

$$= \frac{1}{4}(6^2+6^2) = \frac{1}{4}(86^2) = \frac{1}{4}(6^2)$$

we could be a surface of equal to 0.2
$$= \frac{1}{4}(6^2+6^2) = \frac{1}{4}(86^2) = \frac{1}{4}(6^2)$$

P3.1(c):

After taking the average of above two images, the obtained image has less noise.





P3.2(a,b):

The equation to stretch the histogram of noisy image and the relation between variance of noisy image and image after stretching is given below.

Let we have a noisy image
$$f_n$$

After stetching f_n we get new image g_n
 $g_n = f_n - T_2 \times 255$ (A) the image range is T_n

The variance of g_n is given by

 $g_n = f_n - f_n = f_n - f_n$

P3.3: The median filter is applied and variance is calculated which is less than the noisy image. After applying filter, the image is as follows.

