Homework 5

Introduction

Implement a Noise Filtering function using Adaptive Medium Filtering that can clean up noise on an 8bit gray level image.

Approach

While encourage to use MATLAB my implementation was done with python and OpenCV
A package that is useful for image and data processing. I used an Object-Oriented approach and created a class for Intensity transformations. I hope to add more algorithms from homework and projects related to Intensity transformations in the future in the file. I hope this will pay off in the future when studying for tests. Currently when the class is called the user must input an image, a mode representing the type of filtering transform, and optional parameters for method for filter transformation, d0 the distance of blur and n the insist of blur filter near center. After the transformed image is created it is stored in the class object and retrieved using an accessor method. The functions can be called directly to perform transforms on the image. The user would need to set the image using the class. They would then call the frequency filter function to traverse the image and perform the selected function. The function is selected by providing an intensity transform function. The user can call the transform functions in the class, and they can also create their own function and pass it through as a parameter.

Automated usage:

```
path = “my/image/path”
img = cv2.imread(path)
ff = Frequency_Filters(img, mode=”lowpass”, method =”g”,d0=100, n=10, normalize=True)
new_img = ff.get_img()
```

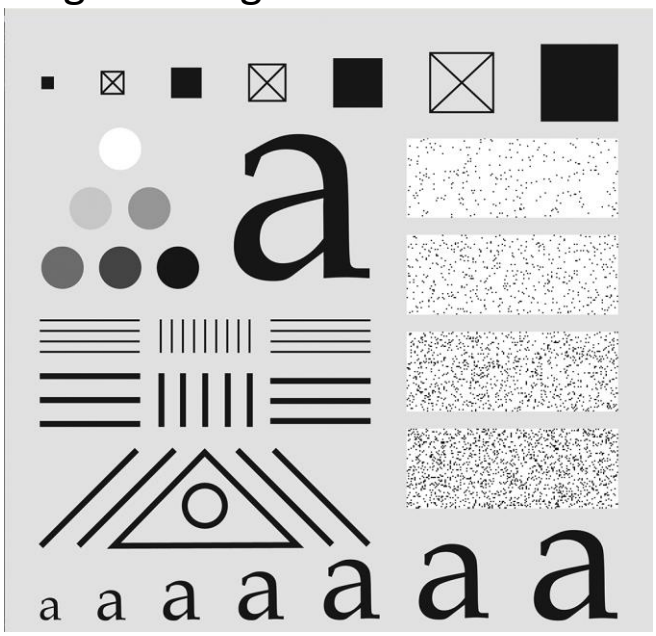
image width - w
image height - h
number of images - i

Time complexity
T(w,h,i) = O(w*h*i)
Space Complexity
S(w,h,i) = O(w*h)

Experimental Results

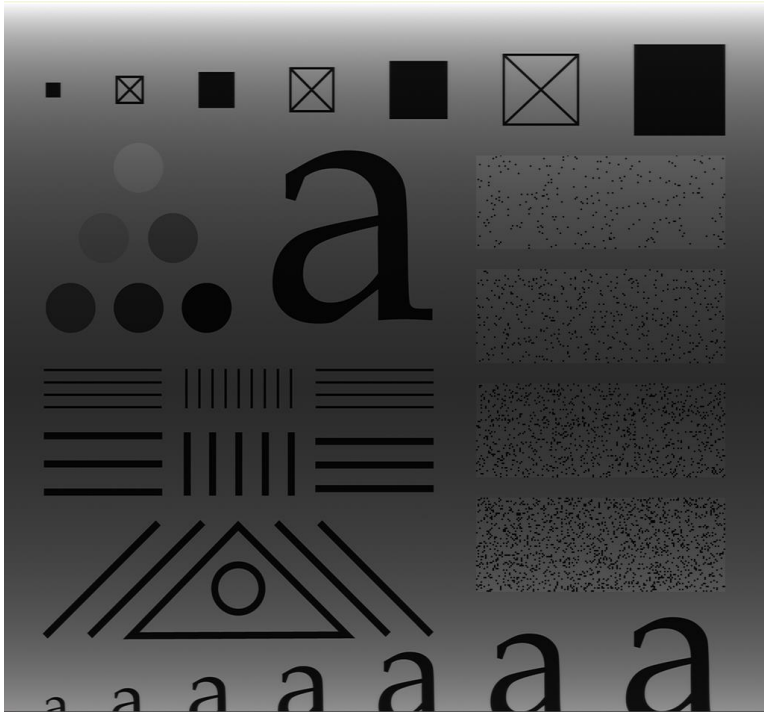
The results of implementing the class were unsuccessful but had some aspects of the desired behavior. Although I was unable to get the desired effect, I was still about to gain a better idea of how low pass filters are useful for blurring images. By changing the parameter d0 I was able to increase and decrease the blurs distance from center. Changing parameter n effected how dark the center was.

Original Image



Sample Image using Gaussian D0 = 100 n=3

Sample Image using Butterworth D0 = 100 n=3



Checkerboard using Butterworth D0 = 100 n=10

Discussion

Although I was unable to get the desired effect, I was still about to gain a better idea of how low pass filters are useful for blurring images. By changing the parameter d0 I was able to increase and decrease the blurs distance from center. Changing parameter n effected how dark the center was.

Conclusion

Although I was unable to get the desired effect, I was still about to gain a better idea of how low pass filters are useful for blurring images. By changing the parameter d0 I was able to increase and decrease the blurs distance from center.