Hw8 Report

Design and Result:

I've written a "image_repair_script.m" MATLAB script for this assignment. In the script I applied appropriate methods to fix various categories of issues about the image.

By, looking at individual RGB channel images, I identified several problems about the image. In the Red channel, there is a wave noise which disrupts the smoothness of the image. In the Green channel, there are some salt & pepper noise distributed all over. In the Blue channel, there is a stripe noise.

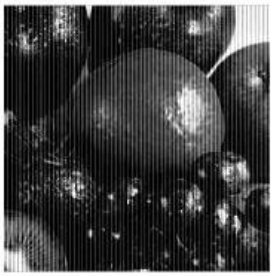
I first used a gaussian filter with appropriate parameters to fix the Green channel noises. The following is the result:

original

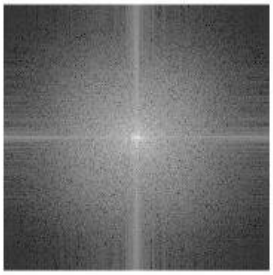
noise filtered

It effectively cleared out most sensible noises.

Secondly, to deal with the Blue channel stripes. I first looked at the Fourier Transformed image of the blue channel. Then, I used ‘impixelinfo’ to identify where the noise frequency is. I manually cleared that frequency range where the noise is. Finally, I converted the fixed frequency image back to the grey-value blue channel image. The repair of Blue channel is effective in my opinion. The following is the figures:



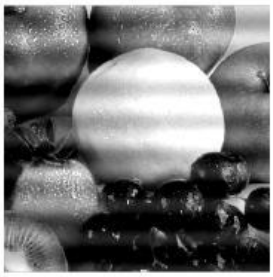
Blue to grey



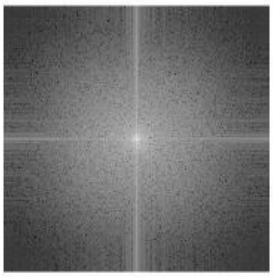
Blue fft

Blue noise deleted

After that, I proceeded to the Red channel. I looked at its frequency domain image. I was able to realize that the noise in this channel is very much mixed in the low frequency parts, so I think a smoothing method should probably do the work. However, due to time constraint, I wasn’t able to find a perfect solution to fix this part.



Red noise



Red fft

Final Result:

Conclusion:

The outcome of this assignment isn’t perfect for me. However, it had been truly very useful and challenging. It had been, in my opinion, the most complicated and comprehensive assignment. It challenged me on both the ability of analysis and the ability of problem solving. I was forced to improve my understanding in many topics.