COSC 5590 – Digital Image Processing and Computer Vision – Fall 2015

Assignment 3

Report

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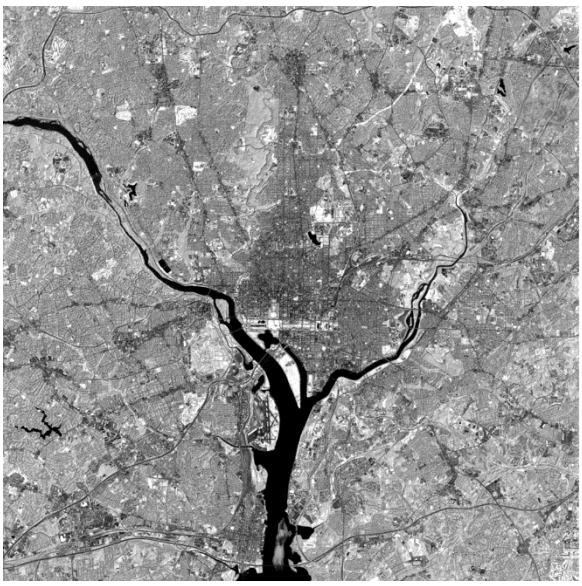
Time spent – 16 hours

The **purpose** of this assignment is to understand Image processing with color images, i.e., with three channels. Red, Blue, Green. Two methods of enhancement techniques are used here.

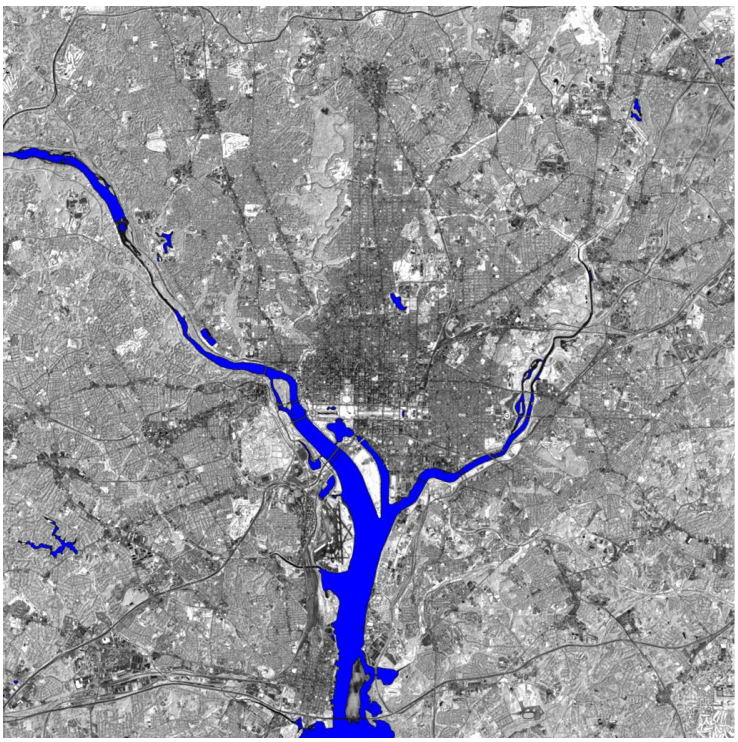
1. **Pseudo–Color Image Processing**.

   An aerial view of Washington City is given. We have to mark the river blue with this Pseudo-Color Image processing technique. That is applying different color to differentiate and easily understand the image (enhancing the image). River was in Dark grey, almost black. Area of the river is identified with the help of the neighboring pixels and the intensities.



Original Image

Output Image



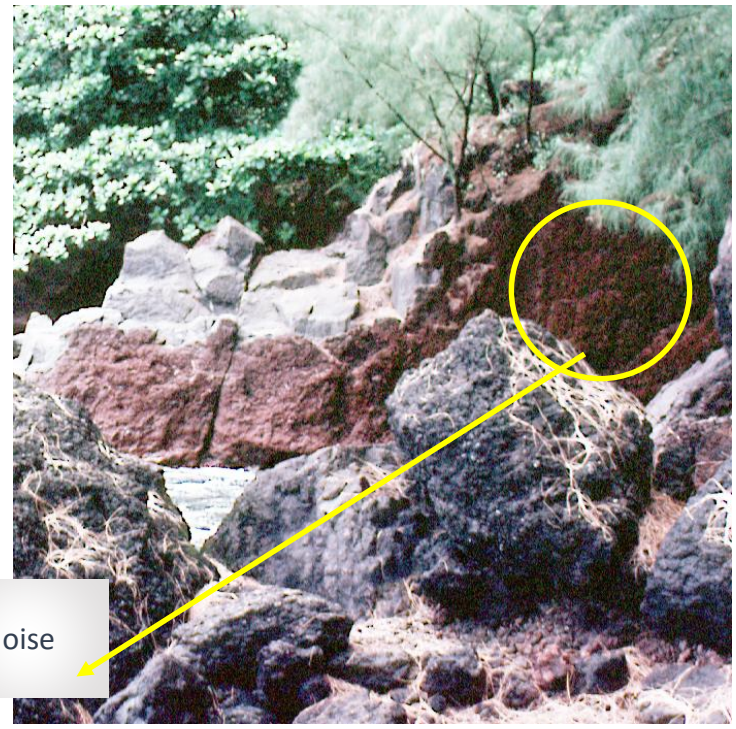
Rather than making every pixel blue, first a black pixel is spotted and the neighbors of that pixel is checked for dark pixels. If at least three of the neighbors can form a direct connection, then that pixel is assigned blue. This gave me good results. And there are no error in the output too.

The threshold for the intensity is taken as 16 out of 255, increasing it more than 20 was causing it to make buildings and roads too as blue. Making the below 15 is making it to leave out few areas, especially to the river on the top left.

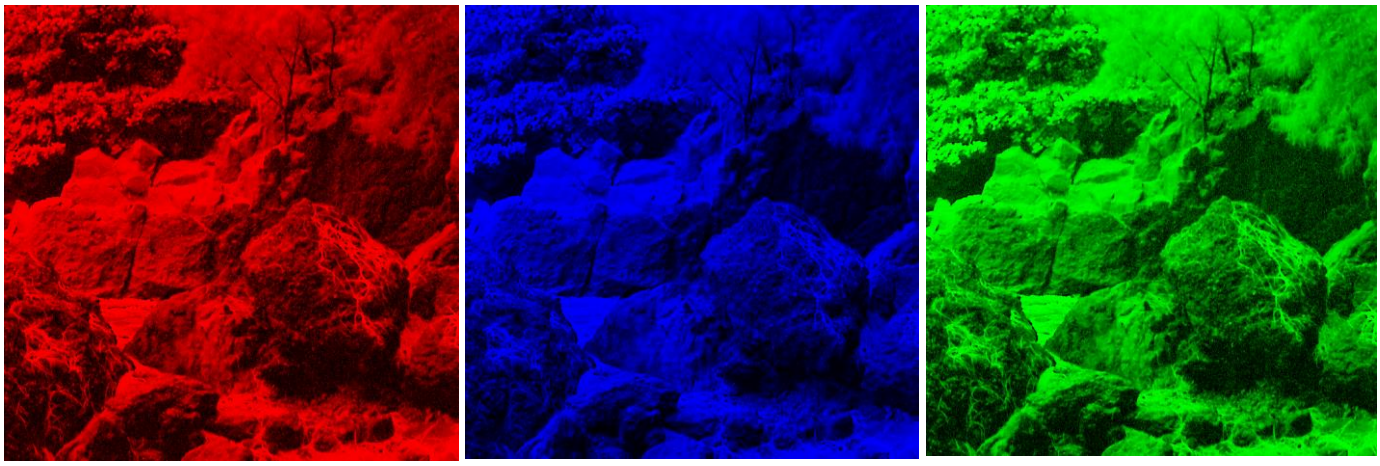
2. Color Image Enhancement by Histogram Processing

   a. The given dark stream color picture was split into R, G, B channels. The output of those three images was all black and white.
   In a color image, we have 3 color channels, which will have three different intensity levels. But after separating three channels, there is only one intensity for each of them and it's displayed on the scale of white to black, same as a grey scale image. So, I had to merge each channel with two null channels to make it to a color image of their respective colors.
   Histogram equalization was applied to each separated channel. And then merged again using built-in functions of openCV. The output was really great, and enhanced. The grainy noise which occurs due to the high exposure of the camera to capture low light was being seen very clearly.

Original Image



Histogram equalized image



b. Histograms for each channels were calculated and were drawn using openCV line function and with the points. Three different colors for the respective channels are applied to differentiate.
We can see that the histogram, which was more on to the darker side is now distributed on all channels.