MP#3 Report

- **Target:**

The purpose of this MP is to implement a histogram equalization algorithm. Histogram equalization is to extend the mass region of one histogram to make them distribute equally in a new histogram.

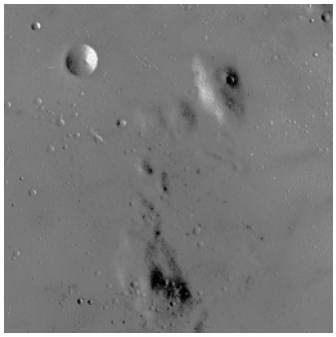
- **Technique:**

I use C++ with the OpenCV library to solve this problem. I use one data structure called IplImage to store the data of picture and employ some build-in methods in the library to solve this problem.

- **Algorithm description:**

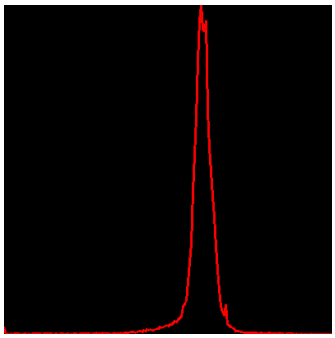
To begin with, I use cvCreateHist() method to create a histogram and use cvCalcHist() method to calculate the histogram of the original picture. Then, I set some basic options and normalized it to output the histogram. After that, I begin to equalize that histogram. First of all, I traverse the all histogram and use cvGetReal1D to get each value of the histogram. And add each value to get the cumulative distribution. Then I figure out the transformation according to the definition. Finally, I use cvLUT() method to update the value in the array to equalize the picture.

- **Result:**

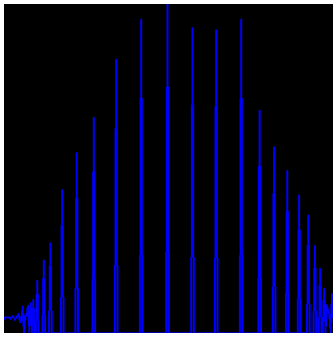


The original picture

After equalization



Histogram before equalization



Histogram after equalization

- **Result Analyze:**

Due to extend one massive region of the histogram to the whole span of the histogram, the value of that image is updated. However, these updated values can still illustrate the original picture correctly. The equalization solved the problem, which invoked by small range of color. And it increases the contrast of the picture to makes the picture become more confortable to observe.