NAME: SOUNDARYA.N

EMAIL ID: [soundaryanagarajan5@gmail.com](mailto:soundaryanagarajan5@gmail.com)

PHONE NUMBER: 9500841469

**To implement a histogram equalization from scratch usung c++:-**

Histogram Equalization:

Histogram of an image is the graphical representation of the distribution of intensities of pixels. It provides an estimate of where pixel values are concentrated and whether there are unusual deviations.

**Example:-**

**e.g. - Consider the following image. Say, all pixel values have a depth of 2 bits and are unsigned. Therefore the allowable value range of pixels is  0 - 3.**

|  |
| --- |
|  |
| Sample Image |

As you can see in the above image, there are 5 pixels with value 0, 7 pixels with value 1, 9 pixels with value 2 and 4 pixels with value 3. These information is tabulated as follows.

|  |
| --- |
|  |
| Intensity distribution of the above image |

**The histogram of an image is usually presented as a graph. The following graph represents the histogram of the above image.**

|  |
| --- |
|  |
| Image Histogram |

**Histogram equalization** is a commonly used technique in image processing to enhance the contrast of an image by equalizing the intensity distribution. It will make a dark image (underexposed) less dark and a bright image (overexposed) less bright.

The equalized histogram of the above image should be ideally like the following graph.

|  |
| --- |
|  |
| Ideal histogram of the image after the equalization |

But practically, it is hard to achieve this kind of perfect histogram equalization. However there are various techniques to achieve histogram equalization close to the perfect one. In OpenCV, there is an in-built function to equalize the histogram.

**Histogram Equalization of a Color image with OpenCV**

In this example, I will show you how to equalize the histogram of a color image using simple OpenCV program.

#include <opencv2/opencv.hpp>

#include <iostream>

using namespace cv;

using namespace std;

int main(int argc, char\*\* argv)

{

Mat image = imread("D:/My OpenCV Website/fly-agaric.jpg");

if (image.empty())

{

cout << "Could not open or find the image" << endl;

cin.get(); //wait for any key press

return -1;

}

Mat hist\_equalized\_image;

cvtColor(image, hist\_equalized\_image, COLOR\_BGR2YCrCb);

vector<Mat> vec\_channels;

split(hist\_equalized\_image, vec\_channels);

equalizeHist(vec\_channels[0], vec\_channels[0]);

merge(vec\_channels, hist\_equalized\_image);

cvtColor(hist\_equalized\_image, hist\_equalized\_image, COLOR\_YCrCb2BGR);

String windowNameOfOriginalImage = "Original Image";

String windowNameOfHistogramEqualized = "Histogram Equalized Color Image";

namedWindow(windowNameOfOriginalImage, WINDOW\_NORMAL);

namedWindow(windowNameOfHistogramEqualized, WINDOW\_NORMAL);

imshow(windowNameOfOriginalImage, image);

imshow(windowNameOfHistogramEqualized, hist\_equalized\_image);

waitKey(0);

destroyAllWindows();

return 0;

}

}}i}}}wNameOfOriginalImage, image);

imshow(windowNameOfOriginalImage, image);

imshow(windowNameOfOriginalImage, image);

imshHistogram Equalization of a Color image with OpenCVHistogram Equalization of a ColoOriginalImage, image);

imshow(windowNameOfOriginalImage, image);

imshow(windowN