CSE: 4734

COURSE: DIP

NAME: FARDIN SAAD

ID: 154419

LAB ASSIGNMENT 01

TASK 1:

Display the histogram and negative transformation of a Gray scale Image.

CODE:

```
imgin = imread('money.jpg');
[R,C] = size(imgin);
histim = zeros(1,256,'double');
imgout = zeros(R,C,'uint8');
yy = 0:255

for x = 1:R
    for y = 1:C
        imgout(x,y) = 255 - imgin(x,y);
        value = imgin(x,y);
        histim(value+1) = histim(value+1) + 1;
    end
end

figure;
imshow(imgin);
figure;
stem(histim);
figure;
imshow(imgout);
```

OUTPUT:

Fig: Negative Transformation of a Gray Scale Image

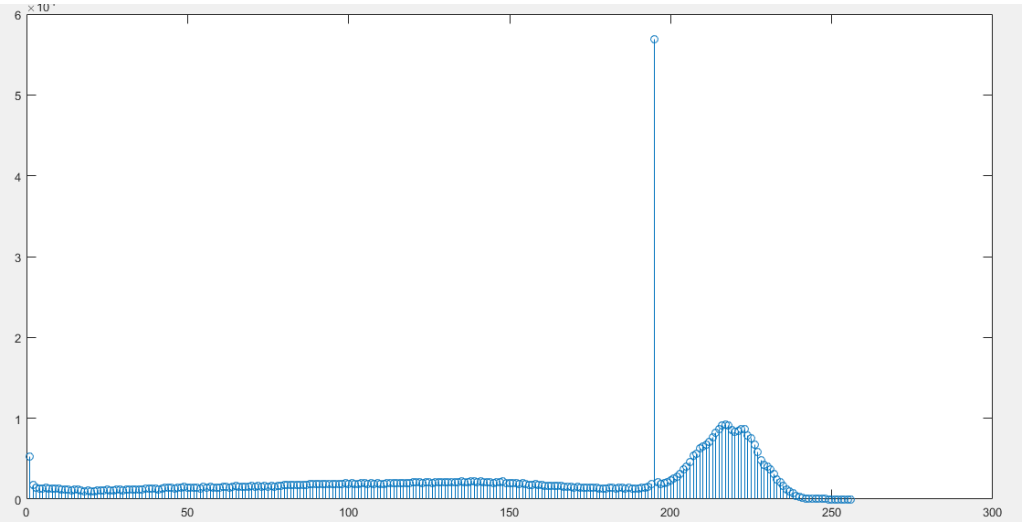


Fig: Histogram displaying the intensity of Grayscale Image

DISCUSSION:

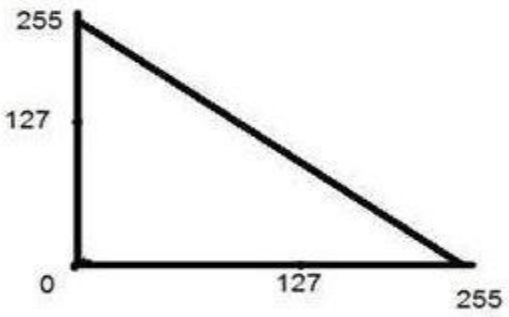
While performing negative transformation of a Grayscale image which is a linear transformation and an invert of identity transformation each value of the input image is subtracted from the L-1 and mapped onto the output image. In this case the following transition has been done.

$s = (L – 1) – r$

Since the input image of money is an 8 bpp image, so the number of levels in this image are 256. Putting 256 in the equation, we get this

$s = 255 – r$

So each value is subtracted by 255 and the result image has been shown above. So what happens is that, the lighter pixels become dark and the darker picture becomes light. And it results in image negative. It is shown in the following graph.



Histogram of an image, like other histograms also shows frequency. But an image histogram, shows frequency of pixels intensity values. In an image histogram, the x axis shows the gray level intensities and the y axis shows the frequency of these intensities. The x axis of the histogram shows the range of pixel values. Since it's an 8 bpp image that means it has 256 levels of gray or shades of gray in it. That's why the range of x axis starts from 0 and end at 255 with a gap of 50. Whereas on the y axis, is the count of these intensities.

As you can see from the graph, that most of the bars that have high frequency lies in the 2nd half portion which is the lighter portion. That means that the image we have got is lighter. And this can be proved from the image too.

TASK 2:

Display the RGB channel individually for a Color image.

CODE:

```
imgin = imread('fruit.jpg');
[R,C,P] = size(imgin);
imgout = zeros(R,C,'uint8');
red = imgin(:,:,1);
green = imgin(:,:,2);
blue = imgin(:,:,3);
imtool(red);
imtool(green);
imtool(blue);
```

OUTPUT:

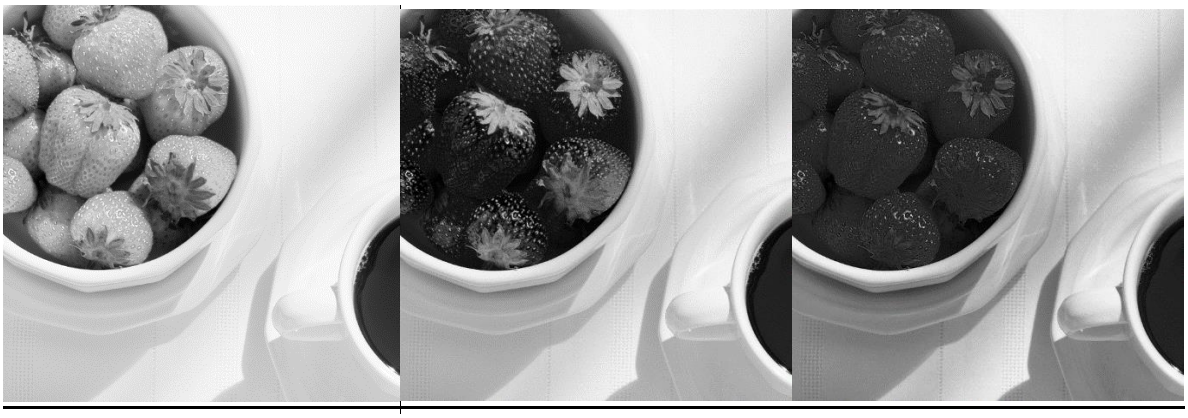


Fig: Red Channel **Fig:** Green Channel **Fig:** Blue Channel

DISCUSSION:

Color image has 65,536 different colors in it. It is also known as High color format. The distribution of color in a color image is not as simple as it was in grayscale image. A 16 bit format is actually divided into three further formats which are Red, Green and Blue. The famous (RGB) format. The Red, Green and Blue Channels are displayed individually by only taking them separately. They display a black-white image since we are only displaying a single channel at a time.

TASK 3:

Display the red, green and blue color of the RGB channel individually for a Color image.

CODE:

```
imgin = imread('fruit.jpg');
[R,C,P] = size(imgin);
imgout = zeros(R,C,'uint8');

onlyred = imgin;
onlyred(:,:,2) = 0;
onlyred(:,:,3) = 0;
imtool(onlyred);

onlygreen = imgin;
onlygreen(:,:,1) = 0;
onlygreen(:,:,3) = 0;
imtool(onlygreen);

onlyblue = imgin;
onlyblue(:,:,1) = 0;
onlyblue(:,:,2) = 0;
imtool(onlyblue);
```

OUTPUT:

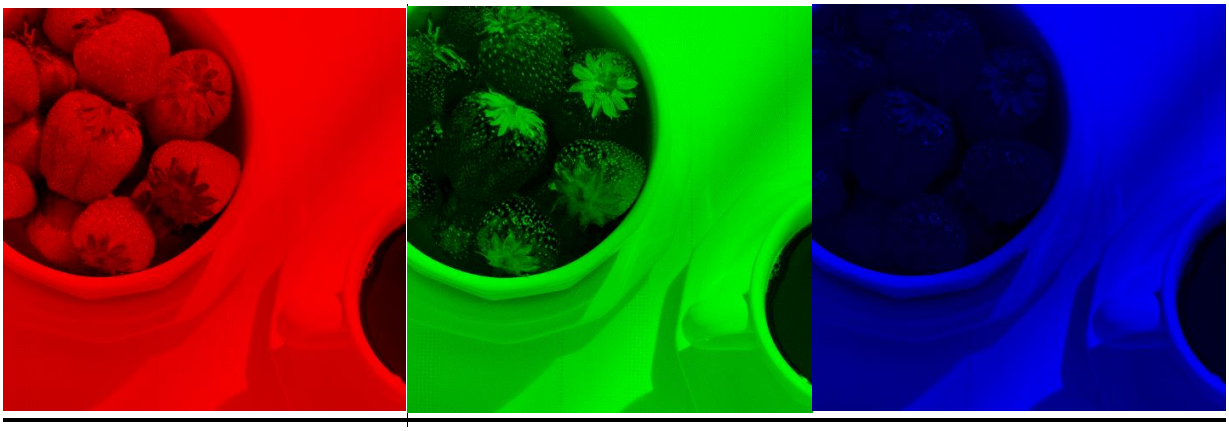


Fig: Red Channel **Fig:** Green Channel **Fig:** Blue Channel

DISCUSSION:

The channels are displaying red, green and blue color since they are mapped in three channels but only 1 of the channel is made to have a color while the other

two channels are emptied. Therefore by keeping the red channel activated it is only showing the red color, by having the green channel activated it is only showing the green channel and lastly by having the blue channel only activated it is only showing the blue channel.