ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 3, Issue 3, pp: (279-283), Month: July - September 2015, Available at: www.researchpublish.com

Luminance Based Conversion of Gray Scale Image to RGB Image

[1]G. Jyothi, [2]CH. Sushma, [3]D.S.S. Veeresh

[1,2,3] Assistant Professor, Information Technology Bhoj Reddy Engineering College For Women, Hyderabad, India

Abstract: **RGB (red, green, and blue) refers to a system for representing the colors to be used on a computer display. Red, green, and blue can be combined in various proportions to obtain any color in the visible spectrum. Levels of R, G, and B can each range from 0 to 100 percent of full intensity. Gray scale images are distinct from one-bit bi-tonal black-and-white images, which in the context of computer imaging are images with only the two colors, black, and white (also called bilevel or binary images). Grayscale images have many shades of gray in between.**

Keywords: **Gray scale, RGB image, intensity.**

I. INTRODUCTION

Grayscale images are often the result of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum (e.g. infrared, visible light, ultraviolet, etc.), and in such cases they are monochromatic proper when only a given frequency is captured. But also they can be synthesized from a full color image.

The intensity of a pixel is expressed within a given range between a minimum and a maximum, inclusive. This range is represented in an abstract way as a range from 0 (total absence, black) and 1 (total presence, white), with any fractional values in between. This notation is used in academic papers, but this does not define what "black" or "white" is in terms of colorimetry. Converting RGB to grayscale/intensity. When converting from RGB to grayscale, it is said that specific weights to channels R, G, and B ought to be applied. These weights are: 0.2989, 0.5870, 0.1140. It is said that the reason for this is different human perception/sensibility towards these three colors.

Fig 1.RGB image

2. TYPES OF IMAGES

1. Binary Image:

Binary images are images that have been quantised to two values, usually denoted 0 and 1, but often with pixel values 0 and 255, representing black and white. Binary images are used in many applications since they are the simplest to process, but they are such an impoverished representation of the image information that their use is not always possible.

Sometimes the output of other image processing techniques is represented in the form of a binary image, for example, the output of edge detection can be a binary image (edge points and non-edge points). Binary image processing techniques can be useful for subsequent processing of these output images.

Binary images are typically obtained by thresholding a grey level image. Pixels with a grey level above the threshold are set to 1 (equivalently 255), whilst the rest are set to 0. This produces a white object on a black background (or vice versa, depending on the relative grey values of the object and the background). Of course, the `negative' of a binary image is also a binary image, simply one in which the pixel values have been reversed.

Fig 2.binary image

2. Gray scale image:

Grayscale is a range of shades of gray without apparent color. The darkest possible shade is black, which is the total absence of transmitted or reflected light. The lightest possible shade is white, the total transmission or reflection of light at all visible wavelength s. Intermediate shades of gray are represented by equal brightness levels of the three primary colors (red, green and blue) for transmitted light, or equal amounts of the three primary pigments (cyan, magenta and yellow) for reflected light.

In the case of transmitted light (for example, the image on a computer display), the brightness levels of the red (R), green (G) and blue (B) components are each represented as a number from decimal 0 to 255, or binary 00000000 to 11111111. For every pixel in a red-green-blue (RGB) grayscale image, R = G = B. The lightness of the gray is directly proportional to the number representing the brightness levels of the primary colors. Black **is** represented by R = G = B = 0 or R = G = B = 00000000, and white is represented by R = G = B = 255 or R = G = B = 11111111. Because there are 8 bit s in the binary representation of the gray level, this imaging method is called 8-bit grayscale. In the case of reflected light (for example, in a printed image), the levels of cyan (C), magenta (M), and yellow (Y) for each pixel are represented as a percentage from 0 to 100. For each pixel in a cyan-magenta-yellow (CMY) grayscale image, all three primary pigments are present in equal amounts. That is, C = M = Y. The lightness of the gray is inversely proportional to the number representing the amounts of each pigment. White is thus represented by C = M = Y = 0, and black is represented by C = M = Y = 100.

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 3, Issue 3, pp: (279-283), Month: July - September 2015, Available at: www.researchpublish.com

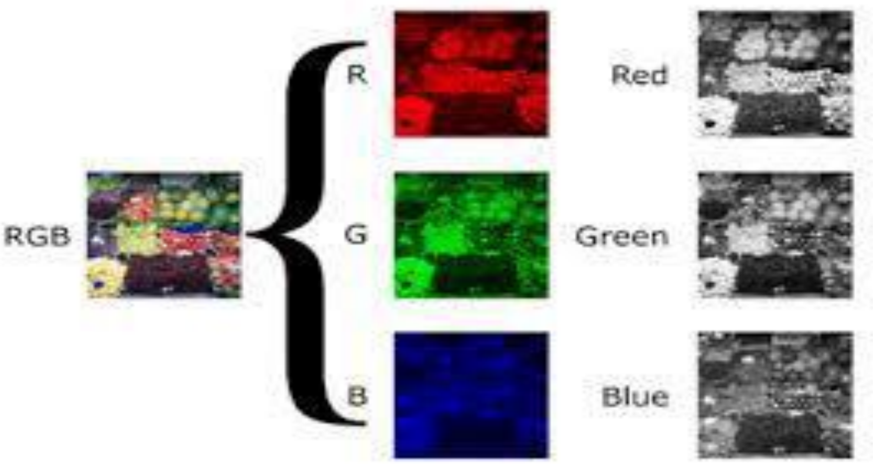

Fig 3.gray scale

3. True color image:

True color is the specification of the color of a pixel on a display screen using a 24-bit value, which allows the possibility of up to 16,777,216 possible colors. Many displays today support only an 8-bit color value, allowing up to 256 possible colors.

The number of bits used to define a pixel's color shade is its bit-depth . True color is sometimes known as 24-bit color . Some new color display systems offer a 32-bit color mode. The extra byte, called the alpha channel , is used for control and special effects information.

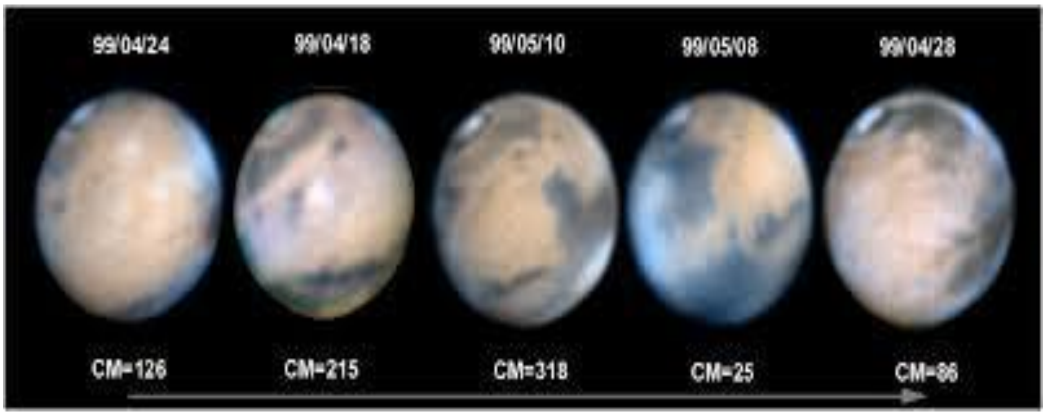

Fig 4True Color

3. CONVERSION OF GRAY SCALE IMAGE TO RBG IMAGE

When converting from RGB to grayscale, it is said that specific weights to channels R, G, and B ought to be applied. These weights are: 0.2989, 0.5870, and 0.1140. It is said that the reason for this is different human perception/sensibility towards these three colors. How all grayscale algorithms fundamentally work All grayscale algorithms utilize the same basic **three-step process:**

1. Get the red, green, and blue values of a pixel.

2. Use fancy math to turn those numbers into a single gray value.

3. Replace the original red, green, and blue values with the new gray value.

When describing grayscale algorithms, I'm going to focus on step using math to turn color values into a grayscale value. So, when you see a formula like this:

Gray = (Red + Green + Blue) / 3

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 3, Issue 3, pp: (279-283), Month: July - September 2015, Available at: www.researchpublish.com

Recognize that the actual code to implement such an algorithm looks like:

```
For Each Pixel in Image {
Red = Pixel.Red
Green = Pixel.Green
Blue = Pixel.Blue
Gray = (Red + Green + Blue) / 3
Pixel.Red = Gray
Pixel.Green = Gray
Pixel.Blue = Gray
}
```

Fig 5.gray scale image to rgb image

Correcting for the human eye (sometimes called "luma" or "luminance," though such terminology isn't really accurate)

It's hard to tell a difference between this image and the one above, so let me provide one more example.

fig 6. luma

If you look closely, you can see a horizontal line running across the center of the image. The top half (the average method) is more washed-out than the bottom half. This is especially visible in the middle-left segment of the image, beneath the cheekbone of the background skull.

The difference between the two methods is even more pronounced when flipping between them at full-size, as you can do in the provided source code. Now might be a good time to download my sample project (available at the bottom of this article) so you can compare the various algorithms side-by-side.

The algorithm plays off the fact that cone density in the human eye is not uniform across colors. Humans perceive green more strongly than red, and red more strongly than blue. This makes sense from an evolutionary biology standpoint – much of the natural world appears in shades of green, so humans have evolved greater sensitivity to green light.

4. CONCLUSION

The Future extraction can be defined as the operation to quantify the image quality through various parameters or functions which are applied to the original image. When converting the image from gray scale to RGB image the image luminance value may differ from image to image.

REFERENCES

[1] Irani, M., Peleg, S., 1991, Improving resolution by image Registration, Graphical Models and Image Processing, vol. 53,no. 3, pp.231-239.

[2] Finlayson, G. D., Qiu, G., Qiu, M., 1999, Contrast Maximizing and Brightness Preserving Color to Grayscale Image Conversion.

[3] The Math Work, 1999 the neural network and image processing toolbox, The Math Work Inc.

[4] Bala, R., Braun ,K. M., Color to grayscale conversion to maintain discriminability, Xerox Innovation Group, 800

[5] Phillips Rd, 128-27E, Webster, NY 14580.

[6] Rafael C. Gonzalez & Paul Wintz, “Digital Image Processing”, Addison-Wesley Publications, May, 1987.

[7] Pratt, W. K. “Digital Image Processing”, John Wiley & Sons, 1991.