

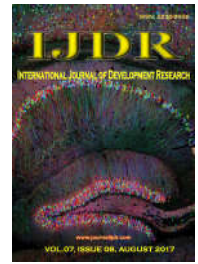


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DIFFERENT COLOR DETECTION IN AN RGB IMAGE

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ABSTRACT

This paper presents the methodology for extracting different colors from an RGB image. RGB image have different colors with different values of color contents for each pixel. As red, Green and blue are the fundamental colors for every color formation and these can be extracted by simply using MATLAB commands. But in real life applications like face detection or skin detection or some applications in floriculture, detection of different fruits of vegetables etc. other colors have to be detected. So this paper presents the dignified approach to extract the concerned color from an image.

INTRODUCTION

A RGB image is a colorful image consisting of fixed values of color contents for each pixel. These color contents have different values ranging from 0 to 255. There are inbuilt functions and commands available in MATLAB to extract the required color content from a RGB image. If we required extracting a particular color from a RGB image, there are no integral commands that we use directly to do so. For such type of operations we required some algorithms. A simple algorithm is introduced having series of MATLAB commands and looping statements to extract a particular color from a RGB image. It is very helpful in image processing such as in pattern reorganization and mapping to find best equivalent used in many application fields. To extract a particular color from a RGB image or extract a particular area of interest for processing then we have no need to course the whole image. We have less number of values for processing further. It becomes easier to process the image for some other errands. So a simple algorithm or a simple method is introduced in this paper to extract a requisite area of interest and a particular color from a RGB image.

In the recent years many studies are done in which basic color (RGB) detection is done along with making a box around the particular color. This is done using GUI in MATLAB (Raquib Buksh, 2014). The only problem in this approach is some other area is also detected in box along with required field. In another study, neural network is used for detection of colors in an image. In this approach based on membership probability of experts assigned to red, green and blue, final decision is taken by neural network (Atlun, 2011). Along with this many studies are done in which grain detection from husk and another broken grains and skin color detection using different approaches (Harashwardan kakkar, 2016; Justyna Inglot, 2010; Kruppa, 2002).

METHODOLOGY

In this section an algorithm is proposed for the detection of interested color from an image. All he steps are implemented using MATLAB 2014. The flow chart above gives the detailed description of an algorithm.

Capturing an Image

Foremost step of this algorithm is to capture the good quality image for processing which should be done using high eminence camera, good illumination conditions. Good quality image means which is having high resolution and contrast, free from noise and proper depth of field. Then this image is imported to the MATLAB using Command:

```
IMG=imread('C:\Users\Amarpal\Desktop\flow.jpg');
```

Extraction of RGB color

A RGB image is a blend of three different color layer (red, blue and green). In this step, extract these color contents differently. These color contents are extracted by using some inbuilt functions or some commands in MATLAB.

```
red=IMG(:,:,1);
green=IMG(:,:,2);
blue=IMG(:,:,3);
```

Thresholding

A RGB has multiple colors with different color content (red, green and blue) value mixture for each pixel ranging from 0 to 255 for each color. Based on these different color combination values different colors in a RGB image is formed. For a pure white image these color content values are having maximum range and for pure black they have minimum values. For maximum example for dark red color the red color content value has low value and for light red color red color content has maximum value. It is easier to find the combination value of each color content for any pixel, a cursor named data cursor is accessible in figure window of MATLAB to do so. By using this cursor find out the average value of the red, green and blue color content of the exacting that required extracting. These average values are used for thresholding of that color.

Masking

After the thresholding, mask these thresholding values of each color contents for the color that is requisite to extract, by using logical and operators. If the threshold value of red color, green and blue content for a particular color is 80, 90 and 190 respectively, then for masking these values use the following MATLAB function.

```
redthreshold=(80);
greenthreshold=(90);
bluethreshold=(190);
redmask=(red>redthreshold);
greenmask=(green<greenthreshold);
bluemask=(blue<bluethreshold);
```

The logical operators are altered according to the color shade required.

Application of logical operation

A logical AND operation is performed after masking the color content between these masked color contents to extract the required area of the RGB image. The output of this step is resulted in an image with the drawing out of the area of interest. If the required color or required area of interest is not properly extracted then change the threshold values of color contents, or change the trend of logical and operators.

```
new = (redmask & greenmask & bluemask);
```

Multiplication of images

A In final step multiply the resulted image of logical AND operation operated in step 5 with the original RGB image. There is a problem or issue to do this multiplication because the RGB is three layered image have unit 8 type integer values but the image resulted after the logical AND operation has different data type than RGB image. There is a call for conversion of data type to multiply these images. No inbuilt functions are available in MATLAB to do such type of conversion. The algorithm purposed in this paper contains a looping statement for such sort of conversion.

RESULTS

This section of paper includes all the images obtained after applying operations proposed in the algorithm. First and foremost step is to capture the image which is having good quality information and illumination. After capturing the image, read this image to MATLAB platform using imread instruction as defined in methodology section. There are different types of image formats existing like RGB, gray scale, binary and indexed images etc. These different images have different characteristics from each other. A RGB image is a colourful image has different color content values ranging from 0 to 255 for each pixel. Each color pixel of a RGB image has different value grouping of red, green and blue color content.

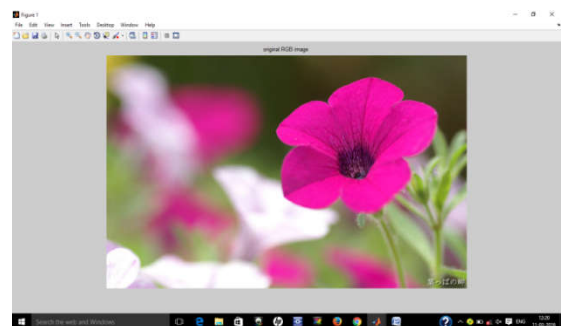


Figure 1. Original Image

Figure 1 shows the image from which the color has to extract. This image is then imported to the MATLAB platform, using the instruction defined in image processing toolbox. Then, from this image the basic colors red, green and blue are extracted to get proper information on the subject of the amount of these colors present in the image.

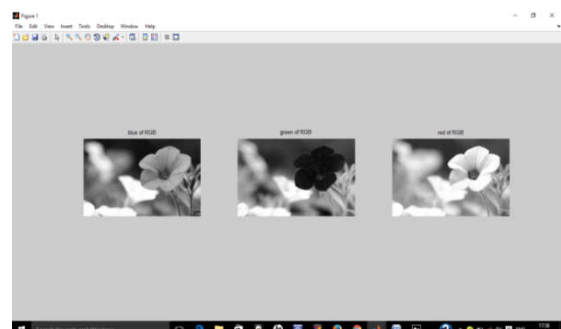


Figure 2: RGB content extraction

Figure 2 represents the image in which fundamental colors are extracted and shown in different plots using subplot.

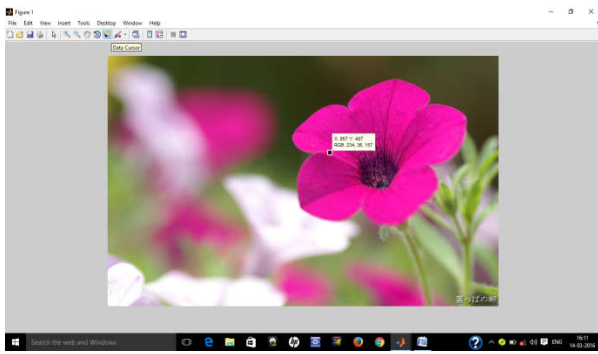


Figure 3. Data cursor showing color content

Figure 3 shown above defines the use of data cursor with which amount of color content present in the image that is to be extracted is calculated and using the thresholding command on this value particular is extracted.

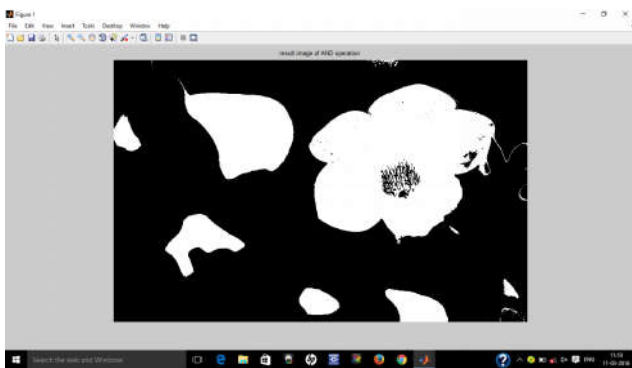


Figure 4. Image showing masking process

Figure 4 shown above defines the masking process which is implemented on the image using the threshold value defined using the data cursor. This process will extract the area of interest from the whole image.

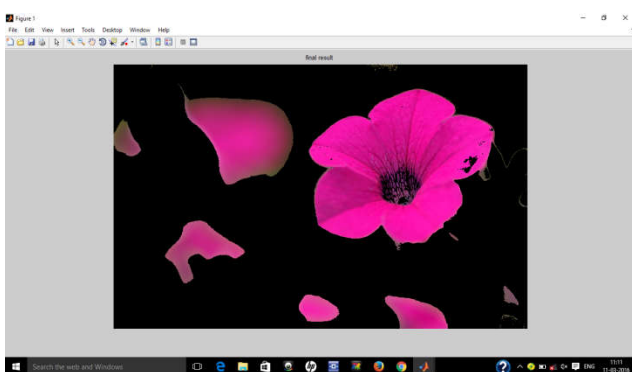


Figure 5: Final result

Figure 5 shows the final result of the algorithm in which the color which is required to be detected from the RGB image is extracted. This process is done using multiplication of the images after masking process. Main problem of this method is the data type of the image. So to implement this step first thing is to change the data type of image. After that, the final result is obtained using looping commands and multiplication process.

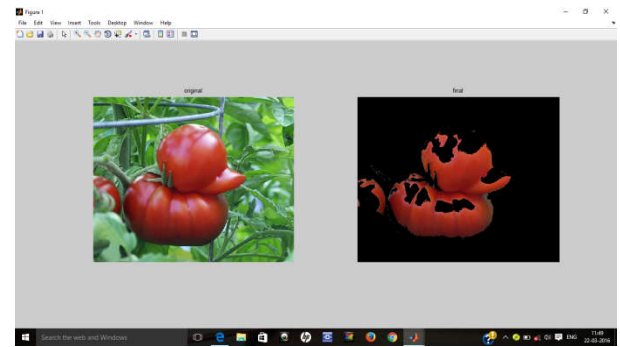


Figure 6. Application on vegetable detection

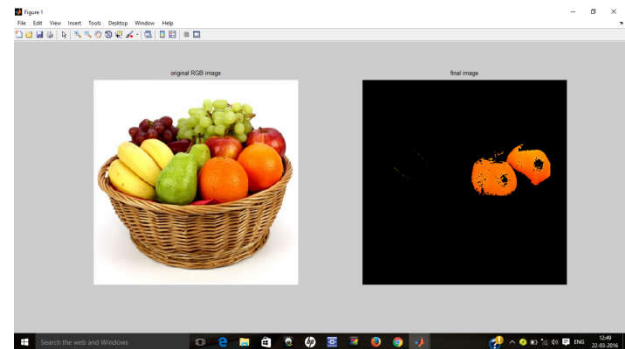


Figure 7. Application on fruit detection

Figures 6 and 7 represents the application of this algorithm on detection of vegetables and fruits based on color detection. As in real life applications, like in factories were fruits or vegetables are used for the manufacturing of different products, all the ingredients are present on conveyer belt. So using this algorithm these ingredients can be differentiated and collected by detecting the color.

Conclusion

In this paper a methodology is defined to get the required color filed from an RGB image. In this various steps are implemented using MATLAB platform. This algorithm can be used in various applications in day today's life, professional companies in face detection on basis of skin color. Many applications like floriculture, fruits and vegetable differentiation from other fruits or vegetables; all this is done using this methodology. Main positive point of this method is its speed. In the future scope what we can do using this color detection an edge detection techniques different other applications can also be implemented.

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