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Object Detection for Color Blind Applying Binary Images

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***Abstract*: In this paper is basically used for Color blind peoples and color blindness test. Color blindness is a defect of color vision. Due to presence of color blindness, human eye becomes unable to differentiate colors. General reason for color blindness is genetic, but sometimes it happens due to some damage and disorder in brain and eye. Color blindness is of many types like Red-Green, Blue-Yellow etc. Red-Green color blindness is most common type in which person is unable to differentiate between red and green colors. We are decided to work about this research paper for using color image with RGB and with transferring GRAY image, image is basically collection of matrix or we can say a 2D array (A_{ij} means i's row and j's column), Multiplication rows and columns and comparing them with different color with not occurring same color (Fig. 1, 2 3).**

Keywords: color blindness, pixel, RGB model, HSV model.

I. Introduction

Image is representation of some information such as drawing, pictures, graphs, etc., all those information's are visual. The unit of an image is pixel. Image processing is the study of any algorithm that talks an image as input & returns as image as output. It is used in bio science, astronomy, medical science, security, biochemistry, etc. Processing of an image is a complex mechanism; here we are performing image segmentation .In this paper is basically we are discussing an algorithm to help person suffering with color blindness [1]. Human eye becomes unable to differentiate colors. When you are unable to see normal way Color blindness or color deficiency occurs. Colors in Color blindness often happens when nobody not differ between certain colors. Green, red, and blue colors are differing from this way. General reason for color blindness is genetic, but sometimes it happens due to some damage and disorder in brain and eye. Color blindness is of many types like Red-Green, Blue-Yellow etc. Red-Green color blindness is most common type in which person is unable to differentiate between red and green colors. The rods and cones in our retina are detecting light. Rods are very sensitive to low level light that detect only light and dark and Cone cells are concentrated near the centre of your vision to detect color and three types of cones to see three different colors i.e. red, green and blue Our nervous system to brain uses as input from these cone cells to determine our viewing color perception. Color blindness occurs when more than two of the colors, cone cells are absent or not working, or detect a different colors than normal.

Otherwise Color blindness happens if and only if all three cone cells are present but one cone cell not work normally so, detects a different color than normal. The different degrees of color blindness with mild color deficiencies person can see colors normally in day vision but have difficult in night vision. Others cannot determine certain colors in any light. The most several form of color blindness are see in shades of gray, is uncommon. Color blindness usually affects in both eyes equally as well as remains stable throughout life. Colors blindness is usually something that a person has from birth but you can also get it later in life. Change in color vision can signify more serious condition. Experiences a significant can change color perception to see an ophthalmologist. My perfection and matrix theory as theory Cal purpose. Before that working I learned about the basic concept and various types of thesis and work about image processing.

II. Color Blindness

Color blindness is a color vision problem where person is deficient to recognize colors like red, green and blue. To see something there are photoreceptors on retina of human eye, which pass information of light to the brain [2]. There are two types of photoreceptors: Rods and cones. Cones are responsible for color vision while rods are not sensitive to colors. There are three types of cones:

1. *S cones:* Sensitive to short wavelength (Blue color).
2. *M cones:* Sensitive to medium wavelength (Green color).
3. *L cones:* Sensitive to long wavelength (Red color).

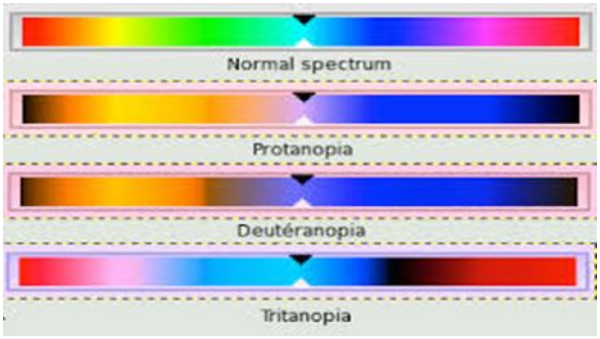

Fig. 1. Spectrum

Due to abnormality of these cones there are three types of color blindness:

1. *Monochromic:* When a person has a single cone cell or no cone cells. This color blindness type is called total color blindness. It is very rare.
2. *Dichromic:* When one of the three cone cells is missing.
3. *Anomalous Trichromaly:* When all three types of cones present but with shifted peaks of sensitivity for one of them. Dichromic and anomalous Trichromaly are of further three types:

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a) *Protanopia:* Due to absence or improper functioning of L-Cones.
b) *Deuteranopia:* Due to absence or improper functioning of M-Cones.
c) *Tritanopia:* Due to absence or improper functioning of S-Cones. The following fig-a shown below-The easiest way to prepare your document is to use this document as a template and simply type your text into it.

III. Algorithm

The algorithm used in this project is dependent on several steps which are explained one by one. Our report for this specific problem can be solve by following this algorithm, a blind victims can't see the RGB (red, green &blue) due to cone cells, further that tri cells are not see those colors at a moment, at first viewing color image of a blind victim are converted into RGB format, divided into a matrix from then compare each row and column then similar colors pixels are remove from the picture then further compare using loop. Resulting image converted into HSV format and take an outer black image or mapping image, seen it to the blind victim to able or not.

A. Matrix Representation of an Image

Create a matrix for specific rows (r=1500) and columns (c=1000) (Fig. 2, shown the 5×5 matrix or 2D array) then concatenate this rows and columns using cat(),store it into image, build a matrix or image using img(: : :) . specify the size using size().Input or read an image using imread() and store it into img1,show the image using imshow(). Check the equality of img=img1, dim=img1, convert an image into RGB format then show the image.

B. Comparison between the Values of Pixels in the Image Matrix

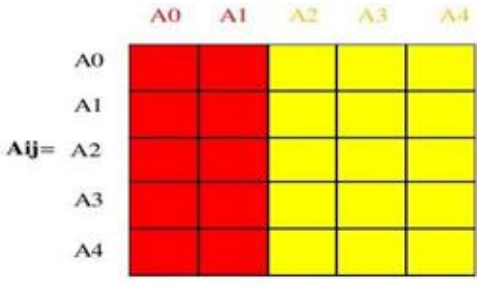

Fig. 2. 5×5 pixel matrix

Aij = aij where i! =j, so, removing i=j value we get

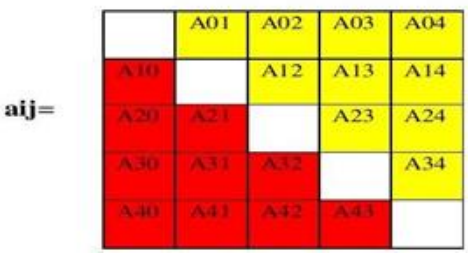

Fig. 3. 5×5 pixel matrix (other position)

Now the code divide the image to Blocks After the divided we take the average of each block with size 5×5 pixel and store values in new matrix image called (A_{ij}) Then we want to compare the value of each pixel in matrix (A_{ij}) with all the other values of pixels in the same matrix when we find value equal another values in the same matrix put in other position of those value zero. After that we store in the new image in first row we store the value of each pixel and in another row we store the number of pixel equals and its position (Fig. 3, 4) [3].

A00	A01	A02	A03	A04
A10	A11	A12	A13	A14
A20	A21	A22	A23	A24
A30	A31	A32	A33	A34
A40	A41	A42	A43	A44

Fig. 4. Pixel position

C. RGB to HSV

As this process starts first web contents are extracted from the websites and then out of these contents some images that are to be transformed are selected and saved. After saving these extracted images are passed through the color transformation process, by which unrecognized color are transformed to recognizable colors to the color blind person. This research focuses on the red green color vision deficient. Transformation process result as red is transformed to yellow and green is transformed to blue and blue is remaining same [4].

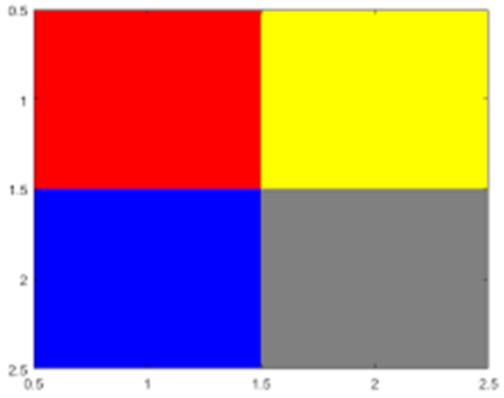

Fig. 5. Background

For an image (Fig. 5), the background is neutral and the subject is not. So I'd probably convert to HSV with RGB2HSV [5] and then threshold on saturation to get highly saturated pixels. The background won't get selected. Then get rid of any small Regions with beware open, call region props, get the bounding box and call imcrop [6].

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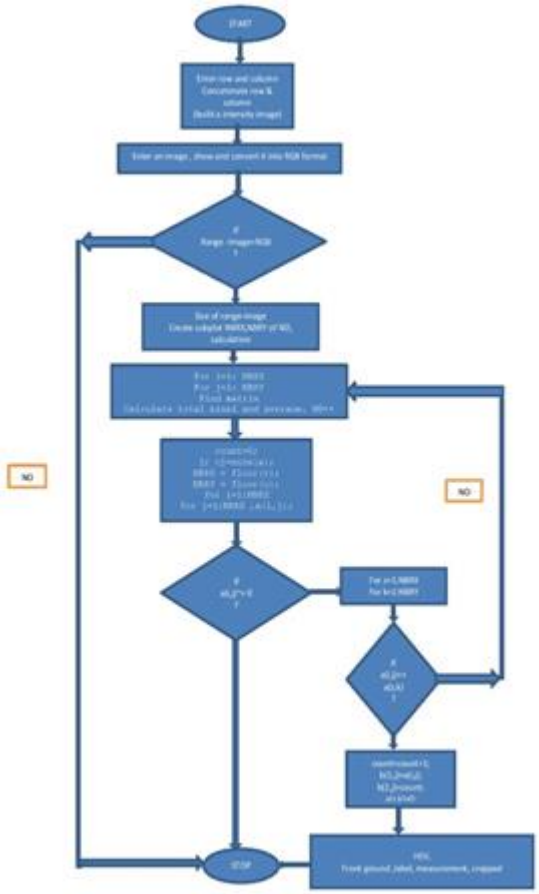
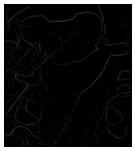
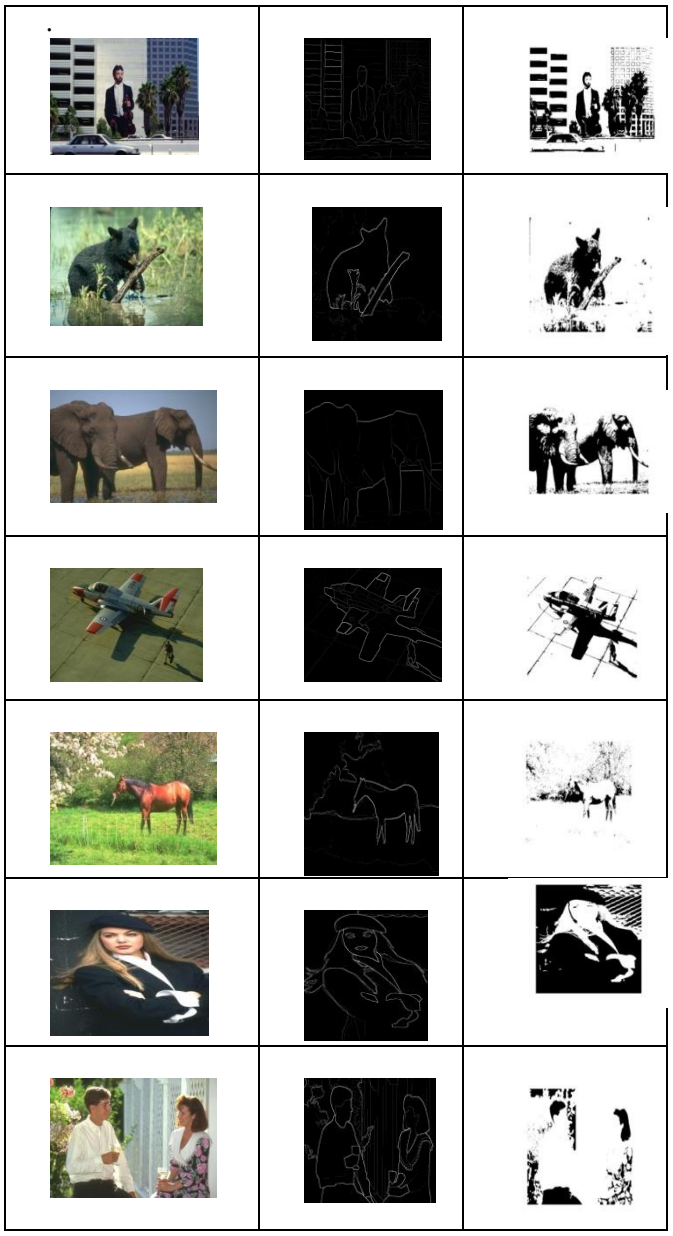


Fig. 6. Flowchart

IV. Experimental Result and Comparison

TABLE I
Experimental Result and Comparison

Original Image	Machine Image	Proposed Method
		
		
		



Test images are taken from Berkeley data set [6] and our consulting algorithms respective images are better than their given machinery images from original images.

V. Conclusion

In this paper we are a comparing the output image of bench mark algorithm to our very own method. Other algorithms are mostly using "background subtraction" to find the output image but we are considering both the fore ground and the background. When back ground is subtracted we are losing few features of the image are lost but we are trying to keep intact all these features. Keeping all the features actually helps the output image to be much better for pattern recognition not only that in few cases keeping all features enhances the output image. As our algorithm works color pixel difference a color blind person will understand the whole image and will detect every object present in the image. a color blind person will see

the whole image through a device and will understand or detect the objects present , it might be that the eye does not catches a color and miss the object but our algorithm will help the person to detect that object. Our algorithm as only use two colors black and white so a eye suffering from color blindness will never have a problem to understand the output image of our algorithm. Color blind person find it most difficult to detect object in the real world like roaming around the city or while having wild life safari so to make life easy we can always have the algorithm to work.

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