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Image Processing for Colour Blindness Correction or Colour Detection

Pisini Mani Bhargav

Student, Rajam, Vizianagaram, 532127, India.

ABSTRACT

In this paper we mainly discuss about color detection for color blindness people. As we all know that color blindness people are facing so many problems because of their deficiency. With the help of image processing, they can detect much large range of colors By using different technologies we can reduce it This is also done by CNN based supervised machine learning color detection. By this we can modify the image so that they can get more details about the image. The main aim is to detect color and edge of an image with help of image processing they can detect the color and the edges of the image easily. In image processing we can shift the dull and light shades and filter them into different shades. Subjects with normal vision and color blindness were shown the original image, and the outcomes varied depending on the participant. After the modified filter was applied to a natural image, the color blind and normal vision subjects were all able to correctly identify the test colors. Our main purpose is to identify the RGB colors in the image so that they can correctly identify the test colors. This was mainly successful for seeing the stored images but not translate well for real world images.

Keyword : Image processing, Colorblindness, CNN, Filter design, RGB, Color correction.

1. Introduction

In this paper we mainly discuss about colour detection for colour blindness people. As we all know that colour blindness people are facing so many problems because of their deficiency. With the help of image processing, they can detect much large range of colours. By using different technologies, we can reduce it. This is also done by CNN based supervised machine learning colour detection. By this we can modify the image so that they can get more details about the image. The main aim is to detect colour and edge of an image. With help of image processing, they can detect the colour and the edges of the image easily. In image processing we can shift the dull and light shades and filter them into different shades. Subjects with normal vision and colour blindness were shown the original image, and the outcomes varied depending on the participant. After the modified filter was applied to a natural image, the colour blind and normal vision subjects were all able to correctly identify the test colours. Our main purpose is to identify the RGB colours in the image so that they can correctly identify the test colours. This was mainly successful for seeing the stored images but not translate well for real world images.

2. Literature Survey

In paper [1] Ali Hasan Ali, Mohammed RASHEED, Suha SHIHAB, Taha RASHID and Saad Abed Hamad discussed about the main purpose of doing such modifications on images is to get some details that are impossible to be seen without modifying the images. Moreover, there are some factors can affect images in the medical field such that the divergence of the x-ray photons, minimizing magnification, the size of the projected object ...etc. Therefore, the general plan of this paper is to converting the images to matrices and applies our mathematical operations in the next section that associated with the Heat Equation on those images to enhance them and then reconvert them to desirable images.

In paper [2] M. RASHEED, A. A. Abdulrahman, and S. Shihab in the paper proposes suitable transformations to find transformation for image analysis and compression. The purpose of this articles to determine the appropriative wavelengths for comprising images by recording the parameters Trees is used to obtain a better compression of the image with a high compression ratio using different wavelets and to compare the results that the techniques were implemented in the mat lab program through the result such as basic criteria for the compressed.

In paper [3] A. A. Abdulrahman, M. RASHEED and S. SHIHAB in the paper proposes different types of method for noise are analysed from the necessary image, where the disturbance was removed using wavelets with basic theories, and the most important details that will be presented in work. Wavelet thresholding technique is used in this work influenced by the wavelet coefficient. so that each parameter is a threshold with the threshold of the image if coefficient is smaller than the threshold it will be equal to zero. This proposed smooth and effective theory in terms of accuracy in our result.

In paper [4] A. A. Abdulrahman, M. RASHEED and S. SHIHAB. In order to enhance the images under examination using the Chebyshev wavelet filter, this paper offers the article provides fresh image processing approaches. The method allows for the creation of Chebyshev wavelet transforms employing four different integration matrices for Chebyshev wavelets, improving the quality of the image being studied. The second type of proposed wavelets was found to be the most effective of the three types after comparing the results with standard waves that play a significant part in image processing; all of

this work was carried out using the MATLAB programme. The outcomes can be applied to a variety of fields, including medicine, noise removal, and picture compression.

In paper [5] A. A. Abdulrahman, M. RASHEED, S. SHIHAB. The paper suggests using picture analysis to a variety of fields, such as physical therapy, medicine, and other disciplines. using a sample of a real atom that was studied in an image, emphasising the compression, and amplifying the noise A suitable threshold value was discovered through the investigation, which aids in energy restoration and ensures that the compressed material retains the majority of its original information. In contrast to the normal study, a sample of an atom's physical picture was obtained to shed the proposed wavelets and was utilised for the first time in a physical image analysis for analysis based on the wavelet image algorithm analysis, where the image was examined and its statistics, pressure, and noise.

In paper [6] Ali, A., RASHEED, M., SHIHAB, S., RASHID, T., Sabri, A., & Abed Hamed. An efficient method of colour detection is provided in this paper. In the field of image processing, colour detection techniques are frequently employed, particularly for calculating the amount of a specific colour after editing a picture to determine whether the image has been improved or not. We gave four instances employing various types of graphics, including binary, vibrant, and tactile ones. In order to demonstrate the comparability of our suggested strategy, a red eye reduction experiment was used.

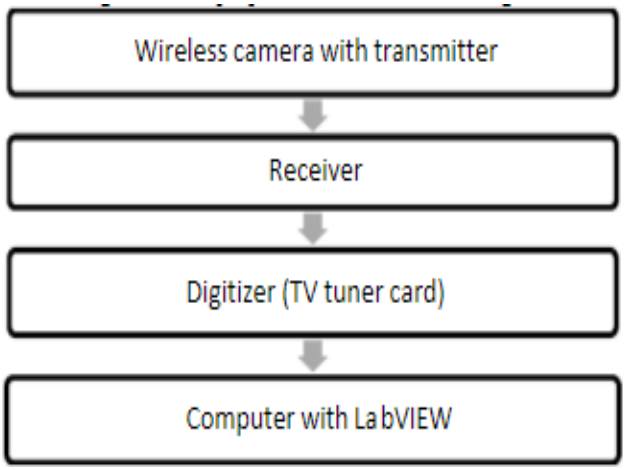
In paper [7] Shambhavi Vijay Chhaya, Sachin Khera, Pradeep Kumar S. We use image processing methods with the aid of MATLAB to recognise fundamental geometric shapes and primary RGB colours in a two-dimensional image. The fundamental shapes are the rectangle, circle, square, and triangle. The technique first converts an RGB image to a greyscale image, and then it turns it into a black-and-white image. The thresholding concept does this. No matter the angle of rotation of the item, the area of the minimal bounding rectangle is computed, and the ratio of this area to the area of the object is calculated and compared to the specified ratio to determine the shape of the supplied object. The colour of the object can be determined in part by the dominant colour pixels that are present. It has a wide range of potential applications using numerous cutting-edge techniques.

In paper [8] Vladimir Vezhnevets, Vassili Sazonov, Alla Andreeva. In situations where training data is scarce and the target data set is anticipated, parametric skin modelling techniques are better suitable for building classifiers. These approaches' capacity to generalise and extrapolate makes it possible to build a classifier with respectable performance from sparse training data. Although it won't improve the ability to distinguish between skin and non-skin colours, excluding colour brightness from the classification process can help to generalise sparse training data. Because different skin modelling techniques respond to colorspace changes very differently, evaluating colorspace goodness "in general" by looking at skin/non-skin overlap, skin cluster shape, etc. without regard to any particular skin modelling method cannot provide an accurate impression of how well the colorspace is suited for skin modelling.

3. Data Collection

The below data is collected from the references.

4. Methodology



Live image is captured using a wireless camera. The input image is converted to digital form using a TV tuner card, and the digitalized image is then examined in LabVIEW to determine its colour and edges. creates a temporary image storage place in memory. Then opens a camera, inquiries about its features, loads a camera configuration file, and establishes a special reference to the camera. Then A snap acquisition is configured, started, acquired, and reconfigured. Then Obtains the most recent frame and places it in Image Out. Only dial this VI after dialling Then This VI transforms the picture type to a suitable format if the image type does not match the video format of the camera. terminates the chosen Camera Session and halts all active acquisitions while releasing any associated resources. Returns an element or subarray of the n-dimensional array at the specified index. Extract A single plane is extracted from a colour image by Single Colour Plane. finds edges and extracts contours from Gray-level values. The image type linked to Picture Src must match any image attached to the input Image Dist. The input image mark must be attached to an 8bit image type. Then the colour spectrum will be defined the image mask will be done.

5. Results and Discussion

The discrete wavelet transformation and decomposition algorithm, which uses wavelets at Levels (1–8) of decomposition, has been suggested for usage with a colour image. Following decomposition, MSE, PSNR, and bit-per-pixel ratio are employed in Table to analyse the principle behind compression.

Decomposition level 1			
Transforms	**Haar**	**db1**	**Sym**
MSE	10.06	10	8.85
PSNR	38.11	38.11	38.66
CR%	120.70	120.70	114.41
BPP	28.9672	28.967	27.4583
Decomposition level 2			
Transforms	**Haar**	**db1**	**Sym**
MSE	8.314	6.296	6.466
PSNR	38.93	40.14	40.02
CR%	73.65	73.65	70.80
BPP	17.6763	17.676	16.9915
Decomposition level 3			
Transforms	**Haar**	**db1**	**Sym**
MSE	9.589	9.589	4.923
PSNR	38.31	38.31	41.21
CR%	59.94	59.94	58.60
BPP	14.3864	14.3862	14.0643
Decomposition level 4			
Transforms	**Haar**	**db1**	**Sym**
MSE	11.37	4.506	4.266
PSNR	37.57	41.59	41.83
CR%	56.31	56.31	55.19
BPP	13.5145	13.5144	13.2456

Table 4.1.1. Levels of decomposition with performance evaluation levels (1-4)

Decomposition level 5			
Transforms	**Haar**	**db 1**	**Sym**
MSE	3.036	4.521	4.301
PSNR	33.31	41.58	41.79
CR%	55.40	56.40	54.21
BPP	13.2852	13.295	13.0109
Decomposition level 6			
Transforms	**Haar**	**db 1**	**Sym**
MSE	2.263	2.263	1.676
PSNR	44.58	44.58	45.89
CR%	55.14	56.14	53.94
BPP	13.2345	13.2344	12.9453
Decomposition level 7			
Transforms	**Haar**	**db 1**	**Sym**
MSE	2.764	2.764	2.211
PSNR	43.72	43.72	44.68
CR%	41.49	41.49	40.06
BPP	9.9585	9.9584	9.6136
Decomposition level 8			
Transforms	**Haar**	**Db 1**	**Sym**
MSE	2.764	2.764	2.211
PSNR	43.72	43.72	44.62
CR%	41.41	41.47	40.03
BPP	9.9519	9.9518	9.6074

Table 4.1.2. Levels of decomposition with performance evaluation levels (5-8)

6. Conclusion

The suggested technique for determining the colour and borders of a given image satisfies the work's objective. Finding the colour and edge of a colour image is done using the development tools LabVIEW IMAQ vision and vision assistance. The entire framework of the task is discovered to be affordable, practical, adaptable, & efficient.

For those who are colour blind, it will be challenging to read letters written in some colours on a different backdrop colour. The proposed method's future ion

work will involve detecting text by integrating LabVIEW with the GSM module, which is utilised to deliver processed information to the user and aid colour-blind individuals in reading text. then conversion can also prolong the work. By this study we can understand that image processing is very useful colour blindness correction.

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