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SKIN COLOR BASED AND PIXEL BASED TECHNIQUE FOR SKIN DETECTION USING HSV AND YUV

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ABSTRACT

The paper provides a comparison between HSV and YUV techniques used in detecting human skin. It is the technique to identify skin colored picture elements from an image of human skin is not an easy task as human skin of people varies from area to area. So, it is not possible to make a general method to detect skin of different pupil. Various techniques like face recognition etc. require the process of skin detection. Surveys depicts that many color models have been introduced to detect skin color from images but in this paper comparison of HSV and YUV models are the focus of this paper. A comparison of HSV and YUV is also highlighted.

KEYWORDS

Image Processing, HSV, YUV, Skin detection, Color Models.

INTRODUCTION

As human skin is a collection of combination of red, yellow and brown. Apart from these, there is also some range of hue and saturation [1]. From past few decades, researchers are focusing on skin detection as it is becoming an important area in image processing [2]. Skin detection is considered as a preprocessing step for face recognition, gesture recognition and various fields of image processing [1]. The main objective of skin detection method is to recognize skin portion from an image [3]. As, the color scheme of skin varies from region to region so, developing a uniform method to detect skin is a complicated task [3].

The image processing is subfield of signal processing and possess advantages over analogue image processing. For the process of images there are several algorithms, which can be applied to the input data such as: hardcopies, print outs and photographs. Using computers and algorithms several advantages of image processing are obtained as compared to analogue image processing.

In skin detection skin color pixels and regions of an image are identified. The subject of skin detection is growing field particularly the adaptive skin detection using Open Cv[8]. There is another field that is important in this area that is Optimal Color Spaces for skin Detection. The other one is based on RGB Ratios.

1.1 YUV Technique

YUV shading space comprises of uncorrelated channels, the glowing channel has no relationship with other two Chroma channels. This inspires to propose a weighted 3-D Laplacian administrator for the YUV shading space.

YUV show encodes a shading picture or video considering human observation, permitting diminished transfer speed for splendid segments. YUV can limit the determination of U and V channels while putting away Y at full determination, since luminance is more critical than shading. On the off chance the determination of U and V is limited in a way that is perfect with convolution.

Skin detection is used in digital image processing to detect human skin color pixels. Image processing is a field of computer science which is used to perform different operations on images. Combination of different colors is referred as color model. HSV and YUV are different types of these models. HSV stands for Hue, Saturated, and Value.

Skin detection involves identifying skin color pixels from input image [4]. Skin detection is classified into two broad categories. These categories are:

a) Pixel Based
b) Region Based.

In former technique, every picture element is categorized as skin or non-skin pixel from its neighbor. Color based skin detection is classified as pixel based detection. While in second method the performance is improved by arranging the skin pixels. Region based method requires some extra information such as intensity or texture etc. [3].

Although skin detection seems to be an easy task but for certain reasons it is a challenging task. Illumination is one of the important factors that affect the quality of image. It is important to present the color in such a way that color does not vary by changing illumination. Also the choice of color also affects the performance of skin detector. Another challenging point is that there are many things in real world that resembles the human skin color. So, skin detector's performance may also be affected [5].

2. IMAGE PREPARATION

There are some factors that will affect the image detection of skin in an image which is a challenging task. These factors are illumination, camera characteristics, region and other factors.

Illumination: The color of skin varies greatly if light source distribution and level of illumination is changed.

Camera Characteristics: A camera sensor characteristic also plays an important role in image capturing. Sometimes skin color dispersal for single person variates from one camera to another.

Region: Persons of different regions and different tributes have different skin colors.

Other Factors: Skin color appearance also vary greatly by certain other factors such as: makeup, color of background etc. [4]

3. COLOR SPACE

Shading Space is a particular association of hues. In a mix with physical gadget profiling, it considers reproducible portrayal and rendering of shading, in both simple and advanced portrayal [6]. Shading space might be subjective, with particular shading appointed to an arrangement of physical shading swatches and separate allocated names or numbers, for example, with Pantone gathering.

4. ABSOLUTE COLOR SPACE

In shading science, there are two implications of term outright shading space:

- A shading space in which the perceptual distinction between hues is specifically identified with separations between hues as spoke to by focuses in shading space.
- A shading space in which hues are equivocal, that is, the place the understandings of hues in the space are calorimetrically characterized without reference to outside factor.

5. COLOR MODEL

Shading model is a conceptual scientific model depicting the way hues can be spoken to as tuples of numbers, however a shading model with no related mapping capacity to a flat out shading space is a pretty much subjective framework with no association with any all-around comprehended arrangement of shading understanding [7].

Since "shading space" distinguishes a specific mix of shading model and mapping capacity, the word is regularly utilized casually to recognize shading model. Despite the fact that recognizing a shading space consequently distinguishes the related shading model, such a use is off base in a strict sense.

5.1 YUV Color Model

YUV is a shading space generally used as a component of a shading picture pipeline. It changes over a shading picture or video taking human acknowledgment into report, endorsing restricted exchange speed for chrominance sections, by that infers routinely supporting transmission bumbles or weight antiquated rarities to be more gainfully hidden by the human acumen than using a "direct" RGB-depiction. Other shading spaces have alike properties and the essential inspiration to execute or analyze properties of Y'UV would be for interfacing with basic or propelled TV or photographic rigging that changes with certain Y'UV benchmarks.

The Y'UV shows portrays a shading space similarly as one luma (Y') and two chrominance (UV) parts. The Y'UV shading model is used as a piece of the PAL and SECAM composite shading video gages. Past high difference structures used just luma (Y') information. Shading information (U and V) was incorporated autonomously by methods for a sub-carrier with the objective that an exceptionally differentiating beneficiary would at display have the ability to get and demonstrate a shading picture transmission in the gatherer's neighborhood exceedingly differentiating plan.

Y' stays for the luma portion (the sparkle) and U and V are the chrominance (shading) parts; luminance is exhibited by Y and luma by Y' – the prime pictures (') demonstrate gamma weight, with "luminance" which implies perceptual (shading science) quality, while "luma" is electronic (voltage of show) splendor.

The YPbPr shading model used as a piece of basic portion video and its automated adjustment YCbCr used as a piece of cutting edge video are basically gained from it, and are now and again called Y'UV. (CB/PB and CR/PR are disparity from dim on blue– yellow and red– cyan tomahawks, while U and V are blue– luminance and red– luminance differentiates.) The Y'IQ shading space used as a piece of the straightforward NTSC TV broadcasting structure is associated with it, regardless of the way that in a more perplexing way.

5.2.Format of YUV File:

YUV is a document expansion for the raster designs record frequently connected with the Color Space Pixel Format. YUV document comprises of bitmap picture information put away in the YUV design, which parts shading crosswise over Y, U, and V esteems; stores the luminance (splendor) as Y esteem, and color (chrominance) as U and V esteems.

Y in YUV is the aggregate of three RGB segments increased with a few substance:

$Y = 0.299*R+0.578*G+0.114*B$

5.3.HSV Color Models

High quality images are generated using HSV color models. It is basically a type of color wheel from which user can select required color. It gives the color according to human perception. In HSV, the term H refers to Hue which includes red, blue or yellow color. S stands for saturation which is the range of colors. And V stands for values which is the brightness of color.

6. ALGORITHM

Skin detection algorithm follows these steps:

a) Take the image

b) Image is then converted to HSV

c) Morphological operations which operations are implemented on image

d) Output is displayed

The same steps are repeated for detection of skin using YUV technique.

7. RESULT AND SIMULATIONS

The results of comparison are shown in Fig. 1. The image A in Fig. 1 represents original image. Image B, represents the results of HSV technique and Image C shows the result of YUV technique.

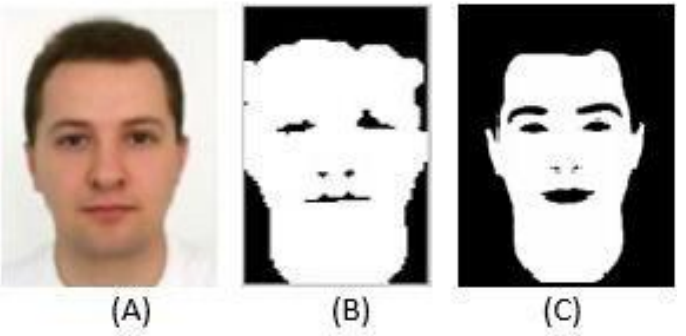

Fig: 1

8. CONCLUSION

This paper demonstrates a relative between the two skin location approaches in view of two distinctive shading models. It exhibits a factual investigation to assess the execution of the techniques as for progress measures. This examination has attempted to investigate which of the two strategies is best reasonable. Among the different strategies, the YUV shading model based strategy is appropriate for recognizing human skin The testing additionally demonstrated certain disadvantages which were redressed by advancement of identifying parameters.

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