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A Survey on Edge-Based Color Constancy for Image

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Abstract: This paper presents detailed study of various color constancy techniques. Color constancy is the ability to approximation of the color of the light sources. Unusual illuminates may impact the appearance of an image as compared to the image taken under canonical light source. Face is one of the most popular biometric modalities. This paper represents in detail about the color constancy of 2D-3D face and objects using color consistency and the brightness of the images. These results suggest that color constancy has a positive impact on face recognition.

Keywords: Color Constancy, Illumination, Computer Vision, Face Recognition, 2D-3D image, face recognition, biometric modalities.

I. INTRODUCTION

A significant factor in face detection by human beings is pigmentation. In this paper, we investigate the impact that the illumination color has on the performance of a FR system. We look at how the recognition accurateness is exaggerated when information about the illuminant dye is explicitly included in facade recognition. For that purpose here we choose to use the FR system. We also drew from the work on computational color constancy and directly estimated the illuminant color in the face images, a distinctive approach for including skin color information into a 3D-2D face recognition system is to directly figure out by the skin from the 2D input.

Our researchers have tried to solve the problem of color constancy by proposing a number of algorithmic and instrumentation approaches. Here is the example for the justification for these papers just imagine radiance emits by a lamp and reacted by a red color thing, cause a color sense in the intellect of the viewer. The physical composition of the reacted light depends on the color of the light source.

However, this eject is compensated by the human vision system. Hence, apart from the color of light source, we will see the accurate red color of the object. The ability to correct color deviations caused by a deference in enlightenment as done by the human vision system is, known as color constancy. The same process is not insignificant to machine vision systems in a restricted sight.

The mass of color constancy algorithm is based on one light source i.e. it may be basically depends on the supposition of spectrally uniform lighting. However, in real world, an image may be affected by different multiple sources of light.

The Grey edge algorithm and Physics based algorithms are based on estimation of color of multiple sources of light. Color constancy is based two approaches they are
i)Pixel Based Approach. ii)Edge Based Approach.

i). Pixel Based Color Constancy Approach
Pixel Based color constancy algorithm focus on the judgment of illuminant using only the pixel values in a figure, object or an image. These algorithms process all the pixel values of an image to estimate the light source.

ii). Edge Based Color Constancy
Pixel based technique is extended to edge based color constancy algorithms, since most of the details in an image is represented by its edges. Various image derivatives (i.e. edges) are calculated for estimation of color of light source.

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A. **RETINEX BASED WHITE PATCH ALGORITHM:**

Retinex is one of the initial color constancy method developed and it is considered that a rapid change in chromaticity is caused by a change in reflectance replica. This implies that the illuminant effortlessly vary across the image and does not change between contiguous or nearby location. Various implementations have been proposed using this theory. The white patch algorithm is also a Retinex theory based algorithm which works on white patch assumption i.e. the assumption that the maximum rejoinder in RGB channels is caused by a white patch. The assumption that the illuminant transition is smooth, which is not the case. Hence, Retinex theory was a fundamental step towards color constancy based on one light source.

B. GREY WORLD ALGORITHM:

The grey world algorithm is based on grey world assumption i.e. the average reflectance in the scene is achromatic. The light source color can now be predictable by computing the average pixel value which yields the normalized light source color. This is indeed a very simple algorithm to find the light source color of a scene. Since, the grey world algorithm is sensitive to large uniformly colored surfaces. Related methods may attempt to identify the intrinsic grey surfaces in an image i.e. they may attempt to find the surface under a colored light source that would appear grey if rendered under a white light source. Further improvements may provide better results in grey world algorithm.

C. GAMUT MAPPING ALGORITHM:

Gamut mapping algorithm is also based on Pixel based color constancy approach. It is based on the supposition of human vision system. Since, only one can view only a limited numeral of colors for a given light source in real world images. But, any variations in the colors of an image i.e. the colors that are diverse from the colors that can be observed under a given illuminant are caused by variation in the color of light source. The limited set of colors under a given illuminant is represented as a canonical gamut C which is computed under a given light source by observing many surfaces.

D. GREY EDGE ALGORITHM:

Most of the methods developed in past research are based on single uniform source of light and they consider the pixel values to estimate the source of light, which is not the case always. Since, an image can also be exaggerated by numerous sources of light. Recently, pixel based methods are extended to integrate plagiaristic information and highly organized information, resulting in grey edge algorithm. The figure shows the flow of algorithm. Where the algorithm flows begin with inputting the image. The first step is to input images for the color constancy. The next proceeding is image is to be pre processed. Later the image is calculated for the estimation of pixels. Then after the color correction is made. After the color correction the final image is going to be displayed. This is the flow of the algorithm in the color consistency of the images as well as objects.

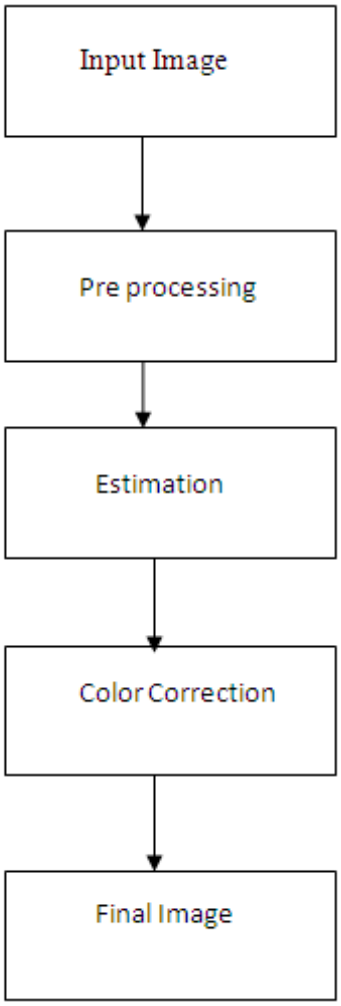

FIG: FLOW OF ALGORITHM

II. LITERATURE SURVEY

This paper also provides a relative study of different color constancy algorithms, based on well-known experimental results and different data set metaphors. The work in this paper has laid the foundation for future work with image data. Here we developed a comprehensive understanding on how a number of the leading algorithms perform in controlled circumstances, and we are therefore in an excellent position to interpret results from image data obtained with complementary methodology. Constancy of surface color may be perceptually represented in at least two different ways. Alternatively, hues and saturations might change when the illuminant changes but be perceived to result from constant surface colors and varying illumination. The paper that looks unique yellow under direct sunlight might look greenish yellow under the tree and yet might be clearly identifiable as a yellow paper. That is, perfect constancy could still obtain if the

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viewer, by a perceptual computation, Were able to see the paper as an object of the same surface color under illumination perceived to be greener than the direct unlighted. Color constancy was weak for our hue matches (direct sensory representation), although two of the three observers could, if required, approximate the latter type of color constancy (the paper matches). This result held true over variations in relative patch luminance's (full-simulation and equal-luminance conditions) over display complexity (annuli versus Mondrian's), and of surround luminance (black, dimly illuminated gray annuli or, in informal observations, a mean-luminance uniform gray field).

Under our viewing conditions, the illumination difference was always clearly perceptible. We conclude that mechanisms such as simultaneous color contrast, which inflexibly discard, through a normalizing process, information about abrupt spatial illumination changes, make little contribution to color constancy within a single scene. Humans can, however, compute approximate chromatic reflectance information in such

III. CONCLUSION

Color constancy is the capability to determine colors of objects independent of the color of the light source. This paper proposes an integrated approach which combines the edge based color constancy with the nonlinear color enhancement. Edge-based color constancy methods make use of image derivatives to estimate the illuminant. However, different edge types exist in real-world images, such as material, shadow, and highlight edges. These different edge types may have a distinctive influence on the performance of the illuminant estimation.

The proposed techniques seems to be correct as when color correction is performed some pixel may become darker or lost due to correction in the color, so proposed techniques will produce better results as it is integrating the edge based color constancy with adaptive image restoration. Color vision is a process by which organisms and machines are able to distinguish objects based on the different wavelengths of light reflected, transmitted, or emitted by that object. In humans light is received by the eye where two types of photoreceptors, cones and rods, send signals to the visual cortex which in turn processes those sensations into a subjective perception of color.

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BIOGRAPHIES

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