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An Image Based Defogging Using Dark Channel:

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Abstract: Defogging is removing pollutant particles from an image, pollutant particles such as rain, fog, shadows occurred from the building. Dilapidation in visibility is introduced to images or a video captured in poor weather this causes defogging in an image. In this paper, the Gaussian-based dark channel is proposed to the hazy images. The RGB and estimated transmission is computed to the haze image further the filter called Laplacian is computed to the image, thus overall image is enhanced by formulating the proposed method.

Keywords*:*haze, fog, dark channel, defogging, atmospheric light, enhancement.

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I. INTRODUCTION

Many important visual applications, such as detection and scene understanding rely on the quality of the image. It is common that in bad weather conditions Dilapidation quality degrades. Chromatic Atmospheric Scattering [1] is a study done on different climatic conditions.The traditional image processing techniques where not sufficient to remove weather effects from images, thus they introduced a physics-based model that describes the appearances of scenes in uniform bad weather conditions proposed a fast algorithm [2].Single image haze removal [3] uses the Gaussian -based method because the original image has very low intensities.Physical model[4] is used in a computer vision in order to have a haze free image in different climatic conditions earlier they used polarization now to have a better enhancement in the image a physical model is used.The image defogging [5] is occurred due to frequently exposure to strong light, rain, snow and fog thus Gaussian-based dark channel is proposed.

II. LITERATURE REVIEW

Shree K. Nayar and Srinivasa G. Narasimhan in the year 1999 explains all about the bad weather and they have studied different weather conditions and identifying effects caused by the poor weather and trying to make the effects as advantages and the images where transformed into the three dimensional structure. [1]

Srinivasa G. Narasimhan and Shree K. Nayar in the year 2003 explained about the right amount of light required to the camera and they have proposed technical method to have a good image. In technical method they used fast algorithm to overcome the pollutants in the images. [2]

Kaiming He, Jian Sun, Xiaoou Tang in the year 2011 tell us about prior-dark channel, to remove all the pollutants such as haze, rain, rain, snow from a single input image. They use a high-quality haze free image to remove all the pollutants. [3]

Qingsong Zhu, Jiaming Mai, Ling Shao in the year 2015 address about the color attenuation prior in this paper to remove the haze from a single input image , they use depth map and restore the radiance through the atmospheric light. In color attenuation [4]to detect or remove the haze from a single image is a challenging task in computer vision, because little information about the scene structure is available. In spite of this, the human brain can quickly identify the hazy area from the natural scenery without any additional information. This inspired us to conduct a large number of experiments on various hazy images to find the statistics and seek a new prior for single image dehazing. Interestingly, we find that the brightness and the saturation of pixels in a hazy image vary sharply along with the change of the haze concentration.

Jing-Ming, Guo, Jin-yuSyue, VincentRadzicki, HuaLee, Fellow in the year 2017 wrote a paper based on defogging , it deals with different algorithm Li, Tarel, Hazy, He, Meng, Lai, Zhu, Tang , Kim , Kolor , Proposed method, Gaussianbased dark channel , the problem in the image was caused by defogging to overcome this problem they used Fusionbased transmission estimation method combined with two different transmission models , The new fusion weighting scheme, the atmospheric light computed from the Gaussian-based dark channel and the flicker-free module. To get a complete defog image, the dehazing was combined with fusion weighting function and Vibe method was used to remove or reduce the flicker effect in the image. [5]

III. PROPOSED METHOD

The algorithm for restoring hazy images in various levels is shown in Figure 1.We first load the image which is captured in the outdoor scene, then we separate the RGB components and compute the Gaussian -based dark channel prior, with the hazy image and assumption of atmospheric light we can Estimate the transmission. To enhance the image Laplance Transformation is estimated,thus haze free image is restored.

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The RGB components are separated in three colours red, green and blue. Here the original image is split into three images called red, green and blue image. The Gaussian-based dark channel is proposed in the given original image to identify the RGB colour component in each pixel of the original image. Traditionally [5], the atmospheric light in is normally considered as the brightest pixel in the input image, assuming that there are no saturated pixels. However, this assumption is not valid in many practical cases. According to He's method, the atmospheric light can be correctly obtained through the selection of part of the brightness pixels in the dark channel of the normalized input. The Estimated Transmission is called A is proposed in the original image to estimate the atmospheric light. In most [3] of the previous single image methods, the atmospheric light Ais estimated from the most haze-opaque pixel. For example, the pixel with highest intensity is used as the atmospheric light in [16] and is furthered refined in [2]. But in real images, the brightest pixel could on a white car or a white building. As we discussed in Section 3, the dark channel of a haze image approximates the haze denseness well (see Figure 6(b)). We can use the dark channel to improve the atmospheric light estimation. We first pick the top 0.1% brightest pixels in the dark channel. These pixels are most haze opaque (bounded by yellow lines in Figure 6(b)). Among these pixels, the pixels with highest intensity in the input image Iis selected as the atmospheric light. These pixels are in the red rectangle in Figure 6(a). Note that these pixels may not be brightest in the whole image. This simple method based on the dark channel prior is more robust than the"brightest pixel" method. We use it to automatically estimate the atmospheric lights for all images shown in the paper. Laplacian filter is used to remove disturbance in the original image and it highlights the edges of the image. Laplance Gaussain filter is used to enhance the image.

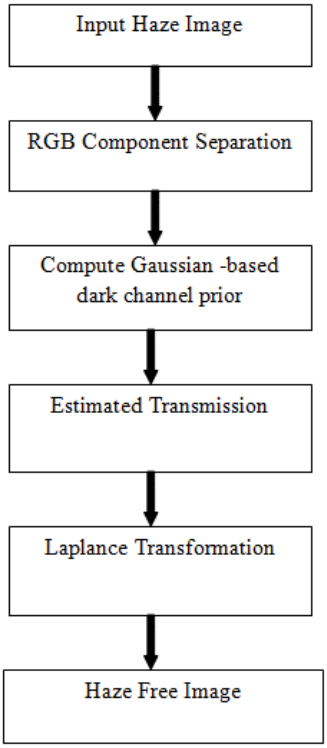
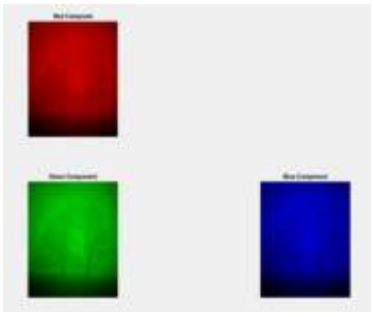


Fig.1.Proposed Method Taxonomy

IV. Experimental Results

In the proposed method, the input haze image is loaded and the image is enhanced using RGB component, the RGB component splits the image into three colours red, green and blue in Figure 3(a). The image is then estimated using dark channel prior and Gaussian filter is used to enhance the image.



(a)

(b)

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(c)

Fig. (3). (a) RGB component (b) Dark Channel Prior Estimated Image (c) Dehazed Image

V. PERFORMANCE ANALYSIS

In this paper we have proposed Haze image using Gaussian-based dark channel algorithm. The Gaussian-based dark channel is outdoor haze based images, which contain dark pixels due to bad weather. Our proposed method consist of RGB component, the dark channel and estimated transmission which is a atmospheric light and Laplance filter to enhance the haze image. The image pixel is visualized using image tool for each output image to analysis the pixel count is the image. The image tool shows the pixel count of each RGB component present in the image. ThePeak signal to Noise Ratio(PSNR) is used to calculate the maximum pixel values in the original image and the proposed method. The PSNR value should be maximum in the proposed image compared to the original image. MSE (Mean Square Error), The MSE is used to calculate the error in the original image and the proposed image. The MSE value should be minimum in the proposed image compared to the original image.

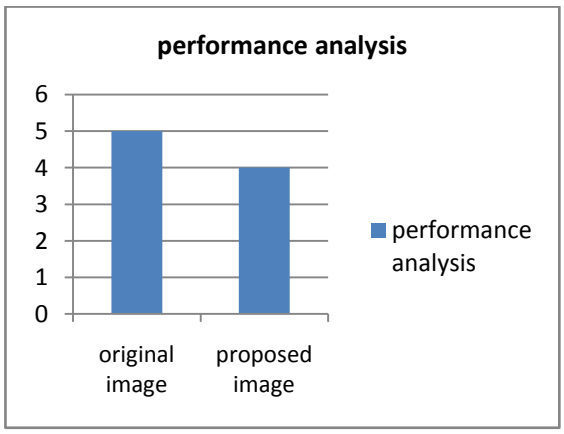

Fig.2. Results of performance analysis

VI. CONCLUSION

To establish a dehaze model, the RGB and Gaussian-based dark channel method was proposed. The further method consist of estimated transmission and Laplance Transformation to dehaze the image which is taken in the poor weather conditions. The PSNR and MSE is calculated in the proposed method to know the performance in the original image and the proposed image.

REFERENCES

[1]. S. K. Nayar and S. G. Narasimhan, "Vision in BadWeather," in Proc. IEEE Int. Conf. Comput. Vis. (ICCV), vol. 2. Sep. 1999, pp. 820–827.

[2]. S. Narasimhan and S. Nayar, " Contrast Restoration of Weather Degraded Images", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 25, no. 6, pp.713-724, 2003.

[3]. K. He, J. Sun, and X. Tang, "Single Image Haze Removal Using Dark Channel Prior," IEEE Trans. Pattern Anal. Mach.Intell., vol. 33, no. 12, pp. 2341–2353, Dec. 2011.

[4]. Q. Zhu, J. Mai and L. Shao, "A Fast Single Image Haze Removal Algorithm Using Color Attenuation Prior," Image Processing, IEEE Transactions on, on page(s): 3522 - 3533 Volume: 24, Issue: 11, Nov. 2015.

[5]. Jing-Ming Guo, Senior Member, IEEE, Jin-yuSyue,*Vincent Radzicki, and *Hua Lee, Fellow," An EfficientFusion-Based Defogging", IEEE Transactions on ImageProcessing ,Vol: 26, Issue: 9, Sept. 2017