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A Survey Paper On Single Image and Video Dehazing Methods

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Abstract:

Most of the computer applications use digital images. Digital image processing acts an important role in the analysis and interpretation of data, which is in the digital form. Images taken in foggy weather condition often suffer from poor visibility and clarity. After the study of several fast dehazing methods like Tan's dehazing technique, Fattal's dehazing technique and aiming Heat al dehazing technique, Dark Channel Prior (DCP) intended by He et al is most substantive technique for dehazing.This survey aims to study about various existing methods such as polarization, dark channel prior, depth map based method etc. are used for dehazing.

***Keywords* — Transmission map, Image Dehazing, Polarization Filtering, Enhancement.**

I. Introduction:

Images of outdoor scenes are basically degraded by the presence of different particles and the water droplets in the atmosphere. The outdoor scene images are frequently degraded by poor atmospheric conditions. In these instances, atmospheric singularities like fog and haze weaken substantially the visibility of the captured image. While capturing a scene in the camera in a bad weather condition the irradiance received by the camera from the scene point is attenuated along the line of sight. Some other option would be to suppose that an estimated 3D geometric style of the image is supplied. Terabits and Schechter showed how different angles of polarized filters are utilized to calculate the haze effects. So individual frame or image when undergoes the dehazing algorithm and then debased frames are recombined to form a video. Image Fusion is a mechanism to improve the quality of information from a set of images. By the process of image fusion the good information from each of the given images is fused together to form a resultant image whose quality is superior to any of the input images. For a single input hazy image the haze removal problem is under constrained problem. Therefore many researchers adopted the method in which they have considered multiple images or additional images.

II. Literature Survey:

This section covers the literature from the study of various research papers. Wang, et al. (2010) has explored that haze removal from the image depend upon the unknown depth information. This algorithm is based on the atmospheric scattering physics-based model. In this on selected region a dark channel prior is applied to obtain a novel estimation of atmospheric light. This model is based upon some observation on haze free outdoor image. In non-sky patches, at least one color channel has very low intensity at some pixels. The low intensity in that region is due to shadows, colorful objects and dark objects etc.

Figure 1. Natural Foggy Image and Air Light Effect

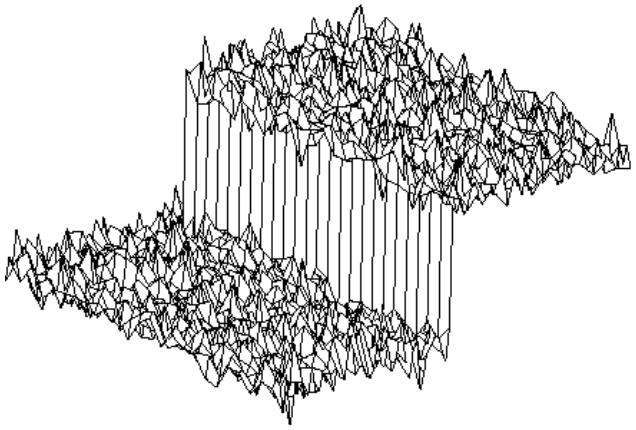
Defogging can be done by two ways i.e., multiple images fog removal method and single image fog removal method. Multiple images fog removal techniques includes various methods described below: Vision in bad weather was proposed by S. K. Nayar et. al. In this method multiple images under different weather conditions of the same scene are taken and are then combined to remove fog from image. Later the concept of polarization filters was used. These methods used different degree of polarization to remove haze from images

III. Gaps in Literature Survey:

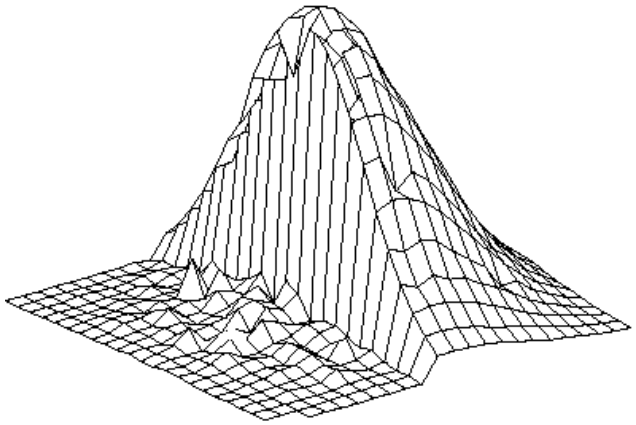
It has been originated that the most of the existing research have mistreated many subjects.The presented methods have neglected the techniques to reduce the noise issue which is presented in the output images of the existing fog removal algorithms. Not much effort has focused on the integrated approach of the Adaptive histogram equalization and Dark channel prior. The problem of the uneven illuminate is also neglected by the most of the researchers.

IV. Bilateral filter:

Filtering is perhaps the most fundamental operation of image processing and computer vision. In the broadest sense of the term "filtering", the value of the filtered image at a given location is a function of the values of the input image in a small neighborhood of the same location. For example, Gaussian low-pass filtering computes a weighted average of pixel values in the neighborhood, in which the weights decrease with distance from the neighborhood center. Although formal and quantitative explanations of this weight fall-off can be given, the intuition is that images typically vary slowly over space, so near pixels are likely to have similar values, and it is therefore appropriate to average them together. The noise values that corrupt these nearby pixels are mutually less correlated than the signal values, so noise is averaged away while signal is preserved.



(a)



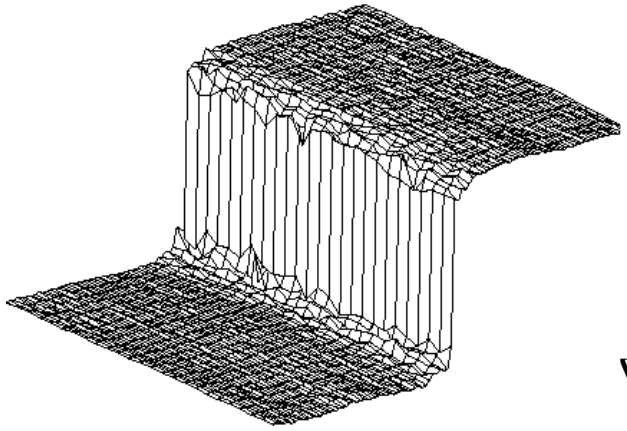


Fig. Bilateral filter

Parameters:

As the range parameter sr increases, the bilateral filter gradually approaches Gaussian convolution more closely because the range Gaussian widens and flattens, which means that it becomes nearly constant over the intensity interval of the image.As the spatial parameter sd increases, the larger features get smoothened.

Limitations:

The bilateral filter in its direct form can introduce several types of image artifacts:

Staircase effect - intensity plateaus that lead to images appearing like cartoons .Gradient reversal - introduction of false edges in the image .There exist several extensions to the filter that deal with these artifacts. Alternative filters, like the guided filte, have also been proposed as an efficient alternative without these limitations.

V. Dehazing Methods:

Under the bad weather conditions the atmosphere contains the fog and haze particles so that the color and contrast of the images are drastically degraded. The degradation level increases with the distance from the camera to the object. The removal of haze from the captured hazy images needs to estimate the depth of the haze. The initial works for the haze removal uses multiple input images those have been taken under a bad weather condition of a same scene and the recent haze removal process requires single input image for the estimation of the depth.

VI. Conclusion:

These paper gives a brief review on various dehazing techniques. review work to minimize artifacts introduced by the Images, multi-scale fashion view. Compared with previous dehazing methods, our algorithm has three main advantages. it performs an effective per-pixel computation, different than the majority of the previous methods that consider patches. Finally, which enables us to submit on time once our paper is ready and also enables us to do more research..

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