International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 04 | Apr -2017 www.irjet.net p-ISSN: 2395-0072

SINGLE IMAGE DEHAZING – A REVIEW

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Abstract-*Here propose a simple but powerful color attenuation prior, for haze removal from a single input hazy image. By making a linear model for modelling the scene depth of the hazy image beneath this novel previous and learning the parameters of the model by employing supervised learning methodology the depth info is well recovered. With the depth map, we can easily estimate the airlight and transmission map. Now the scene radiance can be restored via atmospheric scattering model to obtain the haze-free image.*

1. INTRODUCTION

The particles absorb and scatter light as it travels from the source to the observer, resulting in an unclear image. While this effect may be desirable in an artistic setting, it is sometimes necessary to undo this degradation. For example, several laptop vision algorithms have confidence the idea that the input image is strictly the scene radiance, i.e., there's no disturbance from haze. When this assumption is violated, algorithmic errors can occur. Among current haze removal analysis, haze estimation strategies is divided into two broad classes of either hoping on extra information or employing previous assumption. Methods that rely on additional information include: taking multiple images of the same scene using different degrees of polarization, multiple images taken during different weather conditions, and methods that require user supplied depth information or a 3D model. While these can achieve good results, the extra information required is often not available, and so a more flexible approach is preferable. Significant progress in single image haze removal has been made in recent years. The main objective of the project are Reduce the hazed part of image, Remove the impulse noise, To improve the quality of hazed image, To focus on dehazing caused of environmental sources like haze, fog, dust etc

Key Words: Dehazing, Color Attenuation, Airlight, Depth map, Transmission map and Scene Depth

2. LITERATURE REVIEW

Various literatures reviewed on dehazing are presented in this section. A review of literatures is presented in brief summarizing the work done by different scholars and researchers.

Y.Y.Schechner et.al (2001), Haze removal techniques are gaining popularity due to its availability in many classifications. These methods can be used to construct a high quality, noise free, and dehaze images. The classifications are done in two major types' image segmentation and image restoration.

This air light is scattered by the atmospheric particles. In the proposed work, the image formation process is shown where the image is a clean image. The polarization impact is taken into account and also inverting method is employed, wherever it outputs into a haze free image. Two components are used to compose the image, one is known as scene radiance and the other is air light. Scene radiance is in the absence of haze and air light is the ambient light that is scattered towards the viewer. For recovering the two components, there is a need for two non-dependent images. And these images can easily be acquired because air light is partially polarized. This approach can be immediately applied. It does not require the change in weather conditions. The images that are taken by a polarizer use the concept of polarization filtering. This polarization filtering is used in photography across haze.

Xie, Bin, Fan Guo (2010), Paper deals with the bad weather conditions may demean the quality of the images of outdoor scenes. This is an ultimatum to reliability of many applications. The unwanted condition is caused by the atmospheric conditions like haze and fog, which blurs the captured scene. Always the air is misted by some added particles which are scattered around, and hence, the reflected light is also scattered which results in less visibility of distant objects. The scattering is caused by two basic events namely attenuation and air light. In the last few years, a technique has gained popularity and this is known as restoration of images that are taken into bad atmospheric conditions. This paper additionally focuses on the approach that provides the automated and quick acquisition of transmission map of the scene. This approach is based on the implementing the multi scale retinex algorithm on the luminance component in YCbCr space of the input image to get the pseudo transmission map.

G. Meng, et.al (2013), Haze removal techniques will retain the color and brightness of the scene. These techniques are widely used in many applications such as underwater photography, satellite images etc. Haze removal is very difficult task because fog depends on the scenes depth information which is unknown. There for the removal

of fog requires the estimation of air light lamp the overall objective of this paper is to describe the various methods for efficiently removing the haze from remote sensing images .It also gives description of some filters used for dehazing. It also decreases the clarity of satellite images and underwater photography.

So removing haze from images is an accepted and broadly demanded area in computer vision and computer graphics related systems. The quality of images of outdoor scenes depends on the haze such as fog, mist and other bad weather condition. It's usually degraded by scattering of a light. Before reaching the camera due to these large quantities of particles (fog, haze, smoke impurities)in the atmosphere, it got degraded. This phenomenon affects the normal work of automatic monitoring system and outdoor recognition system racking and segmentation process and intelligent transportation system very often. Haze removal algorithms become more useful in many computer vision applications.. This survey has shown that the presented methods have neglected the techniques to reduce the noise which may presenting the output images of the existing fog removal algorithms. So it is required to work under more filtering methods.

Archana Kaushik, Alka Choudhary (2014), Image dehazing plays a vital role in the field of image processing. One of the key problems observed by us in image dehazing is that it is very challenging to recognize the white scenery objects whose pixel value is inherently similar to atmospheric light's value. In image dehazing is to acknowledge the white scenery objects whose component price is inherently like region light's price. So there is requirement of a more robust method for image dehazing in homogeneous atmosphere. This paper proposed a simple, efficient and powerful method haze removal in image. It is a robust method that is capable enough to improve the detection quality of hazed image by minimizing atmospheric haze effect.

Manpreet kaur saggu and satbir singh (2015), The general objective of this paper is to explore the short comings of the earlier presented techniques used in the revolutionary era of image processing applications. The deterioration may be due to various factors like relative object-camera motion, blur due to camera misfocused, relative atmospheric violent features and others. In this paper discussing about the degradations due to bad weather such as fog, haze in an image. This incidence influences the traditional work of automatic (mechanized) observance system, outdoor recognition system and sensible installation. Scattering is caused by two basic phenomena such as attenuation and air light.

By the usage of effective haze or fog removal of image, improve the stability and robustness of the visual system. Under water image enhancement based algorithms become more useful for many vision applications. It is found that largely the prevailing researchers have neglected several issues; i.e. no technique is precise for various kinds of circumstances. The existing techniques have neglected the employment of dark channel before scale back the noise and uneven illuminate downside. To overcome the issues of existing analysis a brand new integrated rule are going to be projected.

Sajana M Iqbal, MuhammadNizar (2015), In the study on the different haze removal techniques, haze brings trouble to many computer vision/graphics applications as it diminishes the visibility of the scene. Haze is made attributable to the elementary phenomena that are attenuation and also the air light weight. Haze removal techniques recover the color and contrast of the scene. The overall objective of this paper is to explore the various methods for efficiently removing the haze from digital images. Haze is historically associate degree physical phenomenon during which smoke and alternative dry particles obscure the clarity of the scenery objects. Environmental illumination tends to be scattered by this kind of turbid medium and the white air light is formed. It turns out that images taken in such bad weather are often much brighter and the color of the scenery object fades in different degree. Experimental results show that the projected approach achieves dramatically high and outstanding dehazing result as well

Vinuchackravarthy, KrishnanKutty (2015), In this paper, this interesting problem of enhancing the perceptual visibility of an image that is degraded by atmospheric haze is addressed. Image degradation due to the natural factors manifests as a very challenging problem. There are many aspects that affect the quality of an image in terms of visual perception and interpretation. Some aspects caused attributable to natural factors embody loss of distinction, poor rendering of color and loss of depth data. When such an image is to be processed, it manifests into the reduced image understanding and difficulty in feature detection and identification of the object of interest.

To overcome these disadvantages, several researchers have worked in areas associated with the removal of atmospherical effects like haze, fog, smoke etc. It could be a well-known development that each particle of great size within the atmosphere scatters and absorbs lightweight from the scene; thereby inflicting degradation in the scene visibility. We have proposed an effective way of computing the global atmospheric light. A new method of computing transmission map using saturation and intensity value of hazy image is also presented. The modified haze removal model works well to reliably restore the perceptual visibility of hazy image.

Ms.S.Archana M.E, A.Abiraha (2016), In adaptive linear model with the help of color attenuation prior information, using depth map to recover depth information, easily restore the outlook radiance via the troposphere dispersion model and thus perfectly remove the hazel part from the image. By suggests that of the depth map obtained

by the planned methodology the scene radiance of the hazy image may be recovered simply. Although found a way to model the scene depth with the brightness and the saturation of the hazy image, there is still a common problem to be solved. That is, the scattering coefficient β in the atmospheric scattering model cannot be regarded as a constant in homogeneous atmosphere conditions. As almost all the existing single image dehazing algorithms are based on the constant assumption, a more flexible model is highly desired. To overcome this challenge, some more advanced physical models can be taken into account.

Manjunath.V, Revanasiddappa Phatate (2016), Simple but effective prior is called change of detail algorithm for single image dehazing. This algorithm is based on the multiple scattering phenomena so the input image becomes blurry. When this technique is combined with haze imaging model, single dehazing image becomes easy and effective. This algorithm is based on local content rarer than color and this can be applied to large variety of images. To overcome this drawback some a lot of physical models is taken into consideration. Imaging in inclement weather is often flyblown by dispersion because of suspended particles within the layer like haze, fog and mist.

Shabna, Mr.C.S.ManikandaBabu (2016), Haze could be a main degradation of outdoor images, both colors and contrasts, resulting from the fact that light is absorbed and scattered by the turbid medium such as particles and water droplets in the atmosphere during the process of propagation is explained in this paper. Moreover in most automatic systems, which strongly depend on the definition of the input images, this may fail to work normally caused by the degraded images. Early researches use a traditional technique to remove haze from the single image in image processing. First, uses a histogram based dehazing effect is limited because, it possibly losses the infrequently distributed pixels in intensity due to global processing on the entire image, and also the histogram modification technique is difficult to implement in real time application due to large amount of computational and storage requirements. Later, researches try and improve the dehazing impact with multiple pictures.

In Polarization based mostly strategies are used for dehazing impact with multiple pictures, during this polarization filtered pictures will take away the visual effects of haze. This technique could fail in things of fog or terribly dense haze. The conventional image enhancement techniques are not useful in this method since the effects of weather must be modelled by using atmospheric scattering principles that are closely tied to scene depth.

3 CONCLUSIONS

A brief review of several literatures presented shows that haze recognition is difficult task because the concentration of haze can be varied from place to place. It is easy however powerful approach dark constituent in native windows pixel to get a rough estimate of the transmission map followed by a refinement step using an image matting technique. Their method obtained results which were much better than other state-of-the-art algorithms, and was even successful with every hazy image. Even when the concentration of haze is known, noise can be a major problem when restoring hazy images. There is future scope for further study in this area to find the most efficient dehazing.

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