ENGINEERING IN ADVANCED RESEARCH SCIENCE AND TECHNOLOGY

ISSN 2278-2566
Vol.01, Issue.03
June -2019
Pages: -162-168

# A FAST METHOD OF FOG AND HAZE REMOVAL

**1. KUNAPAREDDY .BHAVANA, 2. Dr.SHAIK UMAR FARUQ**
1.M.Tech, Dept. of ECE, Quba College of Engineering and Technology, Venkatachalam, Nellore, AP, India.
2.Principal, Dept. of ECE, Quba College of Engineering and Technology, Venkatachalam, Nellore, AP, India.

**ABSTRACT:** Fog and Haze degrade the quality of preview and captured image by reducing the excellence and saturation. As a result the visibility of scene or object degrades. the target of the present work is to spice up the visibility, saturation, distinction associate in nursing trim the noise in an passing foggy image. We've got an inclination to propose a way that uses single frame for enhancing foggy image exploitation construction transmissions map. The maneuver is fast and free from noise or associate in nursing object that usually arises in such improvement techniques. A comparison with existing technique shows that the planned technique performs higher in terms of every measure and quality. The planned technique works in real time for VGA resolutions. The planned works collectively gift a topic to induce obviate fog, rain and snow in real time.

**KEYTERMS:** haze removal, marvels, barometrical assimilation, Dark Channel Prior, Scene Radiance.

**INTRODUCTION:** Outdoor images taken in bad weather conditions lost color and contrast. Bad weather conditions as haze, mist and fog degrade the quality of images .because such conditions changes the color and contrast of photos which is an annoying problem to photographers. It is a threat to many image processing applications. Poor weather conditions also degrade the quality of satellite and under water images. Effective haze removal is very broadly demanded area in computer vision and graphics applications. Concentration of haze is different from place to place. Quality of image in haze weather condition is degraded due to scattering of light. This may affect the normal working of many systems like automatic monitoring systems, transportation systems, outdoor recognition systems, and tracking systems. Scattering of light is mainly due to 2 atmospheric phenomena: air light and attenuation. Haze attenuates the reflected light from scene and some additive lights are blended. Haze removal helps to improve reflected light from mixed light. By using effective haze removal techniques stability and effectiveness of visual system can be improved.

**Haze Removal Using Dark Channel Prior**

Pictures of outside scenes are generally debased by the turbid medium (e.g., particles, water-beads) in the atmo-circle. Murkiness, haze, and smoke are such marvels because of barometrical assimilation and diffusing. The irradiance got by the camera from the scene point is constricted along the observable pathway. Besides, the approaching light is mixed with the airlight [6] (encompassing light reflected into the viewable pathway by environmental particles). The corrupted pictures lose the difference and shading loyalty, as appeared in Figure1(a). Since the measure of disseminating relies upon the dis-tances of the scene focuses from the camera, the corruption is spatial-variation. Dimness removal1 (or dehazing) is exceptionally wanted in both customer/computational photography and PC vision applications. In the first place, expelling dimness can altogether expand the perceivability of the scene and right the shading shift caused by the airlight. When all is said in done, the dimness free picture is more visu-partner pleasuring. Second, most PC vision calculations, from low-level picture examination to abnormal state question recogni-tion, typically expect that the information picture (after radiometric adjustment) is the scene brilliance. The execution of vi-sion calculations (e.g., highlight location, separating, and photograph metric investigation) will definitely experiences the one-sided, lowcontrast scene brilliance. Last, the murkiness evacuation can deliver profundity data and advantage numerous vision calculations and propelled picture altering. Fog or haze can be a helpful profundity hint for scene understanding. The terrible murkiness picture can be put to great utilize.

(a) (b)

Figure 3.1. Haze removal using a single image. (a) input haze image.
(b) image after haze removal by our approach. (c) our recovered depth map.

In any case, cloudiness evacuation is a testing issue in light of the fact that the murkiness is subject to the obscure profundity data. The issue is under-obliged if the info is just a transgression gle cloudiness picture. In this way, numerous strategies have been star postured by utilizing various pictures or extra data. Polarization based strategies [14, 15] evacuate the dimness impact through at least two pictures taken with various degrees of polarization. In [8, 10, 12], more imperatives are acquired from numerous pictures of a similar scene under various climate conditions. Profundity based strategies [5, 11] require the unpleasant profundity data either from the client inputs or from known 3D models. As of late, single picture cloudiness removal[2, 16] has made noteworthy advances. The achievement of these strategies lies in utilizing a more grounded earlier or supposition. Tan [16] watches that the cloudiness free picture must have higher balance com-pared with the info fog picture and he evacuates the fog by amplifying the nearby differentiation of the reestablished picture. The outcomes are outwardly convincing however may not be physically substantial. Fattal [2] gauges the albedo of the scene and afterward gathers the medium transmission, under the suspicion.

**3.1.1. Dark Channel Prior**

The dull channel earlier depends on the accompanying obser-vation on fog free open air pictures: in the vast majority of the non-sky patches, no less than one shading channel has low power at a few pixels. At the end of the day, the base force in such a fix ought to has a low esteem. Formally, for a picture J, we characterize

$$J^{dark}(x) = \min_{c\,\{r,g,b\}} \left( \min_{y \in \Omega(x)} (J^{c}(y)) \right), \qquad (5)$$

whereJc is a shading channel of J and Ω(x) is a nearby fix focused at x. Our perception says that with the exception of the sky locale, the power of Jdark is low and has a tendency to be zero, if J is a murkiness free open air picture. We call Jdark the dim channel ofJ, and we call the above factual obser-vation or learning the dull channel earlier. The low forces oblivious channel are for the most part because of three factors: a) shadows. e.g., the shadows of autos, assemble ings and within windows in cityscape pictures, or the shadows of leaves, trees and shakes in scene pictures; b) beautiful questions or surfaces. e.g., any question (for instance, green grass/tree/plant, red or yellow blossom/leaf, and blue water surface) lacking shading in any shading divert will re-sult in low esteems oblivious channel; c) dull protests or surfaces. e.g., dim tree trunk and stone. As the normal out-entryway pictures are generally loaded with shadows and bright, the dull channels of these pictures are extremely dim! To confirm how great the dull channel earlier is, we col-lect an outside picture sets from flickr.com and a few other picture web indexes utilizing 150 most well known labels anno-tated by the flickr clients. Since murkiness more often than not happens in out-entryway scene and cityscape scenses, we physically choose the fog free scene and cityscape ones from the down-stacked pictures. Additionally, we just concentrate on daytime pictures. Among them, we haphazardly select 5,000 pictures and man-ually cut out the sky areas. They are resized with the goal that the greatest of width and tallness is 500 pixels and their dull channels are registered utilizing a fix estimate 15×15. Figure 3

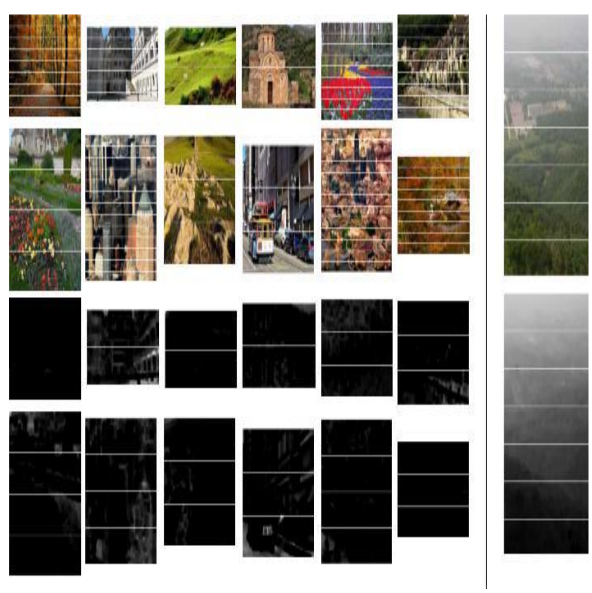


Figure 3. Top: example images in our haze-free image database. Bottom: the corresponding dark channels. Right: a haze image and its dark channel.

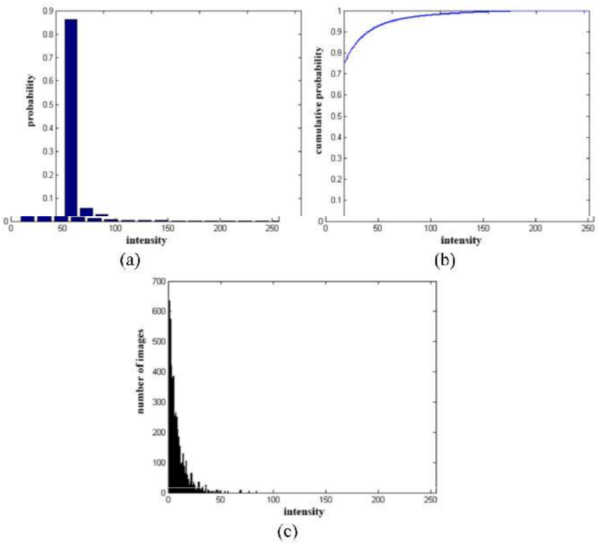



Figure 4.Statistics of the dark channels. (a) histogram of the inten-sity of the pixels in all of the 5,000 dark channels (each bin stands for 16 intensity levels). (b) corresponding cumulative distribution.
(c) histogram of the average intensity of each dark channel.
shows several outdoor images and the corresponding dark channels.

Figure 4(a) is the power histogram over every one of the 5,000 dim channels and Figure 4(b) is the relating aggregate histogram. We can see that around 75% of the pixels oblivious channels have zero esteems, and the forces of 90% of the pixels are beneath 25. This measurement gives an extremely solid help to our dim channel earlier. We likewise process the normal power of every dull channel and plot the corre-sponding histogram in Figure 4(c).

Once more, most dim chan-nels have low normal force, which implies that exclusive a little part of cloudiness free open air pictures go amiss from our earlier. Because of the added substance airlight, a fog picture is brighter than its fog free form in where the transmission t is low. So the dull channel of the cloudiness picture will have higher inten-sity in locales with denser dimness. Outwardly, the power of the dim channel is an unpleasant estimation of the thickness of the cloudiness (see the correct hand side of Figure 3). In the following area, we will utilize this property to evaluate the transmis-sion and the air light. Our dim channel earlier is halfway enlivened by the outstanding dim question subtraction strategy generally utilized as a part of multi-ghostly remote detecting frameworks. In [1], spatially ho-mogeneous cloudiness is evacuated by subtracting a steady esteem relating to the darkest protest in the scene. Here, we sum up this thought and proposed a novel earlier for common picture dehazing

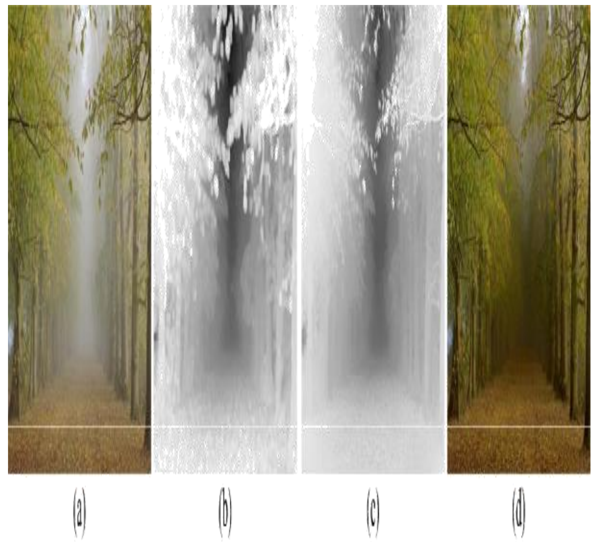



Figure 3.1.1. Haze removal result. (a) input haze image. (b) estimated transmission map. (c) refined transmission map after soft matting. (d) final haze-free image.

Levin's delicate tangling strategy has likewise been connected by Hsu et al. [4] to manage the spatially variation white bal-ance issue. In both Levin's and Hsu's works, the $\tilde{t}$ is just known in inadequate areas and the tangling is primarily used to extrapolate the incentive into the obscure locale. In this dad per, we utilize the delicate tangling to refine a coarser $\tilde{t}$ which has officially filled the entire picture Figure 5(c) is the delicate tangling result utilizing Figure 5(b) as the date term. As should be obvious, the refined transmission delineate to catch the sharp edge discontinuities and layout the profile of the articles.

**3.1.2.Recovering the Scene Radiance**

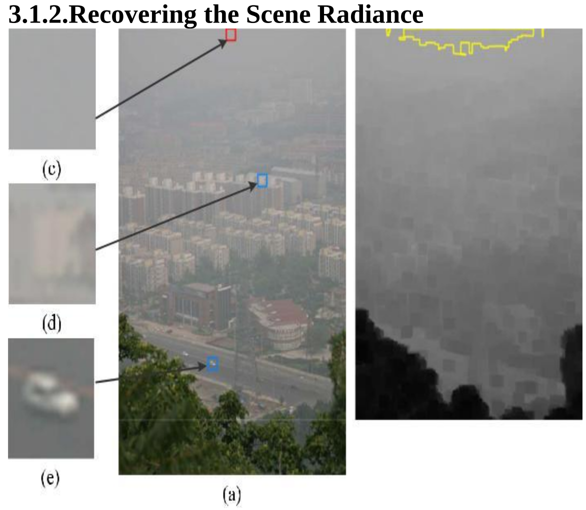


Figure 6.Estimating the atmospheric light. (a) input image. (b) dark channel and the most haze-opaque region. (c) patch from where our method automatically obtains the atmospheric light. (d) and (e): two patches that contain pixels brighter than the atmo- spheric light

With the transmission delineate, can recuperate the scene ra-diance as indicated by Equation (1). Be that as it may, the immediate weakening term J(x)t(x) can be near zero when the trans-mission t(x) is near zero. Quality of image in haze weather condition is degraded due to scattering of light. This may affect the normal working of many systems like automatic monitoring systems The specifically recouped scene brilliance J is inclined to clamor. In this way, we confine the trans-mission t(x) to a lower bound t0, which implies that a little certain amount of haze are preserved in very dense haze re-gions. The final scene radiance

J(x) is recovered by:

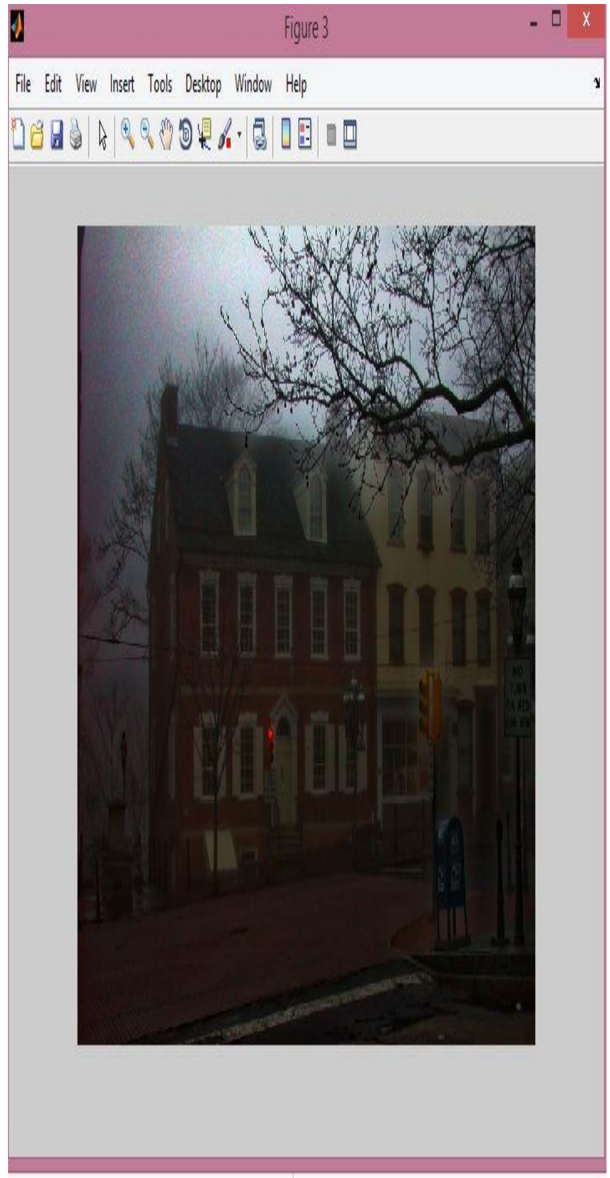
$$J(x) = \frac{I(x) - A}{\max(t(x), t_0)} + A. \qquad (16)$$

A commonplace estimation of t0 is 0.1.Since the scene brilliance is usu-partner not as splendid as the barometrical light, the picture after cloudiness evacuation looks diminish. Thus, we increment the introduction of J(x) for show. Figure5(d) is our last recuperated sceneradiance.

### 3.1.3 Estimating the Atmospheric Light

In a large portion of the past single picture techniques, the at-mospheric light An is assessed from the most cloudiness misty pixel. For instance, the pixel with most astounding force is utilized as the air light in [16] and is advanced refined in [2]. Be that as it may, in genuine pictures, the brightest pixel could on a white auto or a white building. , the dull channel of a murkiness picture approximates the dimness thickness well (see Fig-ure6(b)). We can utilize the dim channel to enhance the atmo-spheric light estimation. We first pick the best 0.1% splendid est pixels oblivious channel. These pixels are most dimness obscure (limited by yellow lines in Figure 6(b)). Among these pixels, the pixels with most noteworthy force in the information picture I is chosen as the environmental light. These pixels are in the red rectangle in Figure 6(a). Note that these pix-els may not be brightest in the entire picture.

## RESULT




## CONCLUSION:

An enhanced fog removal technique is proposed. ,The method is effective in fog and haze removal so as to produced a better output as compared to existing fog removal technique. Both saturation and contrast image are enhanced with out adding any noise or blocking articrafts in the image. The proposed method uses transmission maps based on multiple blocks and temporal filtering which helps to remove some of the noise generated due to fog. Though the proposed method is faster as compared to other existing technique, real time fog or haze removal is still a challenge for HD or better quality preview frames.

**REFERENCES:**


[1] D. Salomon: “Data Compression. The Complete Reference.”3 rd edition, Springer, 2004.

[2] O.K. Al-Shaykh, R.M. Mersereau,: “Lossy Compression of Noisy Images”, IEEE Transactions on Image Processing, Vol. 7, No. 12, 1998, pp. 1641-1652.

[3] D. Wei, J.E. Odegard, H. Guo, M. Lang, C.S. Burrus: “Simultaneous Noise Reduction and SAR Image Data Compression Using Best Wavelet Packet Basis”, Proceedings of International Conference on Image Processing, Vol. 3, 1995, pp. 200-203.

[4] M.L. Mittal, V.K. Singh, R. Krishnan: “Wavelet Transform Based Technique for Speckle Noise Suppression and Data Compression for SAR Images”. Proceedings of the Fifth International Symposium on Signal Processing and Applications, 1999, pp. 781-784.

[5] T.C.L. Chan, T.C. Hsung, D.P.K. Lun: “Improved MPEG-4 Still Texture Image Coding under Noisy Environment”. IEEE Transactions on Image Processing, Vol. 12, 2003, pp. 500-508.

[6] S.D. Kim, S.K. Jang, M.J. Kim, J.B. Ra: “Efficient Block-based Coding of Noisy Images by Combined Prefiltering and DCT”. Electronic Letters, Vol. 35, 1999, pp. 1717-1719.

[7] O.K. Al-Shaykh, R.M. Mersereau: “Restoration of Lossy Compressed Noisy Images”. IEEE Transactions on Image Processing, Vol. 8, No.10, 1999, pp. 1348-1360.

[8] M.V. Sabelkin, N.N. Ponomarenko: “MM-Band Radar Image Wavelet Compression with Prefiltering”. Proceedings of Kharkov Symposium on Millimeter and Sub-millimeter Waves MSMW, Vol. 1, 2001, pp. 280-282.

[9] S.G. Chang, B. Yu, M. Vetterli: “Adaptive wavelet thresholding for image denoising and compression”. IEEE Trans. on Image Proc., Vol. 9, No. 9, 2000, pp. 1532-1546.

[10] N. Ponomarenko, V. Lukin, M. Zriakhov, K. Egiazarian, J. Astola: ”Lossy compression of images with additive noise”, Proceedings of International Conference on Advanced Concepts for Intelligent Vision Systems, Antwerpen, Belgium, 2005, pp. 381-386.

[11] N.N. Ponomarenko, V.V. Lukin, K.Egiazarian, J. Astola: “DCT Based High Quality Image Compression”, Proceedings of 14th Scandinavian Conference on Image Analysis, Joensuu, Finland, 2005, pp. 1177-1185.

[12] D. Taubman, M. Marcellin, “JPEG2000: Image Compression Fundamentals, Standards and Practice”, Boston, Kluwer, 2002.