DEHAZINZ: AN APPROACH TO IMAGE CLARITY BASED ON IMAGE FEATURE EXTRACTION AND CORRECTION

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ABSTRACT

Hazing generally happens due to environmental effect of smoke and water condensing on dust. Hazing is the major problem in image processing domain. Dehazing is the much sought topic now days. Single image haze removal has been a challenging problem due to its ill-posed nature. In this paper, we propose a simple but powerful color attenuation prior for haze removal from a single input hazy image. We first check the feature of the input image like brightness, contrast, luminance heat map etc. If we find any of the features is low then we enhance the features and reconstruct the images. The output image is having the dehazed image feature with highest possible image quality.

Index Terms— *Dehazing, Haze, Attenuation, luminance*

1. INTRODUCTION

Images of the scenes taken from camera in real environment usually degraded of environmental effects such as dust, humidity, water drops etc. Haze is a fog and smoke like degradation. The irradiance received by the camera from the scene point is attenuated along the line of sight. Furthermore, the incoming light is blended with the air light (ambient light reflected into the line of sight by atmospheric particles). The damaged image reduces its contrast and sharpness qualities. Since the extent of scattering depends on the range of the scene points from the device to capture photos, the degradation is parameter based on spatial factors[5, 6, 7, 8, 9].

1.1 Haze and Its Effect

Haze removal1 (or dehazing) is very muchrequiredin consumer/computational photography and applications dependent on computer vision. By improving the haze removal can significantly increase the visibility of the scene and reduce the color shift caused by the light. In common, the haze-free image is more visually clear and high quality. Second, most algorithms dependent on computer vision, from low-level image analysis to high-level object recognition, generally assume that the images given as inputs (after radiometric calibration) is the scene radiance. The degree of accuracy of vision algorithms (e.g., feature detection, filtering, and photometric analysis) will proportionally suffers from the biased, low-sharpness scene radiance. Last, the haze removal can give step to depth information and benefit many vision algorithms and advanced image editing techniques. Haze or fog can be a useful depth clue for scene identification and similarity measurements. The bad haze image can be put to good use by clearing them in much better way. However, haze removal is a difficult problem because the haze is dependent on therandom depth parameters and information. The problem is manageable if the input is only a hazy image. Therefore, many methods are being proposed by using multiple images or additional detailing. [4] Polarization based methods remove the haze effect through multiple images taken with different degrees of polarization and checked simultaneously.

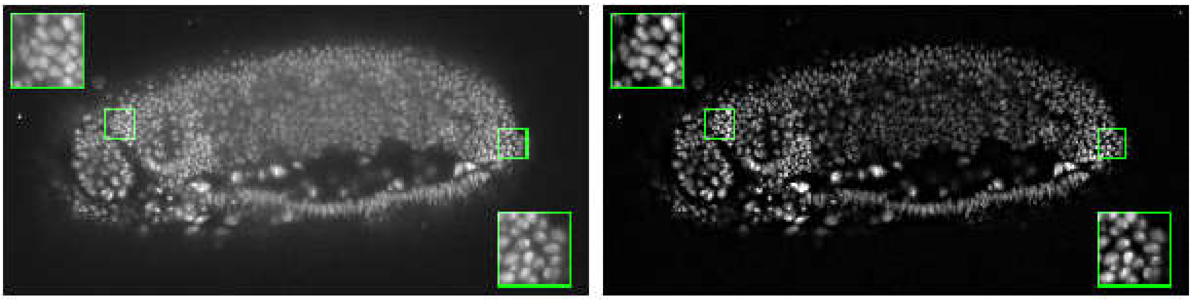


Figure 1.1: Image Dehazing

In more details are obtained from different images of the same scene under different climatic scenarios. Depth based methods require the rough depth detailing either from the user inputs or from known 3D models.

2. PROJECT OVERVIEW

2.1 Objective

- To create a haze frees image system using single image Dehazing.
- It should analyze all the image features and create the map for all the input feature and correct then.
- To create the output with all the image feature correction scheme.

2.2 Existing System

Image Depth map based image dehazing

There are several techniques to dehazed the images like Haze Polarization; Depth baseddehazed and Dark Channel Prior [6]. We observe that the haze-free image must have larger contrast levels compared to the input haze image and he removes the haze by increasing the local contrast of the restored image. The results are visually clear but may not be practically valid. Fattal approach estimates the albedo of the scene and then infers the medium transmission, under the prediction that the transmission and surface shading are locally not correlated [9]. Fattah's approach is physically clear and can produce impressive results when implemented practically. However, this approach cannot well handle heavy haze scenes and might be failing in the cases that the assumption is taken.

2.3 Disadvantages of Existing System

- Polarization based methods remove the haze effect through two or more images taken with different degrees of polarization. In more constraints are obtained from multiple images of the same scene under different weather conditions.
- Depth based methods require the rough depth information either from the user inputs or from known 3D models.
- Dark Channel Prior system of dehazing is non-efficient for most of color image.

2.4Proposed System

Dehazing based on image feature extraction and correction

Now days the research is quite popular on single image haze. The researchers are mainly dependent on stronger prior or predictions. Here we propose a novel prior which is termed as dark channel prior, for single image haze identification and its removal. The dark channel prior is totally dependent on the results and experiments on haze-free outdoor images. We concluded that, in most of the local regions which generally does not occupy the cloud, it is very likely that rare pixels (also called dark pixels) have minute intensity in at least one color (RGB) channel. Mostly in the hazy images, the efficiency of these pixels in that particular channel is mainly depends on the air light. Therefore, these dark pixels can surely providecertain identification of the haze's transmission. By combining a hazy imaging model and a soft matting interpolation based image method, we can recover a good quality haze removed image and achieve a better depth map.

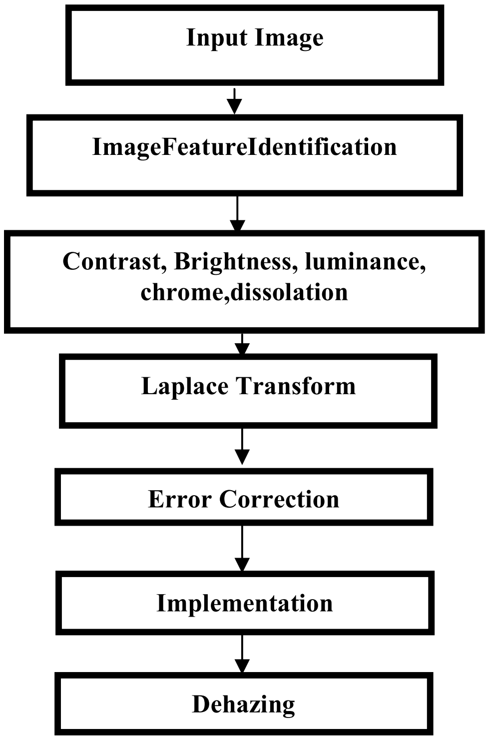
2.5 Advantages of Proposed System

- Higher Haze removal Ratio
- Image Feature Extraction with higher accuracy level
- Automatic system of feature error detection and correction
- Most efficient haze removal

3. IMPLEMENTATION PLAN

In our proposed approach we first check the image feature and correct the features based on their feature maps. The dehazing details are attached in the block diagrams as follows.

3.1 Block Diagram



3.2 Input Image

At first we take the input images. Then we check the corresponding features of the image. The contrast, whiteness, luminance, chromaticetc.ischecked. If we find even one pixel value comes in the range we make that as the reference pixel by using following features. Then we use imfilter toolbox of Matlab filter N-D filtering of multidimensional images.

B = imfilter (A, H) filters the multidimensional array A with themultidimensional filter H.
A can be logical or it can be a no sparse numeric array of any class and dimension.
The result, B, has the same size and class as A. Each element of the output, B, is computed using double-precision floating point. If A is an integer or logical array, then output elements that exceed the range of the given type are truncated, and fractional values are rounded.

B = imfilter(A,H,OPTION1,OPTION2,...) performs multidimensionalfiltering according to the specified options. Option arguments can have the following values:

- Boundary options

X -Input array values outside the bounds of the arrayare implicitly assumed to have the value X. When noboundary option is specified, imfilter uses X = 0. ‘Symmetric’ Input array values outside the bounds of the arrayare computed by mirror-reflecting the array across the array border. ‘Replicate’ Input array values outside the bounds of the array are assumed to equal the nearest array border value. 'Circular' Input array values outside the bounds of the array are computed by implicitly assuming the input arrays periodic.

- Output size options
(Output size options for imfilter are analogous to the SHAPE option in the functions CONV2 and FILTER2.) 'same' The output array is the same size as the inputarray. This is the default behavior when no outputsize options are specified. 'full'. The output array is the full filtered result, and so is larger than the input array.

- Correlation and convolution
'corr'imfilter performs multidimensional filtering usingcorrelation, which is the same way that FILTER2performs filtering. When no correlation orconvolution option is specified, imfilterusescorrelation. 'conv'imfilter performs multidimensional filtering using convolution.

Imfilter

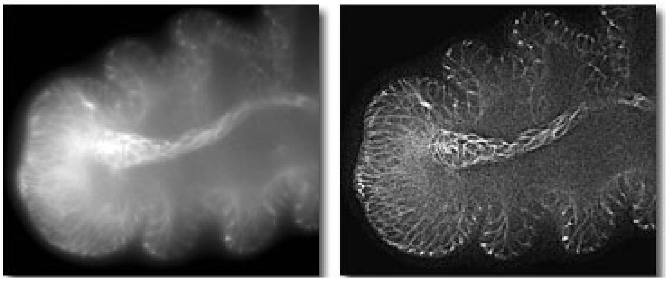
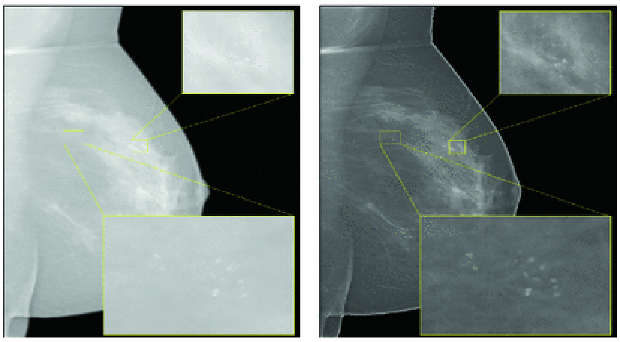


Figure 1.2: Image Filter on blurred pixel

Then we use Laplace transform and absolute values to get exact image extraction and it's the final output.

4. OUTPUT



5. CONCLUSION

Thus we created a system of haze removal by checking the input hazy image features and dehazing it by feature extraction of images. The system is efficient enough from all available possible dehazing techniques.

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