IMAGE FOG REMOVAL BY USING NON-LINEAR FUSSION METHOD

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1 Introduction

In modern Life digital photography has become a major part in professional advertising and entertainment or any other photographical based events. While taking any digital photograph the quality of the picture is considered to be very critical as the quality determines information of the image and the efforts has been made to take the image. Generally indoor images quality is based on the lightning effect but while taking the outdoor images we need to concentrate on the environmental issues such as sunlight, dust, shadow effect, fog effect etc.

1.1 Review of Literature Survey

[1] In this paper the author has proposed based on the observation of the fog
The use of microphysical relation which have been collected from different images which are processed and investigation has been performed in winter season of the china.

[2] In this paper author has used the concentration of the heavy fog situation which have been taken during the winter season china, the key properties of microphysical activities such as water content, fog droplets etc .

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1.2 Scope of the study

The main scope of the project is to develop a system to be used in the scope of the real world are the most important aspect real world in are the most important aspect on the photographic system. The main scopes of the

2.2 overview of Mat lab

Mat lab is considered to be a high level mathematical computational language which needs to be providing the solutions for the complex equation solving

1. Image Color Scale conversion: During this simple phase, the image of one scale is converted to another scale like RGB color scale to grey color scale or HSV color scale etc.

This simple process allows to user to simplify the image by the color coding change.

2. Image transformation: During this simple phase, image transformations like size conversion, shape conversion etc. Are - performed to achieve easiness of the image.

3. Extracting the image feature: It is a simple process of extracting the features which are considered to be unique within the set of groups.

4. Image Enhancement Set: It is a process where each of the input data is transformed for the better and good quality of the image.

SYSTEM ANALYSIS

3.1 Existing System

Many techniques have been proposed for the removal of fog like as examples;

- Equalization of Histogram
- fuzzy logic based methods
- atmospheric model based de-fogging,
- The adaptive histogram contrast limited methods etc.

Many of these existing systems do not remove the noise also the fog from the image. The existing systems which have been proposed for the removal of the fog been achieving significant

amount of success over the fog image.

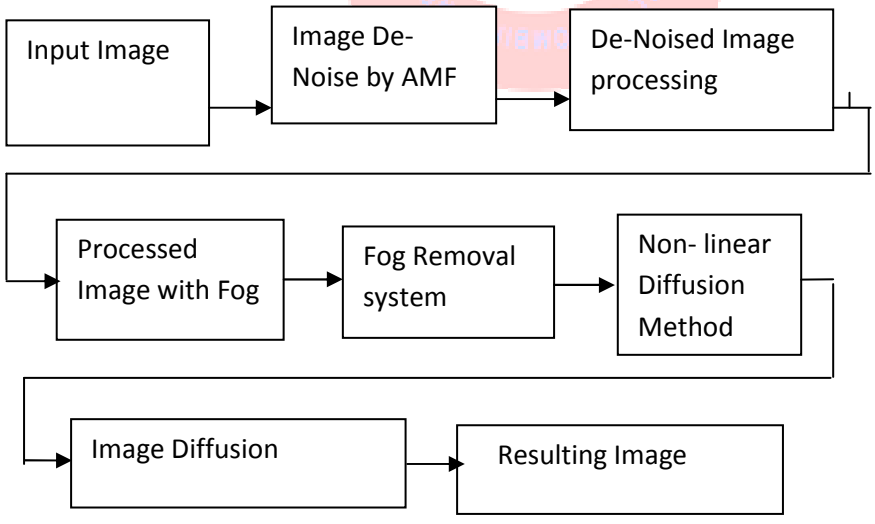
Disadvantages of Existing System

- The saturated images of output are produced by the Markow random field method which also gives impressive results.
- In the gray scale images in De-fogging, the method such as ICA independent component analysis time consuming and it cannot be applied

3.2 proposed system

To overcome the drawbacks of the existing system we have proposed a novel approach which performs both noise removal and fog removal from the system.

We use adaptive median filter for the noise removal of the image and a liner pixel channel prior method for the fog removal of the method. We adopt the liner pixel-bright channel correlation values and then perform the image coding based on the PSNR value of the output image.



3.2.1 Figure: proposed system Architecture

The input foggy image is de-noised by using Adaptive Median Filter based on the value of PSNR and liner

pixel bright channel correlation value the image coding is performed. The de-noised image is processed by just taking the middle value of all values of the pixel in the neighborhood larger and half smaller.

- The Estimation of high intensity and low intensity of the natural images is done by this method.
- For more accurate results and clarity based images the de-noising of adaptive median filter are used.

Advantages of proposed System

SYSTEMREQUIREMENT AND SPECIFICATION

4.1 Hardware Requirements

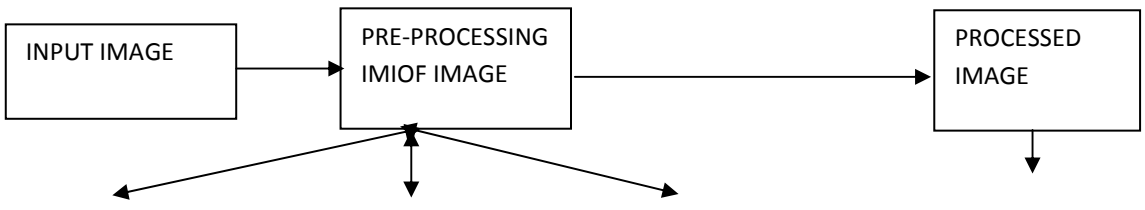
CPU	:	Pentium 4 or higher
Hard disk	:	80GB or higher
RAM	:	1GB
Monitor	:	15’ monitor

4.2 Software Requirement

Software tool	:	MATLAB 2010a
OS	:	Windows 7
Language	:	MATLAB
Domain	:	Digital image Enhancement (processing)

SYSTEM DESIGHN

5.1 SYSTEM ARCHITECTURE



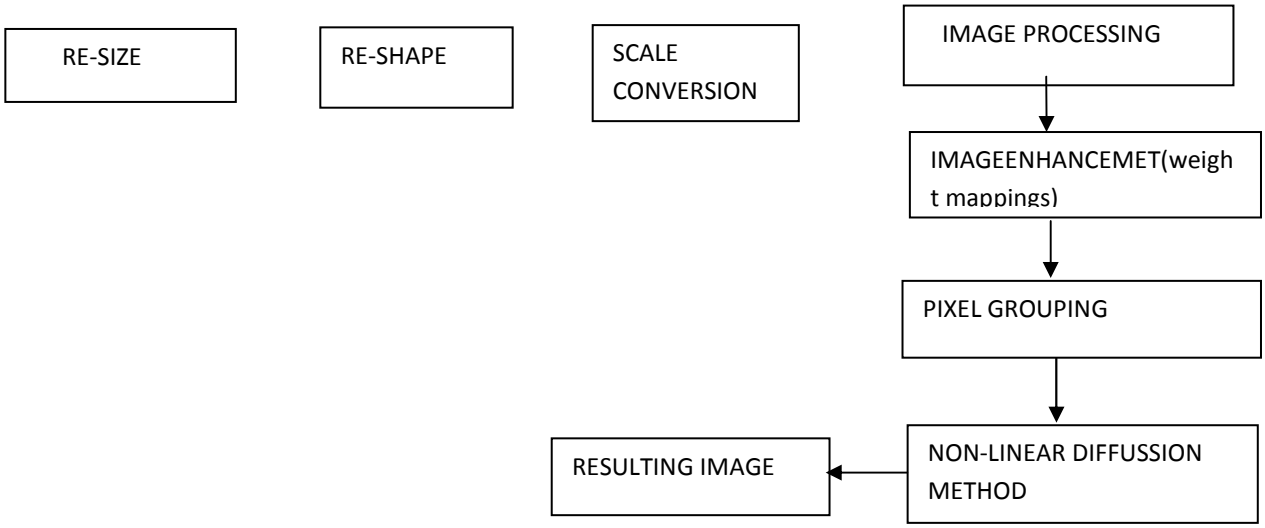


Fig 5.1.1: System Archtechture

IMPLEMENTATION

6.1 Modules:

The proposed system is included with the following main modules which modules which are connected with wach other in the functional way.

- Acquisition of image

  The image is read form the user as he/she required .the image is stored in the system database in the standard format which will be having the fog in

  Img=imread("Image name /path");

- pre –processing of images

  During this phase the input image is undergoes some of basic image processing operations like resize, reshape, image color scale conversion etc. the resulting image can be used for the later phases.

- Analysis of images

  The processed image is now analyzed by the system to detect the noise, de-noise by median filter and also estimate the amount of fog present on the image. it will help to apply the diffusing method which can remove the noise and also the fog

present in the input processed image.

- Non linear Image diffusion

  After the image is analyzed the image is now the processed in the non-liner diffusion method which has been explained in brief in the following section

- Estimation of images

  After the diffusion is performed on the image the remaining pixel groups which exhibit the pixel values in the light allow the system to replace the pixel with the estimated pixel values, which will give the resulting image to the user.

Methodology

In the proposed method of de-fogging we have adopted the de-noising and de-fogging in the separate segments or modules.

The overall system has been classified by the following modules.

1. Pre-processing of images:

The preprocessing of the image includes image resizing, contrast adjustment, brightness adjustment, image cropping, image rotation etc.

Resizing of image: It is a process of reducing the overall size of the image in [height, width] ratio.

Resizeimage=imresize (img, [255,255];

//Hence the image is resized and reduced to 255*255

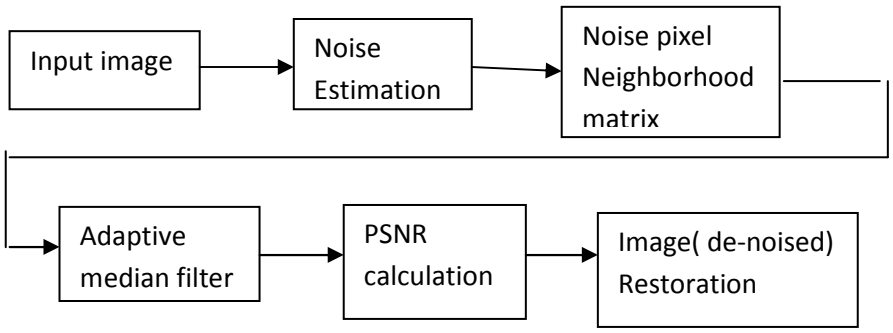


Figure: 6.1.1 Image noising by Adaptive median filter

- Images always get corrupted due to the transmission errors, storage time or addition of unwanted noise to the image. One of the successive methods for de-noising is applying filter for

the image. The filters like median filter, Weighted median filter

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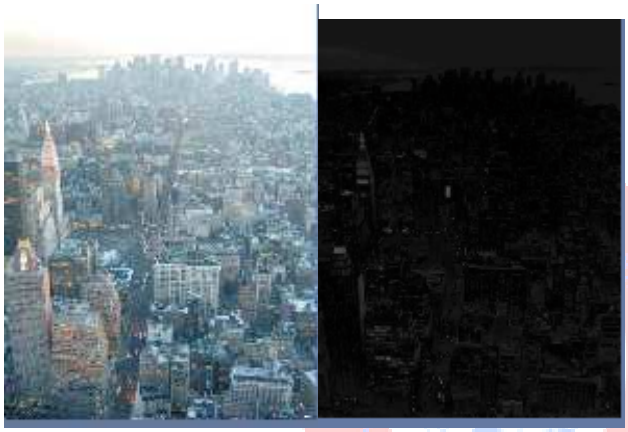
6.2 Image Enhancing by weighted Mappings

In any color images the luminance factor decides the intensity values exhibits by each of the pixels this intensity values different from pixel to pixel based on co-variants values and pixel grouping values.

Luminance Weight map:

Luminance=luminance flux X Angle of penetration

Area



Comparison of Original image with luminance weight map

Chromatic weight map:

Chromaticity of any images is described by the pixel values in a color model RGB, HSV, etc. Each pixel exhibits its own chromatic values in a represents the values in a particular given scale of colors .

The comparison of original image with chromatic weight map

Saliency weight map:

The saliency is a property of any object, in case of images its a property of a pixel the saliency weight mapping is considered to be the reduction if the values based ob required processing

The comparison of original image with saliency weight map

6.3 Non-linear Diffusion:

- This method is stronger and produces efficient results, but due to the assumptions it may regarding the surface shade. In most of the local reason excluding the sky some of the pixels also called as liner pixel pixels which has very low intensity in atleast one of the color bands that is red , green and blue channels.

1. Detection of edge:

By the edge detection method, the edges in images are preserved by permitting the de-fogging method in smooth areas which allows us to minimize the effect of hollow artifact.

Canny Edge Detection Algorithm

The main method of canny edge detection algorithm is to enhance many edge detection methods which already exist by the computational approach for the detection of edges.

1. Error Rate

2. Localization

3. Response

1. The first criteria are the error rate which indicates the edges occurring in the given input image, should not be missed and there should not

be any response to the non edges in the images.

- To implement the canny edge detection method number of steps has to be followed as follows.

  Step 1: Filtering the possible noise.

  Step 2: Find the edge strength.

  Step 3: Estimation of direction of edge.

  Step 4: Relating the edge direction which can be traced in image.

  Step 5: Non Maximum suppression.

  Step 6: Hysteresis method for eliminating streaking.

1. **Step 1: Filtering the possible noise.**

   In the initial step before localization and detection of edges filter is applied to remove the noise present in it. By default canny edge method uses the Gaussian filter which is computed using simple mask

2. **Step 2: Find the edge strength.**

   After the per formation of smoothing the image and elimination of the noise present in it. This step is used to detect the strength of gradient image.

3. **Step 3: Estimation of direction of edge.**

   As mentioned above the rows and column wise gradient values are used for computing the direction of edges. **ǾG(X) = [x=90° if GY=0°]**

4. **Step 4: Relating the edge direction which can be** the constants have to be set regarding the edge direction indicating the direction **traced in image.**

5. **Step 5: Non- Maximum suppression.**

   After Finalization orientation of the edges a non maximum method of suppression has to be applied to trace the edges and find out the pixels which are not considered to be edge. This produces a line in the output images.

6. **Step 6: Hysteresis method for eliminating streaking.**

   In the final step we use the hysteresis for

eliminating all the unwanted pixel from the image called as streaking.

Atmospheric Light Estimation:

The atmospheric light A is assumed to be the known value, for estimating this light value of A many methods have been proposed like fog opaque region or initial guess method among them, fog opaque method is considered as successful one.

ADVANTAGES AND DISADVANTAGES

Advantages

- This method helps us to remove fog.
- The clarity of the image is enhanced.

Disadvantages

- Image based threshold value which has been set for the fog detection is low.
- Images captured in the knight which has fog cannot be removed.
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APPLICATIONS

- The outdoor images can be taken clearly in photography
- In photography office where the intensity pixel and other enhancement techniques can be used with the defogging.

CONCLUSION

The MATLAB tool as simulation framework using nonlinear diffusion based image enhancement techniques to remove the fog.Fog is an unwanted atmospheric feature effect removed by using this method both the noise and fog are eliminated by using AMF for removing noise in an image

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[1] D.A.Sadlier et al., “Automatic TV advertisement from mpeg bit stream,” Journal of the Patt. Rec. Society, vol. 35, no. 12, pp. 2-15, Dec. 2002

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[4] Rafael C. Gonzalez,”Digital Image Processing” second edition,PHI