

# ***Real Time Haze Removal Using Filter Function***

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**Abstract:-** Nowadays the cameras are arriving with high pixels and high software techniques. But this thing is not suitable for all the situations due to cost-effectiveness. For Example, CCTV attached to signal lights, organizations, and so on. To overcome this situation haze removal technique is used to adjust the saturation and contrast to bring clear images. But the main problem in this technique, haze removal is away from its value at the idle situation. In the area of PC pictorial superiority & perceivability levels of a picture is influenced via air-light & weakening marvels. Inflight subdivisions, which were present in climate influence the perceivability glassy of some artifact, termed commotion or undesirable sign among spectator & item. For improvising the proposed methodology perceivability level of a pic & decreasing haze & clamor different upgrade strategies are utilized. After improvement is again reestablished, upgraded image by rebuilding techniques. For enlightening the perceivability level 4 significant advances are utilized. The initial phase is securing the formula of unclear imageries. 2nd is the approximation method (gauge dissipating wonders, perceivability level). 3rd is upgrade progression (advance perceivability, decrease Smog or clamor). Preceding advance is rebuilding practice (reestablish improved pic). The principle point of the proposed methodology is to audit condition workmanship picture improvement & rebuilding strategies for refining the eminence & perceivability of an image which give clear focus in awful climate circumstance. Also, it requires only 0.52 seconds to process an image of 1-MP.

**Keywords-** Haze removal, perceivability, gauge dissipating wonders, rebuilding strategies, clear image.

## **I INTRODUCTION**

Fog is a characteristic wonder caused because of particles in the air retaining & dissipating light. Because of this, in a dim air, light exuding from far off sources are frequently dissipated, & the

onlooker sees a decrease conversely. Also, images with dimness have diminished perceivability & shading loyalty. Along these lines, dimness expulsion is exceptionally looked for after where misfortune conversely & perceivability is of prime significance, for example, independent vehicles. It likewise profoundly wanted in photography & other PC vision applications. The pictures of open-air sights typically debased by the muddled mediocre in the air. Dimness, haze & smoke are such marvels because of environmental assimilation & dispersing[1]. This event impacts the typical work of programmed (motorized) observing framework, open-air acknowledgment framework & savvy transportation framework. Light from the atmosphere & light reflected from a thing is disseminated by the liquid dots, coming about the perceivability of the prospect to be debased. The 2 key marvels that result dissipating are 'weakening' & 'air light'. By the utilization of successful dimness or Haze expulsion of the pic, the safe-keeping & quality of the graphical framework will be improved. Cloudiness expulsion is a troublesome assignment since Mist relies upon obscure passage profundity plot data. Haze impact is the consequence of separation among camera & article. Consequently, the expulsion of Fog requires to find the air & light guide or profundity map. The present murkiness expulsion technique could be isolated into 2 classes: (a) image upgrade & (b) image reclamation. Upgrading the pics gained while meager climate situations called de-enduring & its a basic issue in apps, for example, airborne camerawork, lashing help & visual observation. Reclamation of images is significant in a few open-air applications, for example, remote detecting, astute vehicles, & so forth[2].

## II RELATED WORK

Many algorithms have been tested and produced to improve the quality images. There are four levels to extract the best quality images such as the Initial phase is securing the formula of unclear imageries. 2nd is the approximation method (gauge dissipating wonders, perceivability level). 3rd is upgrade progression (advance perceivability, decrease Smog or clamor). Preceding advance is rebuilding practice (reestablish improved pic). The principle point of the proposed methodology is to audit condition workmanship picture improvement & rebuilding strategies for refining the eminence & perceivability of an image which give clear focus in awful climate circumstance. Numerous calculations are created for improving the perceivability nature of an image in spatial space however if these techniques are applied in the recurrence area, at that point it produces better outcomes & decreases an opportunity to deliver the yield[4].

## III EXISTING SYSTEM

Currently, to perform operations for removing fog & noise in the pic DCP is used & also GLP along with transmission map. This contemplates shading pic & renovate into R.G.B configuration. Convert pic into a twofold enticement for the dim filter. Presently produce lattice for Dark Medium fuddled pic with 0's. Expand lattice magnitude of  $D_m$  utilizing Eqn-4 underneath. Gauge the environmental dainty utilizing least sifter. Compute the broadcast map for the perceivability of an image. The estimation of the map is lesser than 1. To have safety for edges of the pic have edge strategy. The adjusting strategy improved the detectable quality of the snowy pic[3].

### 3.1 DISADVANTAGES OF THE EXISTING SYSTEM

- In a current framework, it produces a commotion
- There is no filter work
- less precision

## IV PROPOSED METHOD

Numerous calculations are created for improving the perceivability nature of an image in spatial space however if these techniques are applied in the recurrence area, at that point it produces better outcomes & decreases an opportunity to deliver the yield[6]. At the point when it is required to change over the spatial space contribution to the recurrence area at that point utilize methods. At the point when the recurrence of clamor is obtained, separating

strategies are used to diminish the commotion recurrence & created is upgraded yield improved image speak to the clamor image separating in recurrence area and without no problem the output can be obtained as a clear image without any noises or disturbances in exterior wise as shown in Fig.1.

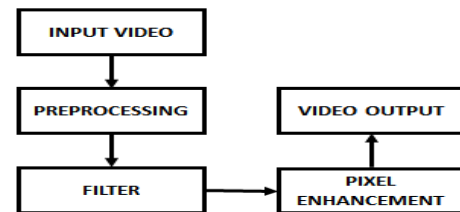


Fig.1. Exterior steps in the proposed methodology

- The given proposed framework is done continuously shows in Fig.4.
- Less commotion happens
- Using filter work it decreases the commotion
- High precision

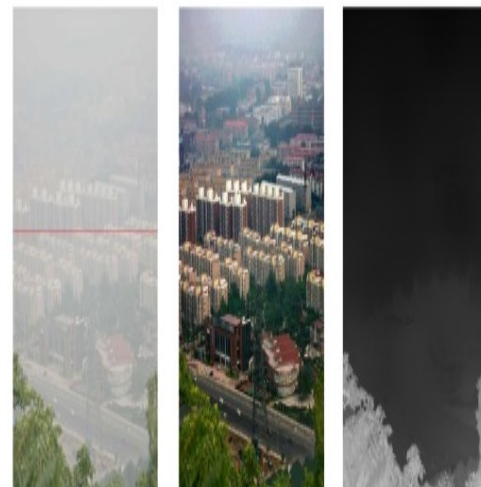


Fig. 2. Various Contract of a single image

Before going to enhanced filter function techniques, it is required to illustrate two roles playing major roles in images.

- Color
- Contract

### 4.1 COLOR IN HRF

The Framework is described in two sections such as,

- Segment Ray Section

ii) Fading Section

$$y(a) = z(a) + p(1 - w(a)) \quad (1)$$

Where  $a$ ,  $y(a)$  represents input image,  $z(a)$  represents the ray section and  $w(a)$  represents a channeling map. Eq.(1) represents the fading section[7,8]. The channeling  $w^*$  obtained from a bright channel  $B_c^*$  is given below,

$$B_c^* = \min(\gamma) \min(c) y(a) / p(a) \quad (2)$$

Where  $(\gamma)$  represents the area within a screen and  $(c)$  represents the RGB color channel.

#### 4.2 CONTRACT IN HRF

In Eq(1) can be rewritten as,

$$1 - \hat{z}(a) = 1 - \hat{y}(a) / w(a) \quad (3)$$

Where  $\hat{\cdot}$  represents all the variables such as  $z$ ,  $a$ ,  $y$ ,  $w$  has been divided by universal light. Using simple strategy eq(3) becomes,

$$\nabla \log(1 - \hat{z}(a)) = \nabla \log(1 - \hat{y}(a)) - \nabla \log w(a) \quad (4)$$

From the above equation, the term energy concerning ideal is written in,

$$\arg(B_c) \max \gamma (B_c - B_c^*)^2 + (\nabla \log B_c - \nabla \log y)^2 \quad (5)$$

Our exposition of divergence in the framework of haze removal shows that the changes to the given input image using the dark medium denoted as  $d_m$  shows in Fig.2. The analysis in the haze removal framework is coherent saturation so that the value of,

$y$  replace with the dark medium. The  $d_m$  is thickly linked with saturation. In Eq (3) the constant value is assigned. Now both sides will applied by the maximum operator. So the result will be,

$$\hat{u}(a) = (1 - \pi \hat{x}_m y(a)) / (1 - \pi \hat{x}_m x(a)) \quad (6)$$

#### 4.3 AMPLIFYING THE TERM ENERGY

Once the value  $\gamma$  has determined then the term energy gives the exact solution using the theorem called PASEVA THEOREM. In Eq(5) can be obtained by using a method extract from mapping[5,10]. The main aim of this method is to comprising the image with contrast. Table I shows that the comparing time taken between the existing algorithms.

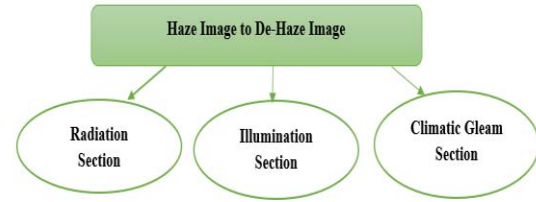


Fig.3. Sections of converting haze image

Once the testing has been finished, it has been found that the present optimal loom to implement our proposed methodology to filtering to differential the edges in the image. Three types of sections are to be followed to remove the haze from the given picture (Haze image to De-Haze image) shows in Fig.3.

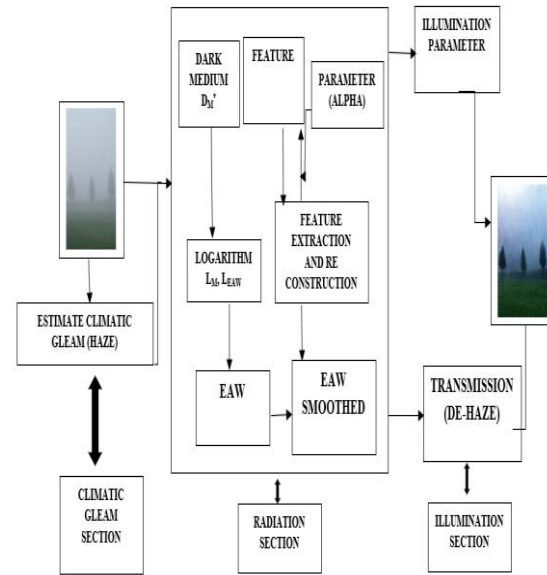


Fig.4. Over all Proposed Framework

##### 4.3.1. Radiation Section

The Radiation section and climatic glean section plays a major role in haze removal. So the best method of dehazing should be estimated using radiation and climatic glean using EAW modes with different levels to extract the images shown in Fig.5. The logarithm segment extract using the dark medium can be written as,

$$L_M = \hat{y}_m \text{ and } L_{EAW} = y(L_M)$$

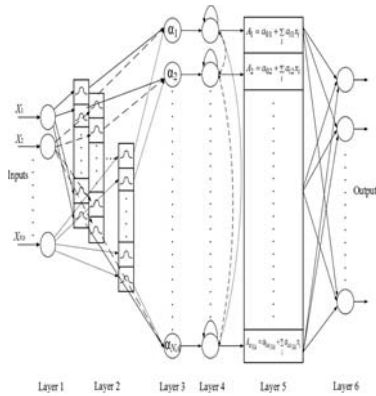


Fig. 5. Different levels to extract the images in the medium radiation section

#### 4.3.2. Illumination Section and climatic gleam section

Here the process of illumination rebuilding based on illumination identity model is shown in TABLE II which has been given in graph format to understand the existing and proposed illumination technique in the form of Time shows in below fig.6.

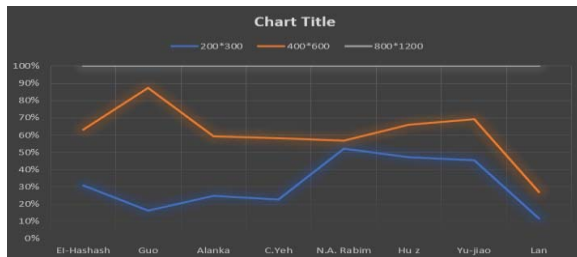


Fig.6. Existing systems- Time based haze removal

### V MODULE DESCRIPTION

#### 5.1 IMAGE PRE-PROCESSING

The first thing that is done by using the image pre-processing is in the increase of contrast. Contrast is occupying the intensities and colors of the pic. Increasing the saturation & contrast is one of the basic operations that can be performed using this module.

#### 5.2 FILTER TYPES

Image filtering can be gathered in two relying upon the impacts:

##### 5.2.1 LESS TRANSMIT SIEVES

Less transmit sieving (also known as smoothing), is useful to change high-level relapse from the advanced image. This method as a rule

utilizes moving window administrator which influences each pixel of the pic in turn, fluctuating its incentive with less capacity of neighborhood locale of the pixel. The administrator helps in moving the pixel over the pic to influence the other pixels in the pic [9].

#### 5.2.2 HIGH TRANSMIT SIEVES

An in height-clearance riddle can be utilized to cause a pic to seem more honed. The above-mentioned method accentuates adequate subtleties in the image - something contrary to the low-transmit sieve. High-pass separating works similarly as low-transmit sieving. It performs edge-detection & sharpening shows in Fig.7

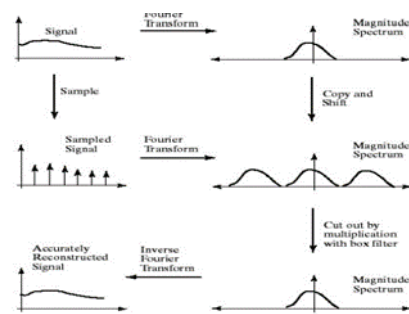


Fig.7. Edge detecting and sharpening

### 5.3 IMAGE ENHANCEMENT

The general purpose of image enhancement is that if you process a pic so that after processing the result pic is obtained which is more suitable than the original like in other words more clearly visible than original. If an image is a little bit dark or not visible more effectively then by using this process the picture can be enhanced up to some extent but not more than that.

#### 5.4 OPENCV

OpenCV is an open-source compendium this is aimed at real-time computer vision and also its library is a cross-platform & can run in any programming language like Python, Java, etc. It is made by Intel & is of the most used tool for pic & video detection & enhancement. CV stands for computer vision & it is the way of teaching intelligence to the machines & making them see things just like human vision and recognition [12].

## VI RESULT WITH PERFORMANCE ANALYSIS

In our proposed framework the result for the time taken is fast and accurate by comparing the existing techniques shows in Fig.8. And the graph analysis of improvement is shown in Fig.9.

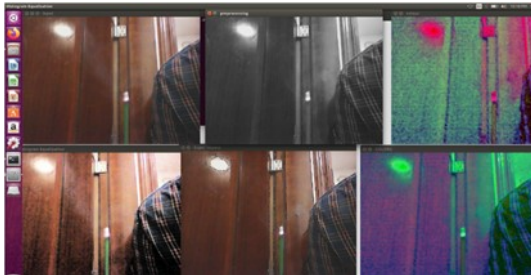


Fig. 8. Refining the eminence & perceivability of an image in various climate condition

$$\gamma = 0.54(a), 0.63(b), 0.21(c), 0.45(d), 0.36(e), 0.52(f)$$

Table I  
Time Taken for Existing Algorithms

Authors	200*300	400*600	800*1200
El-Hashash	5.9	6.2	7.1
Guo	1.2	5.2	0.92
Alanka	5.6	7.8	9.2
C. Yeh	3.4	5.4	6.3
N.A.Rahim	9.1	0.82	7.5
Hu z	6.4	2.6	4.6
Yu-jiao	6.1	3.2	4.1
Lan	0.99	1.3	6.2

Table II  
Time Taken for Proposed Algorithm

Proposed	400*600	800*1200	1600*2400
Light of Transmission	0.54	0.36	4.6
Overall	0.63	0.52	4.3

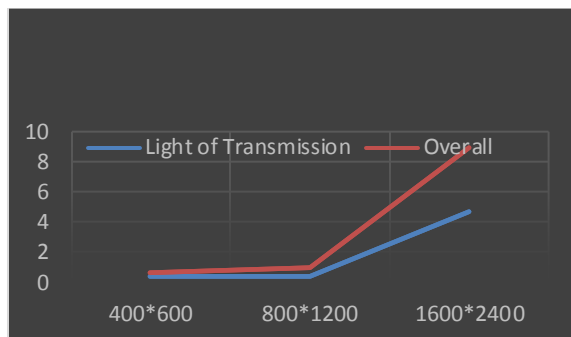


Fig.9. Filter method for haze removal in time

## VII CONCLUSION

Fog because of residue, smoke & other dry particles lessens perceivability for far-off areas by causing an un-Foggable dim tint in caught pics. Fog/Mist disposal is troublesome on grounds that the haze is subject to the inconclusive profundity data. All the dehazing techniques helpful for reconnaissance, astute vehicles, for remote detecting & submerged imaging, & so-on. Haze evacuation calculations are utilized to mend the painterly nature of pic, which is influenced by nimble dissipating concluded murkiness specks. Paper benevolences different straightforward & quicker de-fogging strategies utilized in the turf of pic handling methods, through which haze will get evaluated from foggy pics.

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