AN IMPROVED OBLCAE ALGORITHM TO ENHANCE LOW CONTRAST IMAGES

Parneet kaur[1]*,Tejinderdeep Singh* [2]

Student, G.I.M.E.T, Assistant Professor, G.I.M.E.T

ABSTRACT

Image enhancement is the preprocessing of image to enhance the understandability or observation in order in images for human spectators and to give a superior effort for further computerized image processing techniques. Image brightness is to evaluate intensity after the image has been acquired with a digital camera or digitized by an analog to digital convertor. In this paper,shows the various image enhancement techniques has been done. In the proposed method, input image shown the result after mixing OBLCAE algorithm with Mix-CLAHE .The method shown in this paper has shown better results on various parameters can be analyzed correctly.

Index Terms: Digital Image,Adaptive histogram Equalization, Contrast Enhancement, OBLCAE.

I. INTRODUCTION

Image brightness is to evaluate intensity after the image has been acquired with a digital camera or digitized by an analog to digital convertor. In image enhancement, an image is enhanced by the way of modifying an image's dynamic range or contrast. Low Brightness and low contrast images are frequently obtain in image acquisition and they are required to process for certain applications. Image enhancement plays a fundamental role in many image processing applications.The purposes or enhancement low illumination image be denoising, enhancement brightness and contrast, for now color information also should be maintained. Image improvement process consists of a set of techniques that seek to improve the visual appearance of an image or to exchange the image to a produce improved suitable for analysis by a human or appliance. The main goal of image improvement is to adjust attributes of an image to create it additional appropriate for a certain task and to a particular spectator. During this process, one or more attributes of the image are modified. Digital Image enhancement techniques offer a various options for recovering the quality of images. Image enhancement is the preprocessing of image to enhance the understandability or observation in order in images for human spectators and to give a superior effort for further computerized image processing techniques. The technique based on color space conversion generally is used to change creative RGB image to a definite color space, then use the conventional gray image improvement algorithm openly on the luminance piece and then altered back to the RGB space to get improvement charge, but this type of method is simple to cause the color distortion because of each color section processing is not reliable.

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II. Adaptive Histogram Equalization

Adaptive Histogram Equalization is a computer image processing method used to recover contrast of the pictures. It is a sparkling contrast improvement for both normal images and medical images and other originally non illustration images. It is different from common Histogram equalization [HE] with respect to that the adaptive technique computes various histogram, each corresponding to a separate part of the image, and use them to reallocate the lightness values of the image. In image mixture method, fusion processes may sharp the roughness of the fused image so to overcome this difficulty of poor intensity adaptive histogram equalization will be used to improve the results further. We can say that adaptive histogram equalization approach to protect the intensity of the complex images. The key point of AHE is to in which at smaller scales contrast of an image is enhanced; at the same time as at better scales difference of an image is reduced. The advantage of adaptive histogram equalization [AHE] is that it is automatic, reducible, and nearby adaptive and frequently produce better images. Figure 1 is an example of adaptive histogram equalization [AHE].

(a)Original image (b) Output AHE

Fig 1: The results of adaptive histogram equalization (a) Original image (b) Output AHE

A. THE OBLCAE ALGORITHM

OBLCAE stands for (Overall Brightness and local contrast adaptive enhancement) algorithm based on HSV color space is projected for low illumination color image enhancement.

The following is the illustration of steps involved in OBLCAE algorithm:

Step 1: Choose a global brightness adaptive enhancement.

Step 2: For gray image local contrast, adaptive local contrast enhancement is defined.

Step 3: The color of brightness enhanced RGB image is restored by the linear operation by using the color information in the original image.

III. RELATED WORK

[1] developed the most better highly effective image classification technique to choose the most effective mixture of clipping, scaling parameters by ability to the cost method for image enhancement. [2] Proposed a PSO base a hue preserving color image improvement technique. The method is actually as follow. Image enhancement is known as being an optimization trouble and element group optimization can be used to determine it. The quality of the intensity image is improved with a parameterized transformation function, by which parameters are optimized by PSO centered on an objective function. [3] Introduced a parameterized LIP model that spans both linear arithmetic and LIP operations and all scenarios between inside a single unified model. Additionally they introduced both frequency and spatial-domain named technique PLIP-based image development methods, like the PLIP Lee's algorithm, PLIP bi histogram equalization, and the PLIP alpha rooting. [4] Discussed the feature of digital CR drug emission image has broad vibrant range, rich details and terrible contrast, therefore it is necessary to improve CR image to the requirement of

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doctor diagnosis. However there are general enhancement algorithms do not consider any human visual characteristics. [5] proposed a new method involving the idea of opportunity about the ability to calculate cost to simulate the image enhancement, and identify probably there is one of the most suitable enhancement parameters of clipping and scaling. [6] Developed a new image-enhancement technology in the wavelet domain for radiologists to screen mammograms. The improved enhanced new image-enhancement algorithm has several advantages. [7] Proposed a gray scale transform predicated on regularized incomplete beta function is a highly effective image enhancing approach. It makes use of the global optimal search capacity of differential evolution and combines the regularized incomplete beta function to improve image contrast. It enhances the gray of pixels by transform function. [8] Proposed new method of automatic image enhancement using real-coded GAs. Results obtained indicate that EVOLEHA outperforms the classical point operations which will also be automatic methods when it comes to high effectiveness on a sizable group of images.

IV. PROBLEM FORMULATION

A. Problem In Existing Work

The survey has shown that of existing techniques are not suitable for very low illumination image enhancement. Therefore not much work done has been done for the images with low illumination.

B. Problem Definition

Low brightness and low contrast images are frequently obtain in image acquisition and they are necessary to process for definite applications. OBLCAE algorithm was studied in this research paper for low illumination image enhancement in HSV color space.

V. PROPOSED ALGORITHM

After analyzing and going through the literature survey, there are following steps are involved in OBLCAE algorithm.

Step 1.Firstly, start the process.

Step 2. Input the image for RGB2HSV conversion.

Step 3. Then apply mix- CLAHE to the image.

Step 4. Combine hue, saturation and value.

Step5. Input the parameter when number of iterations is given.

Step 6.After input the parameter, brightness meets to the requirement.

Step 7.Then color restoration process starts and gets the enhanced image.

VI. EXPERIMENTAL SETUP

In order to implement the proposed algorithm the MATLAB has been used. Basically over ten images the algorithm has been implied and the result will be discussed in next session. The table 1 shows the information of the images used.

Table I: Information of Images

Image Name	Extension	Size in K.Bs
image 1	.jpg	3.26 KB
image 2	.jpg	167 KB
image 3	.jpg	221 KB
image 4	.jpg	75.8 KB
image 5	.jpg	53.8 KB
image 6	.jpg	38.5 KB
image 7	.jpg	33.0 KB
image 8	.jpg	23.7 KB
image 9	.jpg	6.54 KB
image 10	.jpg	10.7 KB

VII RESULTS

Fig 2 shows the input image which will be used for proposed algorithm.

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Fig 2 Input Image

Fig 3 shows the image obtained from the existing technique that is OBLCAE.

Fig 3 Image from Existing Technique

Fig 4 represents the image obtained from proposed method that is achieved after mixing the mix- CLAHE and from figure it can easily be seen that enhancement is better in proposed method.

Figure 4 Image from proposed technique

VIII. PERFORMANCE EVALUATION

The table 2 and figure 5 shows the results of proposed method on Peak Signal to Noise Ratio. Basically (PSNR) is the ratio between maximum possible power of a signal and the corrupting power.

Table II: PSNR VALUES

Images	Existing Technique	Proposed
Image 1	48.1308	59.6722
Image 2	50.1426	53.2527
Image 3	48.1308	51.9986
Image 4	49.7408	52.9235
Image 5	85.1392	91.3812
Image 6	57.2791	59.6259
Image 7	49.0820	51.3969
Image 8	49.9550	56.2526
Image 9	57.1133	58.5905
Image10	54.7451	56.5700

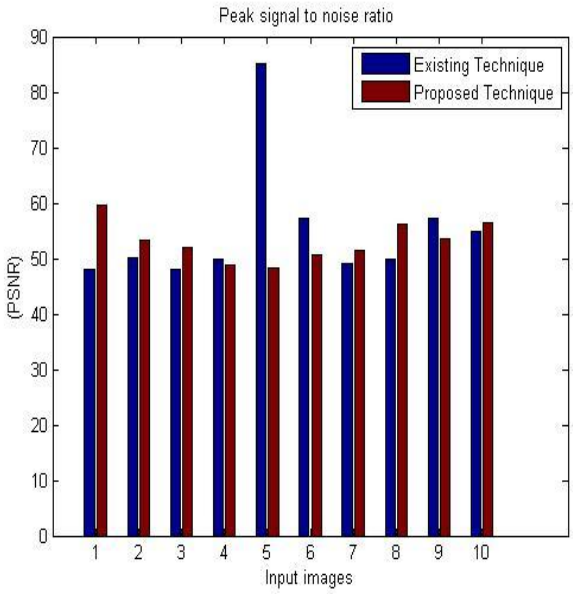

Fig 5: PSNR Analysis

The table 3 and figure 6 shows the results for Mean Square Error (MSE) is better than existing algorithm.

In image processing mean square error is the most general measure for performance measurement of the existing

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method and the coded images. It is a straightforward method to design system that decrease the MSE but cannot capture the impurities like blur artifacts.

Table III: MSE VALUES

Images	Existing Technique	Proposed
Image 1	1.000000	0.070123
Image 2	0.629250	0.307476
Image 3	0.999990	0.410410
Image 4	0.690242	0.833165
Image 5	0.000199	0.943965
Image 6	0.121667	0.562976
Image 7	0.803299	0.471396
Image 8	0.657024	0.154107
Image 9	0.126400	0.284467
Image 10	0.218056	0.143245

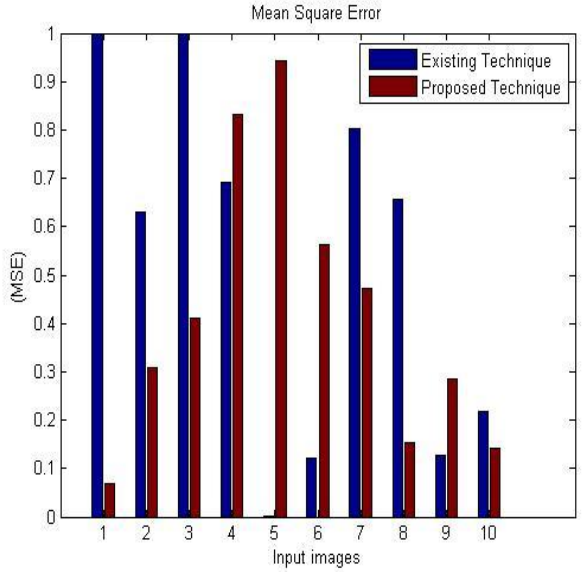

Fig 6: MSE Analysis

The table 4 and figure 7 shows the Root Mean Square Error

Table IV RMSE VALUES

Images	Existing Technique	Proposed
Image 1	1	0.2648
Image 2	0.7933	0.5545
Image 3	1.0000	0.6406
Image 4	0.8308	0.9128
Image 5	0.0141	0.9716
Image 6	0.3488	0.7503
Image 7	0.8963	0.6866
Image 8	0.8106	0.3926
Image 9	0.3555	0.5334
Image 10	0.4670	0.3785

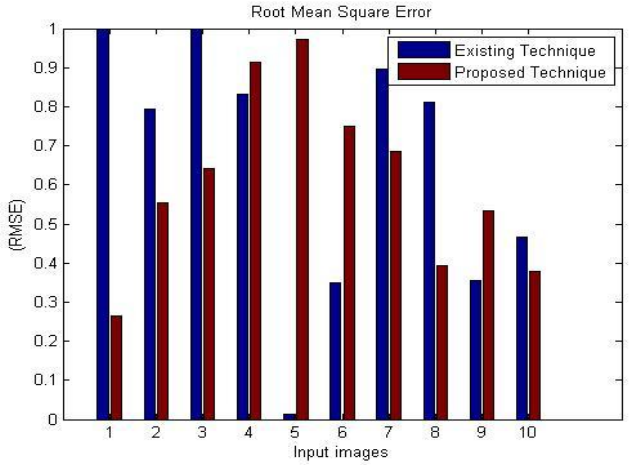

Fig 7: RMSE Analysis

IX. CONCLUSION & FUTURE SCOPE

Low brightness and low contrast images are frequently obtain in image acquisition and they are necessary to process for definite applications. The brightness enhanced image has good quality total contrast and has not hazy reaction. But still related work has shown that OBLACE has neglected many issues, so this work has proposed a hybrid contrast enhancement technique which has fused the features of mix-CLAHE as well as OBLCAE. Therefore, a proposed technique will be enhanced.

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