Study on Various Techniques of Image Enhancement

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ABSTRACT

This paper has discuss the various techniques for image enhancement i.e histogram equalization, Brightness preserving bi-histogram equalization(BBHE), Dualistic Sub-Image Histogram Equalization (DSIHE), Minimum Mean Brightness Error Bi-HE Method (MMBEBHE), Recursive Mean –Separate HE Method (RMSHE),Mean brightness preserving histogram equalization(MBPHE).As well as it represents the comparison between the various techniques that shows the image enhances the overall contrast and visibility of local details. The review has shown that contrast enhancement approach based on dominant brightness level analysis and adaptive intensity transformation for remote sensing images.

General Terms

Enhance the contrast of images,comparison of different techniques of image enhancement.

Keywords

Image enhancement, different techniques of image enhancement HE, BBHE, DSIHE, MMBEBHE, RMSHE, MBPHE and Comparison table

1. INTRODUCTION

Image enhancement shows a really necessary part in different types of image processing applications. Image enhancement contains number of procedures are used to improve the visible act of an imag[1]e. The main intent behind image improvement is to improve features of an image[2]. An electronic digital enhancement technique gives several sets for improving an images. Mostly Image enhancement involves power and distinction adjustment, noise decrease, edges refining etc[5]. Contrast enhancement is specialized in the specific position of increasing the contrast in a visual to create different features rapider professed. There are different software places for improving the visible feature of low contrast images.

Input image   **Output image**

2. DIFFERENT TECHNIQUES OF IMAGE ENHANCEMENT

2.1 Histogram Equalization

It gives unlikely effects in images; nevertheless it is very helpful for images[1].Histogram Equalization (HE) is process which is put on improve the contrast of an image. In that it's possibly not required that the contrast of a graphic will be improved [2]. Often the histogram equalization shows that it can be inferior in comparison to contrast of a graphic is decreased. Before managing histogram equalization, it is necessary to understand the two methods which can be called as probability bulk function and cumulative distributive function. For all pixels in a graphic firstly evaluation PMF and CDF.

2.2 Brightness Preserving bi-histogram Equalization (BBHE)

This process splits the image into two sections. [2].Then these two histograms are autonomously stable. To intend illumination of the resulting image leasing among the original mean and the mid gray level[4]. The histogram vary from 0 to M-1. This parting generates two histograms. The initial histogram has the set of values of 0 though the other has the value of M-1.

2.3 Dualistic Sub-Image Histogram Equalization (DSIHE)

This process usages exactly the equivalent straightforward notion of BBHE mode. It disintegrated the image and then to be equal to the histograms of the sub-images independently [6].

2.4 Minimum Mean Brightness Error Bi-HE Method (MMBEBHE)

This technique also firstly decompose the image and after that put on the HE process to equalize the resultant sub-histograms in an independent manner[4]. In this technique the original image is decomposed I into two sub-images I [0, lt] and I [lt +1, L −1].The lowest illumination distinction between the original and the resultant image is attained.

2.5 Recursive Mean –Separate HE Method (RMSHE)

Recursive Mean –Separate HE is a prolonged variation of the BBHE technique[4]. In RMSHE as opposed to disintegrating the image only one time.it conduct image disintegration in recursive way to help protect the initial illumination around range i. HE is equal to RMSHE stage 0 (i = 0). BBHE is equal to RMSHE with i = 1. The illumination of the result I mage is enhanced maintained by way of r rises.

2.6 Mean Brightness Preserving Histogram Equalization (MBPHE)

This technique could be split in to two major terms called bisection-MBPHE and multi-sections MBPHE. Bisection process can preserve the illumination merely to a definite range. Multi-sections has features a greater mean brightness preservation as in contrast to the bisections MBPHE[4]. Multi-sections split the original image into s sub-histograms. Then all sub-histogram are then equalized independently.

3. LITERATURE SURVEY

Kanwal et.all(2010)[1] has shown a contrast enhancement technique for X-Ray image. A cross approach for

improvement has been proposed Comparative evaluation of predicted method beside contrast improvement practices has been performed and results of predicted method are much better than different techniques. Ehsani et.all(2011)[2] planned a versatile and iterative histogram corresponding algorithm for contrast improvement .Furthermore, the outcomes obtaining the extreme truly real effect. The technology phases can probably vary considerably in regards to the image features and histogram. Ke et.all(2011)**[3]** planned a novel image improvement point that cartels bilateral tone change and saliency-weighted variance development procedures. Dissimilar several curve-based global comparison development practices, bilateral increases the mid-tone elements that usually contain critical shows, beside with the bright and dark sections. Jha, et al. (2012)[4] planned a contrast improvement strategy using scaling of internal noise. The system of improvement is attributable to noise-induced evolution of discrete cosine transform figures from an corrupt form to an improved form. This alteration is impacted by the internal noise existing because of inadequate brightness and might be taking an overall bi-stable process presenting dynamic stochastic resonance. The planned scheme used a regional versatile handling and enhances the image and color data though establishing good value. Jha Kumar et al.(2012) [5] planned a nonlinear resonance-based method for improvement of obscure and squat intensity images. A squat intensity is preserved as a sub-inception sign and noise-improved show processing is placed on enhance their contrast. supplementary frequently to a visual and is consecutively threshold used prudently by complete averaging. Cheng,et.all (2012) [6] planned a method for the detection of over-enhancement .The details for production over-enhancement are studied and surveyed extremely. An impartial principle for distinguishing over-enhancement is planned. Lee et al.(2013) [7] shown a contrast improvement strategy predicated on DBLA and adaptive intensity transformation for remote sensing imagesFirstly, apply DWT on the original images and then decompose the LL sub set in to three different levels by the log-average luminance Intensity transfer functions. The resultant improved image is received applying the inverse DWT. Chouhan et al.(2013) [8] planned a dynamic Stochastic resonance founded approach in spatial domain for the improvement of obscure- and squat-contrast image.The efficiency of somewhat might be better. DSR is used in a iterative style by relating the bi-stable planing with the depth standards of a low-contrast image. Kil, et. all(2013)[9] offered a to remove a haze process based on obscure channel preceding and brightness improvement methods. The traditional obscure channel preceding process eliminates darken and therefore reinstates shades of substances in the section, but it typically not study about the improvement of contrast. Other hand, the procedure enhance the local contrast of images. Reshma lakshmi et.all(2013)[10] has suggested a novel contrast improvement algorithm. Disadvantages of surviving contrast improvement procedures are amended by a scientific software called 'Fuzzy set'. Fuzzy set models might be formed to control the improbability related to images. Chen et.all(2013)[11] has planned a novel contrast improvement technique. It is based on histogram equalization and a un-sharp masking. This planned algorithm usages HEBM to acquire contrast improvement. Maragatham et.all(2013)[12] planned an algorithm to design images presenting their contrast evaluate, to sort and differentiate involving to the unlike contrast.The original image is labeled possibly as low contrast or high contrast.If the labeled image is low contrast will be improved using the Stochastic resonance principle. The effects exposed that the planned mechanized process

enhance the lower contrast image enhanced**.** Celik et.all(2014)[13] has presented an algorithm to enhance the contrast by spatial data of pixels. This process presents a new process to figure the spatial entropy of pixels. For every single grey level, the consistent spatial scattering is figured using a histogram of spatial positions of utmost pixels with exactly the same grey level. Cao gand et.all[1(2013)[14] has offered a multi-scale image improvement algorithm. The parametric comparison examine includes not only the illumination covering value, furthermore the comparison covering value of the human visual classification. The method of the comparison examine may be utilized aimed at each multi-resolution disintegration system.

4. COMPARISON OF DIFFERENT TECHNIQUES OF IMAGE ENHANCEMENT

Table 1. Comparison of Techniques

Ref.no.	Name of auth or and year publicat ion	Issues	Techniques	Features
1.	Kawal, 2011	Adaptive histogram has been ignored	Region based co-ntrast enhancem-ent	Enhance low contrast image
2.	Ehsani, 2011	Introduce color artifacts	Adaptive and iterative histo-gram matchi-ng algorithm	Best result in CIR
3.	Ke,2011	Adaptive histogram has been ignored	Bilateral tone adjustment and saliency weigh- ted contrast enhancement	Achieve high contrast with little noise
4.	Jha,2011	Decrease the intensity	Internal noise induced enha-ncement	Enhance visual qualitys
5.	Jha,2012	Introduce dolor artifacts	Dynamic stoc-hastic resona-nce based technique	Good per-ceptual quality
6.	Cheng, 2012	Decrease the intensity	Detection of over enhance-ement	Decrease the intensity
7.	Lee, 2013	Introduce Color artifacts	Dominant bright-ness level analysis and transforma-tion	Enhance low contrast images
8.	Chauhan ,2013	Decrease the intensity	Dynamic stoc-hastic resonance ba-sed based tech -nique	Best performa-ce in color and cont-rast enha-

				ncement
9.	Kill, 2013	Adaptive histogram technique has been ignored	Dehazing algorithm	Enhance contrast with a les-ser color distortion
10.	Reshma Lakshmi ,2013	Introduce color artifacts	Fuzzy technique	Enhance low contrast images
11.	Chen, 2013	Ignore the use of ada - ptive histogram equalization	Compositive contrast enhancement	Enhance local and global contrast
12.	Maragatham, G.,2013	Usage of adaptive histogram equalization has been ignored	Algorithm to model images using local contrast portion	Enhance low contrast image
13	Celik,2014	Spatial entropy based enhance-ment	Enhance the image of low contrast	Proves the effectivess
14.	Cao gand,2014	Decrease the intensity	Multi-scale image enhancement algorithm	Preserve local and global enhancement

5. CONCLUSION

This paper shows a review on the image enhancement techniques for refining images has been done. Furthermore a evaluation has been formed that express the different methods, features and their confines. As of the review, that the DBLA has neglected the use of guided image filter to reduce the problem of noise which will be presented in the image. Thus, in near future, we will propose the Illuminate normalization for removing the uneven brightness of the images as well as `Guided based image filter to preserve edges of enhanced images.

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