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PARAMETRIC ANALYSIS OF IMAGE PROCESSING INTENSIFICATION TECHNIQUES

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ABSTRACT

Image processing is one of the most significant area of multimedia applications and these applications can be establish almost everywhere in the modern world. Due to which, the number of people functioning with images is rapidly growing so that demand for image processing tools also grows. Image processing is a method to do some operations on an image in order to obtain an enhanced image or to take out some useful information from the image. Image enhancement is among the simplest and most interesting areas of digital Image processing. Basically, the thought behind enhancement techniques is to fetch out detail that is hidden, or simply to bring to light certain features of interest in an image. A familiar example of enhancement is when we raise the contrast of an image because "it looks better." It is essential to remember that enhancement is a very subjective area of image processing.

I. INTRODUCTION

Image enhancement is a process applied on an image in order to make it more suitable for certain applications. It is used to improve the visual effects as well as the clarity of image or to make the original image extra conductive for computer to process. Image enhancement process consists of a set of techniques that seek to improve the visual appearance of an image or to transfer the image to a form better suited for examine by a human or machine. Image enhancement is one of the most visually appealing and interesting areas of image processing. Image enhancement is basically modifying the explainable or perception of information in images for human viewers and providing improved input for other automated image processing techniques [1].

The main objective of image enhancement is to adjust attributes of an image to make it more appropriate for a given task and a specific observer. During this process, one or more attributes are modified. The selection of attributes and the method by which they are modified are specific to a given task. Moreover, observer specific factors, such as the human visual system and the observer's experience, will introduce a great deal of subjectivity into the choice of image enhancement methods. There are many techniques which can enhance a digital image without spoiling it [7].

II. RELATED WORK

Image enhancement process consists of a group of techniques that look for improving the visual appearance of an image or to change the image to a form which is better suited for analysis by a human or machine. It is

important to remain in mind that enhancement is a very subjective area of image processing. Improvement in quality of these degraded images can be achieved by using application of enhancement techniques. The work done by various researchers for Image Enhancement are discussed as follows:

Madhu suggested that the Adaptive histogram equalization created a better result, but the image is still not free from washed out appearance. The sharpness is deprived and the background information as well as the plane is still fogged and poor in contrast. Alpha rooting rendered the entire image in a dark tone. Even the outline of the clouds which was noticeable in case of histogram equalization is lost. Agaian suggested that the common no transform base enhancement technique is global histogram equalization, which attempts to change the spatial histogram of an image to closely match a uniform distribution. Histogram equalization suffers from the problem of being poorly suited for retaining local detail due to its global treatment of the image. It is also common that the equalization will excess enhance the image, resulting in an undesired failure of visual data, of quality, and of intensity scale.

Tang recommended global histogram equalization, which adjusts the intensity histogram to approximate uniform distribution. The global histogram equalization is that the global image properties may not be properly applied in a local context. In fact, global histogram adjustment treats all regions of the image uniformly and, thus, often yields poor local performance in terms of detail preservation. Therefore, several local image enhancement algorithms have been introduce to improve enhancement.

S. Sowmya, Roy Paily have investigate the implementation of brightness control, contrast stretching and histogram equalization algorithm on FPGA that have become a competitive alternative for high performance DSP applications [4].

III. IMAGE ENHANCEMENT TECHNIQUES

The enhancement methods can broadly be divided into the following two categories:

1. Spatial Domain Methods

In spatial domain techniques, we directly work on the image pixels. The pixel values are manipulated to bring the desired enhancement. Spatial domain is a techniques that are perform to the image plane itself and they are based on direct manipulation of pixels in an image. Spatial techniques are particularly helpful for directly varying the gray level values of individual pixels and so the overall contrast of the entire image [6]. But they normally enhance the whole image in the same manner which in many cases produces undesirable results. According to the operations on the image pixels, it can be further divided into two categories [3]:

(i) Point operations :

Point processing operations is the simplest spatial domain operation as operations are performed on single pixel only. Pixel values of the processed image depend on pixel values of original image. It can be given by the below expression, where

$g(x,y)=T[f(x,y)]$

Where, g is the output, f is the input image and T is gray level transformation in point processing as shown in the below fig1. The Point processing approaches can be classified into four categories as Image Negatives in which gray level values of the pixels in an image are inverted to get its negative image.

(i) Mask Operation

In mask operation, each pixel is modified according to values in a small neighborhood. In this we have to classify a neighborhood around every pixel (x, y) at which point we want to get the intensity value in the processed image and for doing this, it is not only the intensity value of that specific pixel but also the intensity values of the pixels close to that point which is around the neighborhood of that point. All of them take part in deciding what will be the intensity value at the corresponding location (x, y) in the processed image g.

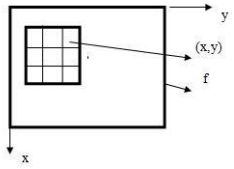

Fig1.Image showing point operation

(ii) Contrast Enhancement

There is a strong weight of contrast ratio on resolving power and finding capability of images. The techniques for improving image contrast are among the most broadly used enhancement processes. The range of any remote sensing detector is designed to record a wide range of brightness from black to white under a wide range of lighting conditions. Few individual scenes have brightness ranges that utilize the full range of these detectors. To produce an image with the best possible contrast ratio, it is important to utilize the entire brightness range of the display medium, which is generally film.

2. Frequency Domain Methods

In frequency domain methods, it is based on the manipulation of the orthogonal transform of the image rather than the image itself. Frequency domain techniques are suitable for processing the image according to the frequency content the image is first transferred in to frequency domain [5]. It means that, the Fourier Transform of the image is computed first. All the enhancement operations are perform on the Fourier transform of the image after that the Inverse Fourier transform is perform to get a the resultant image. These enhancement operations are performing in order to alter the image contrast, intensity, or the distribution of the grey levels [2]. As a consequence the pixel value (intensities) of the output image will be modified as per the transformation function applied on the input values. These methods improve an image f(x, y) by convoluting the image with a linear, position invariant operator.

The 2D convolution is performing in frequency domain with DFT. Spatial domain: $g(x, y) = f(x, y)*h(x,y)$

Frequency domain:

$G(w, w) = F(w, w)H(w, w)$

The usual transforms are discrete cosine transform, discrete Fourier transform, Hartley Transform etc. The transform domain enables operation on the frequency content of the image, and therefore high frequency content such as edges and other information can easily be enhanced.

IV. RESULT AND DISCUSSION

There are various fundamental step involved in image processing but in this paper image enhancement is applied [8,9]. The first scenario was very simple it is the image acquisition showing in the below figure that is the stage of involving pre processing function and taking out the image or acquiring the image and converted it into grayscale for better processing, also represent the intensity of the image. Acquired images have low contrast Classifying the image by gray-level pixels may decrease and simplify some image processing operations. Remove noises that are present in the image to make it suitable for computer vision by 2D median filtering as shown in the below figure. Image enhancement means bring out details that is obscured or basically to highlight certain features of interest in an image such as changing brightness and contrast so that the result is more suitable than original image. After performing the technique a signal to noise ratio (snr) and peak signal to noise ratios (psnr) has been calculated for each transformed image.

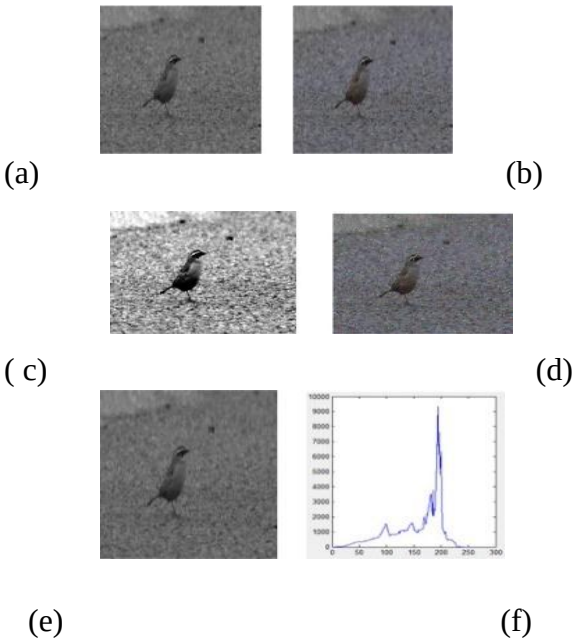

Fig1:- The results of image pre- processing applied to the image: (a) original image, (b) grayscale image, (c) image contrast, (d) noisy image, (e) image after removing noise, (f) histogram.

Table1: Table showing snr and psnr values of images after implementing image processing techniques

Types of images	snr	psnr
Original image	19.2217	33.3043
Grayscale image	20.5806	34.3585
Contrast improved	21.1921	34.0728

image		
Noisy image	20.7888	33.2871
Noiseless image	24.5806	60.3585

V. CONCLUSION

By using digital image processing, analysis of various images is more accurate as well as this method is efficient in terms of cost and time consuming compared to existing techniques, MATLAB software use for this analysis. Most of the techniques in image enhancement are useful for changing the gray level values of individual pixels and hence the overall contrast of the whole image. But they generally enhance the whole image in a uniform manner which in many cases produces unwanted results. There are various techniques available which create highly balanced and visually appealing results for a variety of images with different qualities of contrast and edge information and it will produce acceptable result. The snr and psnr of transformed images determines the quality of the image and can be use for better results, here we can see that image after enhancing have the highest snr value.

REFERENCES

[1]. Gonzales, Rafael C. Woods, Richard E. "Digital Image Processing using Matlab" Second Edition. United States of America. Prentice Hall Publishing. 2008.

[2]. AchalaChathurangaAponso, Naomi Krishnarajah**"**Review on State of Art Image Enhancement and Restoration Methods for a Vision Based Driver Assistance System with De-weathering" 978-1-4577-1196-1/11/$26.00_c2011 IEEE.

[3]. Snehal .Mundhad ,Prof. V. K. Shandilya "Image Enhancement and Its Various Techniques" Volume 2, Issue 4, April 2012 ISSN: 2277 128X International Journal of Advanced Research in Computer Science and Software Engineering.

[4]. Ms. Seema Rajput, Prof.S.R.Suralkar "Comparative Study of Image Enhancement Techniques" IJCSMC, Vol. 2, Issue. 1, January 2013.

[5]. S.S. Bedi, Rati Khandelwal "Various Image Enhancement Techniques A Critical Review" International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 3, March 2013.

[6]. Raman Maini and Himanshu Aggarwal "A Comprehensive Review of Image Enhancement Techniques" journal of computing, volume 2, issue 3, march 2010, issn 2151-9617.

[7]. DiptiDeodhare, NNR Ranga Suri R. Amit "Preprocessing and Image Enhancement Algorithms for a Form-based Intelligent Character Recognition System" International Journal of Computer Science & Applications, vol II pp 131 144.

[8]. Marchand, Patrick Holland, Thomas O. "Graphics and GUIs with Matlab" United States of America. Chapman Hall/CRC,2003.

[9]. Stormy Attaway**.** "Matlab a Practical Introduction to Programming and Problem Solving" Second Edition. Elsevier Publishing 2012.

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