A Survey on Image Enhancement Methods

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Abstract

Image enhancement can be classified into different methods. Adaptive histogram equalization, histogram equalization, decor relation stretch, image adjust and image noise. Adaptive Histogram Equalization (AHE) is mainly used in image processing techniques and it is used to improve the contrast in the images. Histogram Equalization is a contrast adjustment using the image histogram, it is usually increase the global contrast of each images. Apply the décor relation stretch to multi channel image. Image adjust is mainly focus on to adjust the contrast and quality of the image. Image noise is used to add the noise in an image.

Keywords: Binary preserving Bi-Histogram Equalization, Dynamic Random Separate Histogram Equalization, Recursive Mean Separate Histogram Equalization, Dynamic Histogram Equalization.

I. Introduction

Image processing is used in many applications like Gray scale modification, Earth sciences, Remote Sensing, Finger print identification etc., An Image is an array(or)matrix, of square of pixels arranged in rows and columns. Pixel is widely used in the term and it is denote the elements of an image. Image enhancement is process of images more useful. It is mainly used to improve the quality of images, removing noise from the images. HE is used to display the enhanced output images which are based on the original input image. The average image intensity level is 0 to 255. Image enhancement can be spitted into two different types:

1. Spatial domain
2. Frequency domain

Spatial domain

Spatial domain is direct manipulation of image pixels. It is a manipulation or changing the image representations and also it is used into many fields such as smooth and sharpening filtering images.

Frequency Domain

It is used to perform with based purely on convolution theorem and also it is used to change the image position. Image is in the form of frequency domain, the image is computed into Fourier transform.

The remainder of this paper is organized as follows: In section II we describe the different image enhancement methods. Section III describes the comparison results of enhancement methods and finally section IV concludes the paper.
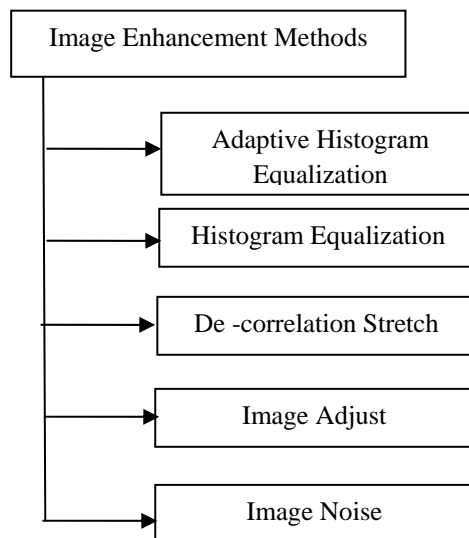

Fig.1. Types of Image Enhancement Methods

II. Image Enhancement Methods

1. Adaptive Histogram Equalization

HE is not suitable for consumer electronics because it could create most of problems. [1] Root Mean Separation is a brightness preservation technique. The preservation ranging is from 0 to 100%. The Dynamic Range value is changed at the output and also the output is based on the picture quality. Here different images having to produce different results. Frequency should be low when the uniform histogram distribution. It offers low frequency. Computation complexity is significantly reduced. Finally the DRSHE could utilize in consumer electronics like LCD and Plasma Display Panel (PDP) TV.

2. Histogram Equalization

Histogram equalization is broadly used in the field of contrast enhancement. [2] Proposed algorithm mainly focuses on the novel extension and also used to utilize histogram equalization. Ultimate goal is present the brightness value. In this paper newly developed one binary preserved histogram equalization is proposed. Many applications can be made up of the proposed algorithm. Main aim of proposed algorithm is to reduce the complexity.

[3] In this paper is referred to as the generalization of Histogram Equalization. Histogram equalization is not delivered a proper result in such applications. These paper is mainly proposes on brightness preservation techniques. Histogram equalization is significantly introducing the brightness of the image. The consumer electronics field can collect at variety of images is involved. Scalability is the most important property and adjusts the image quality. Ultimate goal of this Histogram Equalization is to allow higher level of brightness preservation. Future work of this paper is to lookout the effective implementation with the use of histogram equalization.

[4] Histogram equalization is a one of the useful technique, proposed method and also the comparison of some histogram equalization methods and enhances the contrast, preserve the image as brightness. Different Histogram equalization methods can be used in the images. Each picture is having their own ratio. Experimental results show that two methods M and D are given the best results.

[5] Propose a new method known as Brightness Preservation technique. This preservation technique can fulfill the requirement of aforementioned problems. To overcome this problem new mean brightness preservation is added. Each input image is carried out by sub histogram. Performance measure is calculated with the use gray scale preserved brightness images. Future work is recommended to introduce the new measure which is also used to evaluate the performance.

3. Decor relation Stretch

[6] Proposes a practical implementation approach of decor relation and linear contrast image enhancement technology in image processing. The main aim is to extend the medical imaging for visual interpretation such as cerebral.

[7] Proposes two pre-processing techniques are implemented. Both two methods are mainly used to improve the classification accuracy. Main aim of this method is to improve the interrupted images and also improve the classification results.

4. Image Adjust

[8] Proposed method is based on extensive experiment. This paper novel extension of aging scheme is extracted and also the automatic age is to be identified. Human age is estimated based on the genes. The face images patches at different intensity level. Future work is recommended to improve the accuracy.

[9] Proposes a new image enhancement method with it is based on the Non-sub Sampled Contour let Transform (NSCT). The proposed algorithm enhances the dynamic range of the image. We have proposed a novel algorithm for multi-scale image enhancement based on the NSCT and also the algorithm can be applied to gray-scale and both color images.

5. Image Noise

[10] Related work of this paper is related to partial differential equation based schemes for image processing may be easily incorporated in our framework.

[11]Film-screen mammography has been the most common and effective technique for the disease for breast cancer. Full-Field Digital Mammography (FFDM) is essential to increase the sensitivity of mammography. In our point of view the proposed methods of this paper is to minimize and avoid alcohol, exercise regularly and also take your supplements daily. Then only you avoid the breast cancer.

[12] This paper is mainly focus on canny edge detector and it is the most popular edge detection technique and also it is the one of the successful edge detector. Future work is recommended to investigate the computing those parameter using property of image such as histogram. New step is also used to increase the computational time. Incorporate peer group and neighbor group consideration can be used to improve edge detection performance.

[13] Proposes a plentiful algorithm is used to improve the quality of poor illumination image. Simulation result is purely based on the proposed algorithm.

III. Comparison of different enhancement methods:

This paper collected various image enhancement mechanisms for image processing. In this section the comparisons of various image enhancement methods have been listed. Table I shows the comparisons of various Image enhancement methods.

Methods	Advantages	Disadvantages
Adaptive Histogram Equalization	It contains low contrast and dark regions.	Won't work effectively.
Histogram Equalization	It is a most effective technique for gray-scale images.	But the color images it is a difficult task to work.
Décor relation Stretch	It is originated in the world satellite and aerial mapping.	It is a much complicated process then the other described site.
Image Adjust	It is used to adjust the image intensity at easily.	Not able to find the original image.
Image Noise	It is used to reduce the noise from an image easily.	While the dispensable image in low light.

Table I: comparison of image enhancement methods

IV. Conclusion

In this paper different image enhancement methods discussed in section II has been studied. And comparisons of those methods were presented in table1. Image enhancement methods have been applied to modify the images that have been accepted as a visual perception. Image Enhancement methods primarily applied for contrast the images. Histogram equalization which is used in the form of Cumulative Distributive Function (CDF). Among various image enhancement methods, histogram equalization provides better result for image contrasts.

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