Digital Image Enhancement Using Contrast Enhancement and Windowing Enhancement

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Abstract
The basic idea is to increase the range of the digital numbers in the image, meaning the distribution of the digital numbers of the image to include all the available range, which is from 0 to 255, so that it is There is a wide range of contrast between the image units, which facilitates the interpretation of the visual image and makes it clearer.
In this system, the algorithms (Contrast Enhancement) and the (Windows) algorithm were used because of their great impact in adjusting the lighting in dark images, in terms of clarifying their edges, clarifying their features, improving the image quality, and explaining which is better.
Keywords : Image Enhancement, Contrast Enhancement , Windows Enhancement, Increase the image values

Introduction

Contrast enhancement is the process that is performed on the image to increase the clarity of the desired details (features) in the image, since the human visual improvement system has a limited ability to detect and distinguish small variations in the intensity or color of the elements in homogeneous areas. These changes will be difficult to improve for this reason. Most contrast enhancement techniques work to enlarge the local contrast in intensity and color in the image. One of the side effects of this process is an increase in sharpness in the image, which leads to an increase in sharpness in noise, which will increase with increasing contrast. Fortunately, most contrast enhancement techniques depend on parameters that can be controlled manually. Experimentally and select them to get the best improvement.
A digital image includes a fixed number of pixels in rows and columns. A pixel is the smallest single element in the image and represents a fixed value of the brightness of a specific color. Normally, pixels are stored in the computer's memory as raster images or raster maps, which are small integers in a two-dimensional array [5]. After the image is converted into binary digital information, there is a huge amount of information, which also puts forward huge requirements for the transmission source, transmission medium, transmission means, and storage medium, which has also become a bottleneck problem in the digital communication field [6]. Contourlet domain conversion can separate multiscale analysis and direction analysis at the same time. Images are the most important information carrier in human social activities. According to the statistical results, about 75% of the information obtained by a person comes from visual images [7].

2. LITERATURE REVIEW

Image enhancement is playing important role in the field of image processing. This paper has a deal a review of the various types of enhancement techniques. Few techniques of image processing have been done which are not giving proper results. Most of the techniques are deal with the overall contrast adjustment of the image as they do the alter of grey levels value for every pixel. Depending on the application

field and comparison between the various techniques. we can select the appropriate enhancement technique. Here we just reviewed and study the theoretical part of signal processing. Also studied some signal enhancement techniques shortly.[1]

Salt and pepper type noise is removing with the help of fuzzy-based algorithms since various fuzzy filters can be designed for the removal of different types of noises. This concept was discussed by Sinha et al [2]. Bora was done the comprehensive as well as the comparative study [3]. The signal and various types of noises are discussed by the Sanford research system in [3]. Sangeetha and Kannan have reported the speech signaling with the digital filter in [4].

The objective from system :

1- The research aims to smooth digital images using stretch construct and Windowing Enhancement algorithm

2- It also aims at a method or a method that helps in further improving the display of the color image and smoothing it in a simplified manner.

The System importance

1- Increase the clarity of the image, by increasing the sharpness of the image and increasing the contrast

2- It works to preserve the edges of the image while improving the image

3- Focusing on the image separation that is in color gradations within the range of the three basic colors (R, G, B).

Methodology

The Fig 1 shows the steps for enhancing the image using stretch construct

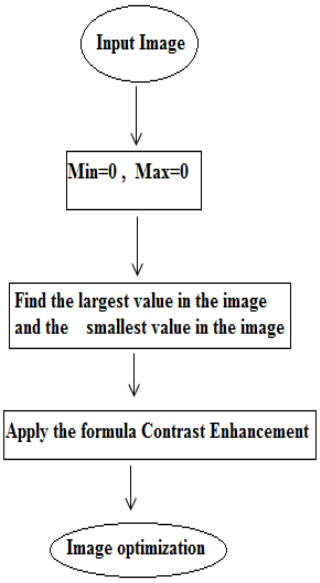

Fig. 1 shows the steps to enhance the image using Contrast Enhancement

The following equation shows image optimization using Contrast Enhancement

$$g(r,c)) = \left[\frac{g(r,c)-g(r,c)_{min}}{g(r,c)_{max}-g(r,c)_{min}}\right] (MAX - MIN) + MIN.$$

shows the steps for enhancing the image using Windows Enhancement 2 The Fig, 2

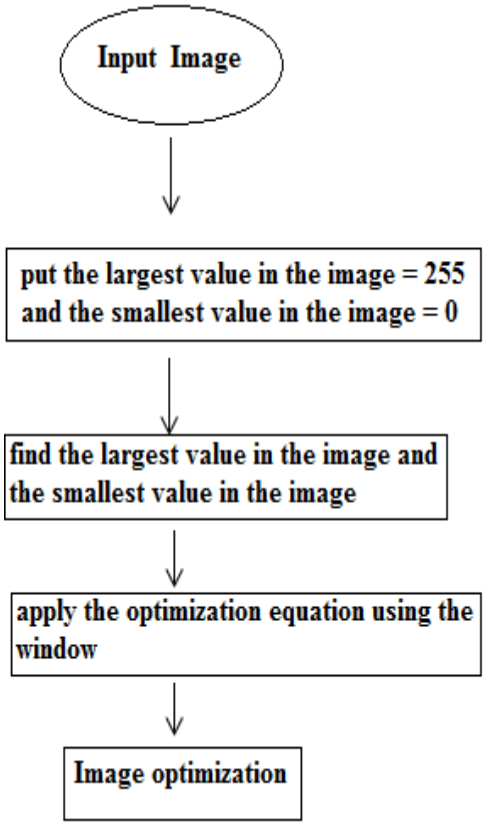

Fig. 2 optimizing the image using Windows

The following equation shows image optimization using Windows Enhancement

$$M(i) = D_{min} + (i - Imin)\left[\frac{Dmax - D_{min}}{I_{max} - I_{min}}\right]$$

Result

There are two images and want to apply an algorithm to them stretch construct and Windows Enhancement the following figures 3 and 4 shows the results.

Fig 3 The images to which the algorithms are applied

The following figure shows an algorithm implementation stretch construct and Windows Enhancement

Fig 4 Algorithm implementation using Contrast and Windows Enhancement

Conclusion

There are different types of image enhancement that we need to solve problems in processing digital images for the purpose of image clarity. In this system, the (Contrast Enhancement) algorithm and Windows were used. note that (Contrast Enhancement) is better than enhancing using windows Because the values are in the image Contrast Enhancement more than windows Enhancemen.

Reference

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