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Adaptive Image Quality Enhancement for Edge Detection

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ABSTRACT

In Restoration process an image is regenerated from damaged image. For the enhancement and restoration and contrast increments require pixel restoration and for this matrix proceeding method is used. In this paper for image enhancement method color enhancement, histogram equalization, color illumination, MRM, RPRM and co-variance based matrix enhancement for edge detection. In this paper the missing pixel is restored and recovered so that image is enhanced. After enhancement the edge is detected by using Sobel,canny and combine edge detection. The experiment is conducted on different images and PSNR and MSE is calculated. The result shows that the performance of proposed model is better. The images also shows that edges detected after enhancement is better than without recovery of images.

KEYWORDS:Contrast enhancement, Edge detection, Image enhancement, Noise elimination.

I.INTRODUCTION

Image enhancement intends to upgrade the nature of the photo which the detail of picture turns out to be more obvious and clear. It is imperative errand which can be utilized as a part of a few applications including the digital video, World Wide Web, scientific imaging and DVDs. At the point when huge pixels embedded in the image so as to improve the size of picture and the principle assignment is an upgrade of most up to date pixels from their surrounding genuine pixels. It generally required an alteration in picture measurements given by non-bury factor, as a 50% zoom where dimensions can be 1.5 times than genuine. There are a few motivations to be executed to resize a picture holding as most as conceivable of data it contains. Image enhancement is valuable in their diverse territories. With the measure of client based digital photographic, clients can hope to take much control over computerized or digital images. In addition, digital enhancement assumes a part to get the intimations and depictions in observation video and pictures. As HD TV innovation come the commercial center, and after that numerous engineers appreciate extensive enhancement algorithmic programs for see traditional most minimal definition programs on High Definition Television. Astronomica pictures take from tests and meanderers which have gotten an outrageous extreme lowest transmission rate, to make transmission with high resolution of data infeasible. In the field of medicinal imaging, the neurologists have a capacity to zoom their specific parts of cerebrum tomography pictures. A similar application has been occured when you need to build their resolution of picture while enhancing it utilizing digital imaging programming. To abbreviate the response time of browsing such web pages, pictures are frequently appeared in low resolution shapes. An improved higher resolution picture is just appeared if user taps on the corresponding thumbnail. In any case, this approach achine on demandt. To save storage space and communication bandwidth capacity it would be desirable if the low resolution picture is downloaded and after that enhanced on the user's machine.

II.EXPERIMENTAL METHOD

2.1 Matrix Recovery Method (MRM)

This method is used for the recovery of single pixel from the matrix. This method takes the image as matrix and takes variance of the image to recover the single pixel. This method can remove Gaussian noise or other type of noises.

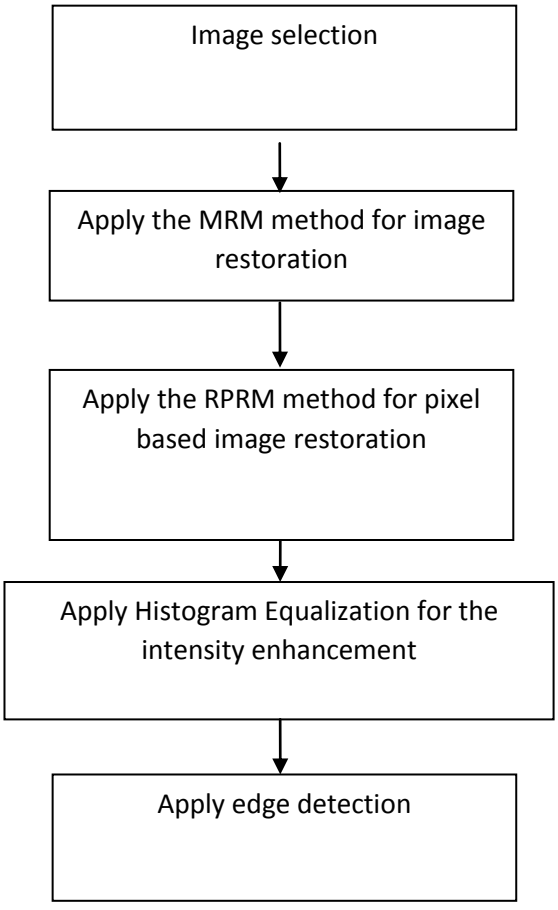
2.2 Region Pixel recovery method (RPRM)

In MRM single pixel are recovered but due to noise there is possibility that a region of pixels is missing for that RPRM is used that recover the region of pixel in the image. This method also take the image into matrix and run the iteration for all missing pixels. This method also take variance of the pixels in a big matrix. So that a region of pixels can be recoverd.

2.3 Enhancement of Image

This is done so that image is enhanced and result of edge detection comes better. In this firstly the intensity of the image is increased. Then by applying adaptive histogram the contrast of the image is increased. Adaptive histogram increased the contrast by using contrast-limited adaptive histogram equalization. Then the edges of the image is sharpen by using image sharpen method. This method enhanced the edges of the image.

In this paper the image is firstly restore for better edge detection. For this following steps are taken



2.4 Edge Detection

For edge detection two types of edge detections are used sobel and canny.

2.4.1 Sobel

A Sobel filter has two kernels, x-direction kernel and y-direction kernel. The x-direction kernel detects horizontal lines, and y-direction kernels detects vertical lines[1].

x-direction kernel (the size is 3x3)

```
floatkernelx[3]*[3] = {{-3, 0,3},
        {-2, 0, 2},
{-3, 0, 3}};
```

y-direction kernel

```
floatkernely[3]*[3] = {{-1, -2, -3},
                      {0,  0,  0},
                      {1,  2,  3}};
```

The gradient of the image is calculated for each pixel position in the image.

$$\sqrt{Gx^2 + Gy^2}$$

2.4.2 Canny edge detection

The Process of Canny edge detection algorithm can be broken down to 5 different steps:

1. Apply Gaussian filter for removal of noise
2. Find the intensity gradients of the image
3. Apply non-maximum suppression for detection of edge
4. Apply double threshold for detection of potential edge
5. Then eliminate edges which have less value

III.RESULT

Firstlychalange is to evaluate the performance of proposed method. In this paper the enhancement is done on different images. The results have been obtained in the form of resulting images and the performance parameters of image quality in the form of similarity and dissimilarity.

Figure 1: Image Enhancement results using MRM.

The above image (Figure 1) shows the results obtained afterMRM.

Figure 2: Image enhancement result obtained using MRM and RPRM.

The above result (figure 2) shows the result after MRM and RPRM.

Figure 3: Intensity increased image

Figure 3 shows the image after intensity increase.

Figure 4: adaptive histogram

Figure 4 shows the image after Adaptive histogram

Figure 5: image sharpen

Figure 5 shows the image after sharpen the edges

Figure 6: original image

The above figure 6 shows the image before the contrast enhancement which shows the darker image, the improved version of which has been shown in the figure 5

Figure 7: sobel edge detection

Figure 7 shows the result of sobel edge detection.

Figure 8:sobel and canny edge detection

Figure 8 shows the result of combined sobel and canny edge detection.

Figure 9: sobel edge detection without enhancement

Figure 9 shows the result without enhancement.

In this research work PSNR and MSE are used to measure the quality of an image. Peak signal to noise ratio (PSNR) and Mean square error (MSE) have been implemented in order to obtain some quantitative results for comparison of enhancement techniques. It is cleared from table values that the new and adaptive image enhancement method is giving far better results than any other technique. Hence, this combined method has been recommended over the existing models.

IV.CONCLUSION

The proposed model the quality of image is enhanced by using hybrid enhancement technique. The proposed method used the MRM and RPRM to restore the pixel than histogram, intensity increments is done for Image enhancement. Then in this image sharpening of edges is done for better edge detection. Then the edges is detected by using Sobel, canny and combination of Sobel and canny edge detection. The proposed model has been tested by using several images. The results have obtained in the form of peak signal to noise ratio and mean squared error. This is used to check the quality of image after enhancement of image. The result shows that that the proposed methodology is giving far better results than any other technique.

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