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Digital Image Processing Using Machine Learning

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ABSTRACT

Main aim of Digital Image Processing Using Machine Learning is to extract important data from images. Using this extracted information description, interpretation and understanding of the scene can be provided by the machine. Main point of image processing is to modify images in to desired manner. Image processing is called as altering and analyzing pictorial information of images. In our daily life we come across different type of image processing best example of image processing in our daily life is our brain sensing lot of images when we see images with eyes and processing is done is very less time.

Keywords : Digital Image Processing, Machine Learning, Gray Scale Image

I. INTRODUCTION

In existing system there are many techniques which are available for extracting information from images but there are no exact processing is defined. In proposed system we will come across different new techniques in Digital image processing. Color filter change the color of image Color filters are sometimes classified according to their type of spectral absorption: short-wavelength pass, long-wavelength pass or band-pass; diffuse or sharp-cutting; monochromatic or conversion. Gamma filtering matters if you have any interest in displaying an image accurately on a computer screen. Gamma filtering controls the overall brightness of an image. Images which are not properly corrected can look either bleached out, or too dark. Brightening images are sometimes needed, it's a personal choice. Sometimes printing needs a lighter image than viewing. Contrasting of images is certainly a complex processing. Instead of just moving all the pixels in the particular direction, we must either increase or decrease the difference between the set of pixelsGray scale filtering is in reference to the color mode of a particular image. A gray scale image would, in layman's terms, be a black and white image, any other color would not be included in it. This is so simple that it doesn't even matter that the color components are out of order. it is just taking the opposite color of the current component. This is resizing the width and height of the image without affecting any pixels of the image so that it does not affect the resolution of the image. Rotating or flipping is also referred to as creating a mirror of a image. This is done in a very simple way by calling the enums available in C#.To cut out or trim unneeded portions of an image is crop. This is just including any required things in the image. This is achieved by the Graphics object of the image.

Digital Image Processing is a rapidly evolving field with growing applications in Science and Engineering. Modern digital technology has made it possible to manipulate multi-dimensional signals. Digital Image Processing has a broad spectrum of applications. They include remote sensing data via satellite, medical image processing, radar, sonar and acoustic image

processing and robotics. Uncompressed multimedia graphics, audio and video data require considerable storage capacity and transmission bandwidth.

II. IMPLEMENTATION

Certain tools are central to the processing of digital images. These include mathematical tools such as convolution, Fourier analysis, and statistical descriptions, and manipulative tools such as chain codes and run codes. We will present these tools without any specific motivation.

Convolution

There are several possible notations to indicate the convolution of two (multidimensional) signals to produce an output signal. The most common are:
c= a⊗ b =a* b

We shall use the first form, c=a ⊗ b, with the following formal definitions.

In 2D continuous space:

$$c(x,y) = a(x,y) \otimes b(x,y) = \int_{-\infty}^{+\infty}\int_{-\infty}^{+\infty} a(\chi,\zeta)b(x-\chi,y-\zeta)d\chi d\zeta \qquad (2)$$

In 2D discrete space:

$$c[m,n] = a[m,n] \otimes b[m,n] = \sum_{j=-\infty}^{+\infty}\sum_{k=-\infty}^{+\infty} a[j,k]b[m-j,n-k] \qquad (3)$$

Fourier Transforms The Fourier transform produces another representation of a signal, specifically a representation as a weighted sum of complex exponentials. Because of Euler's formula:

$$e^{jq} = \cos(q) + j\sin(q) \qquad (7)$$

where 2 1 j =– , we can say that the Fourier transform produces a representation of a (2D) signal as a weighted sum of sines and cosines. The defining formulas for the forward Fourier and the inverse Fourier transforms are as follows. Given an image a and its Fourier transform A, then the forward transform goes from the spatial domain (either continuous or discrete) to the frequency domain which is always continuous.

Histogam-Based Operations

An important class of point operations is based upon the manipulation of an image histogram or a region histogram.

Frequently, an image is scanned in such a way that the resulting brightness values do not make full use of the available dynamic range. This can be easily observed in the histogram of the brightness values. By stretching the histogram over the available dynamic range we attempt to correct this situation

Equalization When one wishes to compare two or more images on a specific basis, such as texture, it is common to first normalize their histograms to a "standard" histogram. This can be especially useful when the images have been acquired under different circumstances. The most common histogram normalization technique is histogram equalization where one attempts to change the histogram through the use of a function b = f(a) into a histogram that is constant for all brightness values. This would correspond to a brightness distribution where all values are equally probable. Unfortunately, for an arbitrary image, one can only approximate this result.

Working Tools

1. Color Filter

Color filters are sometimes classified according to their type of spectral absorption: short-wavelength pass, long-wavelength pass or band-pass; diffuse or sharp-cutting; monochromatic or conversion. The short-wavelength pass transmits all wavelengths up to the specified one and then absorbs. The long-wavelength pass is the opposite. Every filter is a band-pass filter when considered generally.

2. Gamma

Gamma filtering matters if you have any interest in displaying an image accurately on a computer screen. Gamma filtering controls the overall brightness of an image. Images which are not properly corrected can look either bleached out, or too dark. Trying to reproduce colors accurately also requires some knowledge of gamma. Varying the amount of gamma filtering changes not only the brightness, but also the ratios of red to green to blue. We produce a new color array and take the colors from that as the respective components in the image. The input values range between 0.2 to 5.

3. Brightness

Brightening images are sometimes needed, it's a personal choice. Sometimes printing needs a lighter image than viewing. It is done just by adjusting the color components as per the user requirement. The input ranges between -255 and 255.

4. Contrast

Contrasting of images is certainly a complex processing. Instead of just moving all the pixels in the particular direction, we must either increase or decrease the difference between the set of pixels. We accept values between -100 and 100, but we turn these into a double between the values of 0 and 4.

5. Grayscale

Gray scale filtering is in reference to the color mode of a particular image.A gray scale image would, in layman's terms, be a black and white image, any other color would not be included in it.

Basically, it's a black and white image, the colors in that image, if any will be converted to corresponding shade of gray (mid tones between black and white) thus, making each bit of the image still differentiable

6. Invert

This is so simple that it doesn't even matter that the color components are out of order. it is just taking the opposite color of the current component. that is for example if the color component is 00 then the opposite we get is FF (255-0).

7. Resize

This is resizing the width and height of the image without affecting any pixels of the image so that it does not affect the resolution of the image.

8. Rotating and Flipping

Rotating or flipping is also referred to as creating a mirror of a image. This is done in a very simple way by calling the enums available in C#.

9. Crop

To cut out or trim unneeded portions of an image is crop. Here we perform this in 2 steps. First we mention the unneeded part as a semi transparent area. then as the users wish, we crop the image.

10. Inserting Text, Any Other Images and Shapes

This is just including any required things in the image. This is achieved by the Graphics object of the image

III. CONCLUSION

A Scientific & economical analysis of the quality of a image or any product whose quality depends on the color is developed. By using Research we are not only analyzing the product but also controlling the final product quality with the help of which one can check the quality of the image and can easily control the quality of the final product.So, this project can be a good tool in the hands of the business handler who are dealing with image Quality Product. Moreover, the accuracy of this is better than the manual process and above all the speed of operation is very high.

We have seen a few of the features of a good introductory image processing program. There are many more complex modifications we can make to the images. For example, you can apply a variety of filters to the image. The filters use mathematical algorithms to modify the image. Some filters are easy to use, while others require a great deal of technical knowledge. The standard tricolor images produced by the SDSS are very good images. If you are looking for something specific, we can frequently make a picture that brings out other details. The "best" picture is a very relative term. A picture that is processed to show

faint asteroids may be useless to study the bright core of a galaxy in the same field.

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